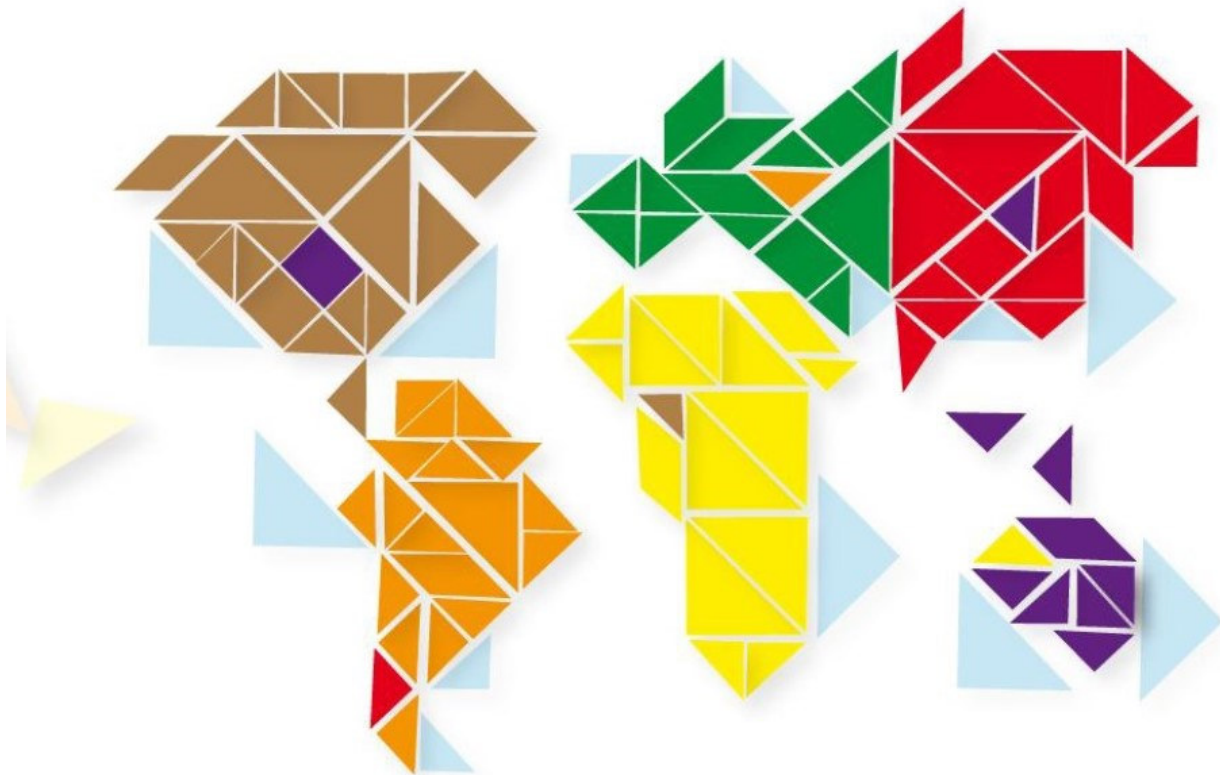


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PRESENTAZIONE DEL NUMERO 2/2022

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Questo numero di JUnCO raccoglie una selezione di contributi presentati nel 6° convegno biennale della rete CUCS (Coordinamento Universitario per la Cooperazione allo Sviluppo: <https://retecucs.it/>), rete universitaria che vede la partecipazione di 40 atenei italiani.

Il 6° Convegno CUCS, svoltosi a Trento dal 19 al 21 settembre 2019, è stato organizzato congiuntamente dall'Università degli Studi di Trento e dal Centro per la Cooperazione Internazionale di Trento. I Convegni CUCS nascono a partire dal mondo accademico, con una particolare attenzione ai giovani e agli studenti, e si rivolgono a tutti gli attori della cooperazione internazionale per facilitare la costruzione di reti, lo scambio reciproco, la sintesi di esperienze e concetti, lo sviluppo dell'innovazione.

Il tema della 6° edizione, “Cittadinanza e beni comuni”, è stato ispirato dalla continua evoluzione ed allargamento del concetto e della pratica della cooperazione allo sviluppo, a partire da uno sguardo che mette al centro la cittadinanza, nelle sue accezioni locale e globale, e la gestione dei beni comuni, questioni antiche che le dinamiche globali attuali e future pongono continuamente come nodi critici ed opportunità dello sviluppo sostenibile.

Il Convegno ha visto 4 sessioni plenarie, 18 sessioni parallele e workshop, una tavola rotonda e 2 *side events* serali. Vi hanno preso parte oltre 300 partecipanti provenienti dal mondo universitario, dalla società civile, dalle organizzazioni non governative, dagli organismi internazionali e dalle istituzioni nazionali e locali.

I contributi contenuti in questo numero sono solo una parte di quelli presentati al convegno, e riflettono bene la vivacità del dibattito svoltosi a Trento. Gli articoli restituiscono una descrizione di modelli di cooperazione e di progetti di sviluppo sempre più multisettoriali e multiscalarari, che adottano un approccio sistemico ed integrato verso l'obiettivo della trasformazione sociale, economica e ambientale, con particolare attenzione alla dimensione orizzontale delle relazioni. Questi modelli e progetti richiedono la partecipazione di diverse combinazioni di attori, e si basano su un proficuo e continuo dialogo fra professori e studenti, organizzazioni non governative, associazioni, enti ed istituzioni locali ed internazionali.

I 22 contributi pubblicati in questo numero (19 in lingua inglese, 2 in italiano, 1 in francese) sono organizzati in 5 sezioni tematiche, che riflettono una buona parte delle tematiche presentate nelle 18 sessioni parallele del convegno:

1. Water Environment & Food (8 articoli)
2. Students (5 articoli)
3. Health (3 articoli)

4. Innovation, Citizenship and Human Rights (4 articoli)

5. Anthropology and Development (2 articoli)

È da notare come tre di queste sezioni (1, 3, 4) siano sostanzialmente “tematiche”, cioè centrate su temi, a taglio interdisciplinare, che vengono affrontati nei contesti di cooperazione allo sviluppo. Gli articoli nelle altre due sezioni (2, 5) riflettono invece un punto di vista più che un tema, quello degli studenti universitari nella cooperazione internazionale e la prospettiva antropologica nei processi di cooperazione.

La varietà dei temi trattati in questo numero, fra cui gestione delle risorse naturali e dei beni comuni, conservazione ambientale e resilienza climatica, agricoltura sostenibile, legame fra cibo, acqua ed energia, salute pubblica e di comunità, salute globale, nutrizione, educazione alla cittadinanza globale, protezione e promozione dei diritti umani, rispecchia la vitalità e la complessità degli interventi di cooperazione universitaria, e rende conto della molteplicità delle soluzioni percorse e delle criticità individuate.

Per una lettura esaustiva di tutti i contributi presentati al convegno si può fare riferimento al Book of Abstract, scaricabile al sito https://event.unitn.it/cucs2019/it/#book_of_abstracts. Sono qui riportati gli abstract dei 97 interventi presentati in forma orale e dei 67 contributi presentati come poster, insieme a un breve profilo di ciascun relatore delle sessioni plenarie.

Grazie a una partecipazione ricca e poliedrica, il convegno ha consentito di sviluppare un proficuo dialogo intersettoriale sulla trasformazione delle pratiche di cooperazione allo sviluppo e sulle direzioni future da intraprendere a livello nazionale e internazionale.

Nel corso dell'ultima giornata del convegno sono state presentate in plenaria la sintesi dei lavori dei due giorni precedenti e si è tenuta una tavola rotonda istituzionale sul futuro della cooperazione allo sviluppo in Italia. I principali contributi sono stati infine sintetizzati in una declaratoria sugli aspetti da considerare nel prossimo futuro, letta a conclusione del congresso.

Questi Atti escono mentre siamo già rivolti al prossimo Convegno biennale CUCS che si svolgerà a Napoli nell'aprile 2022 e consentirà di ritrovarci dopo questo lungo e difficile periodo che ha sconvolto tutto il mondo e che ha avuto particolare ripercussioni sulle attività di cooperazione allo sviluppo e sui territori del Sud Globale.

Ringraziamenti

Il Convegno CUCS Trento 2019 è stato organizzato nell'ambito del progetto strategico di ateneo “UniTrento for Development” (UNITN4D) e con il contributo di Comune di Trento Casse Rurali, Agenzia italiana per la cooperazione allo sviluppo (AICS). Il Convegno è stato inoltre patrocinato da: Comune di Trento, Agenzia italiana per la cooperazione allo sviluppo (AICS), Ministero per gli Affari esteri e la Cooperazione internazionale, Conferenza dei Rettori delle Università italiane, Provincia Autonoma di Trento.

WATER SUPPLY MANAGEMENT IN RURAL TANZANIA: CHALLENGES, POLICIES AND PERSPECTIVES IN IRINGA REGION

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Abstract

This study provides an overview of the situation of rural water supply in Iringa Region, Tanzania. The changes in the legislative framework regulating rural water supply, the main challenges and strategies at local management level, the role of the private sector, and the conditions of monitoring and supervision plans are the main themes explored. As for the national policy and legislative framework, it aims at empowering local communities by decentralizing water management through the establishment of Community Owned Water Supply Organizations (COWSO), who are the entities entitled to operate, maintain and own water schemes. However, several challenges emerged at the local level, such as insufficient technical and managerial skills, lack of spare parts and difficulty in revenue collection.

COWSOs may delegate operational functions to private service providers, but the regulatory framework for public-private partnerships in rural water provision is unclear. Attention has been given to the Water Supply and Sanitation Act adopted in February 2019, which established the new Rural Water Supply and Sanitation Agency (RUWASA) and implemented a general redistribution of competences. This new institutional set-up seems to create a sort of *decentralized centralization* in which coordination lies with the centre whereas day-to-day activities are carried out by local water management entities.

Questo studio fornisce una panoramica sulla situazione dell'approvvigionamento idrico in area rurale nella regione di Iringa, Tanzania. I principali temi esplorati sono i cambiamenti nel quadro legislativo che regola il servizio idrico, le principali sfide e strategie nella gestione locale, il ruolo del settore privato e i piani di monitoraggio e supervisione. Rispetto alla politica nazionale e al quadro normativo, essi mirano a responsabilizzare le comunità locali decentralizzando la gestione delle risorse idriche attraverso l'istituzione delle Community Owned Water Supply Organizations (COWSO), uniche entità autorizzate a gestire, mantenere e possedere gli schemi idrici. Tuttavia, sono emerse diverse sfide a livello locale, tra cui insufficienti capacità tecniche e gestionali, mancanza di pezzi di ricambio e difficoltà nella riscossione delle entrate.

Le COWSO possono delegare parte dei propri compiti a soggetti privati, ma il quadro normativo per i partenariati pubblico-privato nella fornitura idrica rurale è incerto. È stata svolta un'analisi del recente Water Supply and Sanitation Act, approvato nel febbraio 2019, che ha istituito la nuova Rural Water Supply and Sanitation Agency (RUWASA) e ha attuato una redistribuzione generale delle competenze. Questo nuovo assetto istituzionale sembra creare una sorta di *centralizzazione decentrata* in cui le funzioni di coordinamento vengono esercitate a livello statale mentre le attività quotidiane sono svolte da enti gestori a livello locale.

Keywords

Community-based organizations, decentralization, rural water supply, water governance, water policy

Introduction

The paper aims to give an overview about the situation of rural water supply in Iringa region, with specific attention to Community Owned Water Supply Organizations (COWSO), the related implementation policy, their institutional and strategic role and the main challenges arising in the provision of water services for human consumption in rural areas. This topic has been explored in a composite way as it includes an assessment of the COWSO policy implementation in the region, the involvement of the private sector into water supply management, and the monitoring and supervision procedures carried out by both District's authorities and Management Entities (MEs) of the water schemes. Moreover, it provides an outlook over the latest news in the legislative framework regulating the sector.

The dynamics connected to the water management decentralization are particularly relevant to the Tanzanian context as they result in many challenges such as the transfer of all managing costs to local entities, the lack of know-how and training at the local level, the development of *elite capture* dynamics and the presence of a legal pluralism favouring the state law over customary, informal and religious laws (Nkonya, 2008). The decentralizing process needs to ensure the sustainability of rural water management also by constructing a supportive policy framework for the involvement of the private sector, by revising the cost-recovery policy to ensure that low-income households can benefit of the water services, and by putting in place a suitable Management Information System to monitor and supervise the whole process and intervene accordingly (Giné & Pérez-Foguet, 2008).

This study carries on a research project started in 2015 by two students from University of Turin in cooperation with the NGO Lay Volunteers International Association (LVIA), that conducted an empirical study on COWSO strategy implementation, private sector participation and monitoring systems in Dodoma Region (Fierro & Nelaj, 2015)¹. Investigating similar themes, this new research focuses on Iringa Region, in which LVIA has recently completed the SANI project². The study benefited from the long-term experience of LVIA in the water and sanitation sector, which dates to its first projects in 1967 in Kenya and then in Tanzania in 1986. Looking at the international cooperation framework, it is essential to underline the relation of the topic to the Sustainable Development Goals of the 2030 Agenda. Not only is rural water management relevant within the framework of the SDG 6, namely aimed at “*Ensuring availability and sustainable management of*

¹ Both of the researches were carried out within the Uni.Coo project promoted by the University of Turin in cooperation with several local NGOs such as LVIA

² The project, whose Italian acronym is SANI and full name is “MAISHANI - Maji na Lishe, *Integrated Project for the Right to Water, Health and Nutrition in Dodoma and Iringa Regions – Central Tanzania*”, is co-financed by the Italian Agency for Development Cooperation (AICS).

water and sanitation for all”, but the importance of good water management is also mentioned in several other Goals in which water is present in a transversal way (United Nations, 2019).

Legislative and policy framework

In this paragraph, some aspects of the policy context will be presented in order to provide a better understanding of the considerations following the data analysis and a clearer idea of the cornerstones of the subject matter. In the period 2015-2018, no significant changes have been introduced in terms of water policies; therefore, we will not reiterate the broad and deep analysis of the national policies and of the administrative set-up carried out in the 2015 study mentioned in the *Introduction*, which clearly depicts the situation and is still up-to-date (Fierro & Nelaj, 2015, p. 16). Attention will also be paid to the process of reform of the rural water supply sector initiated by the Government, whose reference regulation, the new Water Supply and Sanitation Act, no. 5 of 2019, was approved by the Parliament of Tanzania in February 2019. Clearly, it does not affect the object of our analysis as, at the time of data collection, the Water Supply and Sanitation Act, no. 12 of 2009, was the legally binding act regulating the sector.

The regulation of the private sector in rural water management

A field of the legislative and policy framework which deserves particular attention is the one regarding the relations between public and private actors in the rural water supply system. The starting point of a long reform process towards the current policy perspective is the 1991 *National Water Policy* (NAWAPo): here, the role of private actors is almost unrecognized (MOWI, 2018) and the Government is identified as the sole investor and manager of water projects and service delivery (Arvidson et al, 2006). Then, in 2002, the new NAWAPo introduced a different paradigm, according to which the Government would have played the role of the regulator, facilitator, and coordinator alongside other actors, including development partners and private sector, whose participation was emphasized and highly encouraged at all levels of water projects design and implementation and service delivery (Ministry of Water and Livestock Development, 2002, para 4.3).

In the same way, the *Water Sector Development Programme 2006-2025* (WSDP I) mentions private operators among the key actors to be involved in the implementation and management of water facilities and in some steps of the water supply chain (MOW, 2006, p. x). Also, the document recognizes the weakness of the private sector - especially in relation to rural settings - and its inexperience with the requirements and features of community management: thus, it calls for a

positive impulse in terms of capacity building and quality assurance of these partners (MOW, 2006, para. 1.4.7).

Later, in 2014, the WSDP II (2014-2019) presents the role of private operators in rural water supply sector: here, Public-Private Partnerships (PPP) are considered a viable tool to achieve sustainability and autonomy of water service, also because the private sector has been often found more able to collect revenues, gather funds and manage them. Nevertheless, the document recalls the lack of expertise underlined some years before in WSDP I. Moreover, the risk of excessive profiteering for private operators to the detriment of local communities is foreseen as possible.

As for the legislative framework, if we go through the main regulatory source of the sector, the 2009 Water Supply and Sanitation Act (WSSA 2009), we can find some references to the involvement of private operators. First, among the fundamental principles, the promotion of PPPs is mentioned for the provision of water supply and sanitation services (URT, 2009, s. 4(1)(f)). Then, the WSSA 2009 states the responsibilities of the central government in the implementation of such a prescription: on one hand, to the Prime Minister's Office – Regional Administration and Local Government (PMO-RALG) is assigned the role of creating “*a conducive environment for community and private sector participation in (...) water supply and sanitation services*” (URT, 2009, s. 6(d))³. On the other, in the performance of its responsibility to regulate COWSOs' activity, the Minister of Water and Irrigation (MOWI) has the precise duty to “*provide guidelines (...) for the arrangements for entering into agreements with the private sector as service providers*” (URT, 2009, s. 38(a)).

Overall, apart from some very general references to private sector involvement, we can observe the actual absence of an *ad hoc* regulatory framework with the related ancillary tools, such as specifically designed national guidelines for PPPs in rural water supply⁴.

³ A conducive or enabling environment can be defined as “*a set of interrelated conditions – legal, organisational, fiscal, regulatory, informational, political and cultural – that impact on the capacity of partners, including national governments, donors and NGOs to engage in developmental processes in a sustained and effective manner*”. Definition taken from Lockwood, H., Casey, V., & Tillet, W. (2018, October). *Management models for piped water supply services*, Aguaconsult & WaterAid. p. 55, (adapted from Thindwa, J., (2001), *Enabling environment for civil society in CDD projects*, Washington, DC: World Bank)

⁴ Note that a general regulatory framework for PPPs already exists; under the *National Public Private Partnership (PPP) Policy, 2009*, the *Public Private Partnership Act, 2010* (as amended in 2014 and 2018) and the connected *Regulations* (2011 and 2015) have been issued. Precisely, in the *Water Supply and Sanitation (Registration and Operations of Community Based Water Supply Organisations) Regulations, 2019*, s. 30(1), we find an indirect reference to Part X of the *Public Private Partnership Regulations, 2015*. Noteworthy, the *Water Supply and Sanitation (Registration and Operations of Community Based Water Supply Organisations) Regulations, 2019*, s. 30(2), envisage the possibility for the Rural Water Supply and Sanitation Agency, upon consultation with the MOWI, to “*develop a framework for appointment of service providers by a community organization*.”

The new Water Supply and Sanitation Act, 2019

As previously mentioned in the analysis of the legislative framework regulating rural water supply, in early 2019 the Parliament of Tanzania approved the new *Water Supply and Sanitation Act* (WSSA 2019), which replaces the homonymous Act in force since 2009 (WSSA 2009).

Thus, in the following paragraphs, the new legislation will be briefly presented, considering only those provisions linked to the topic of this research.

Rural Water Supply and Sanitation Agency (RUWASA)

The most striking innovation in the institutional setting is the creation of a new entity, the RUWASA, which will be responsible for the provision of

sustainable potable water in rural areas through resource mobilization, project implementation, capacity building and operation and maintenance of project with the active participation of major stakeholders (World Bank, 2009).

This Agency will be in charge of the development and sustainable management of rural water supply and sanitation projects and will perform several functions, such as carrying out the design and implementation of rural water supply projects, monitoring and evaluating the performance of community organizations (CO), providing financial and technical support to COs, advising the Minister on issues related to rural water supply and sanitation, facilitating training and capacity building to COs and so forth (URT, 2019, s. 43(2)).

With regard to the administrative structure of RUWASA, it will be managed by a Board of Directors, representative of various stakeholders involved in the rural water supply sector: besides the Director General, appointed by the MOWI after the recommendation of the Board of RUWASA, and the Chairman, appointed by the President of Tanzania, there will be six members from several institutions holding interests and competences in rural water supply (URT, 2019, III Schedule, s. 1(2)).

Then, it is relevant to underline that RUWASA is incorporated in the pre-existing institutional set-up and it is invested with several responsibilities, which were formerly given to other institutions. *Figure 1* below displays an essential representation of how RUWASA is included in the new set-up, compared with that outlined by WSSA 2009.

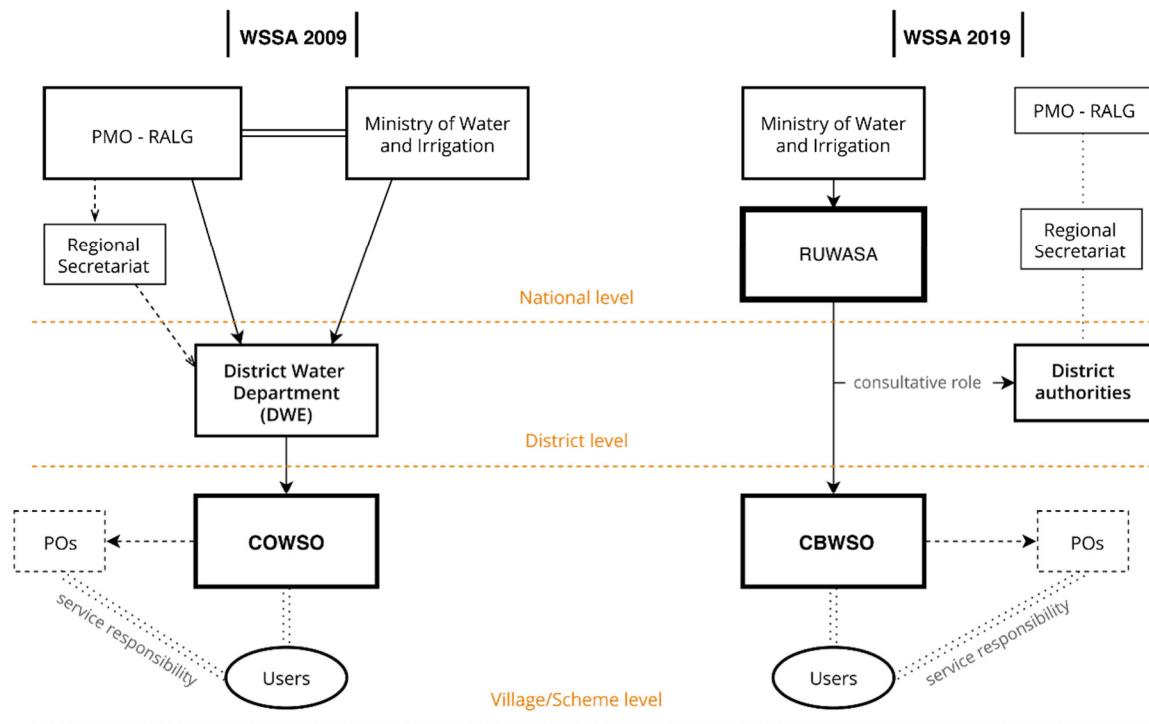


Figure 1. WSSA 2009/2019 Institutional framework

First of all, it assumes all the duties previously attributed to local government authorities (LGA) in relation to community organizations⁵, with the responsibility for RUWASA to submit plans and operational informative reports to full Councils and to Regional and District Administration forums (URT, 2019, ss. 48(h) and 49). Moreover, the new Agency will be responsible for carrying out monitoring and regulation of community organizations, while this function was previously vested in the Minister of Water and Irrigation; interestingly, among the various duties transferred to RUWASA, it is no longer present that of providing guidelines and approving tariffs chargeable for the provisions of water supply services, which disappears from the new Act^{6, 7}. On the other hand, the WSSA 2019 addresses the important issue of monitoring and regulation of COs, establishing that RUWASA shall provide guidelines for such purposes. Finally, the reporting system is also innovated as the executive organs of the community organizations will have to submit to the Agency reports regarding “performance of the scheme, functional and non-functional water points, major breakdowns and financial affairs of the community organizations” (URT, 2019, s. 34(5)).

⁵ See *WSSA 2019*, ss. 47-48, and *WSSA 2009*, ss. 39-40

⁶ See *WSSA 2009*, s. 38(1)(e), and *WSSA 2019*, s. 41(1)

⁷ Notwithstanding the fact that, apparently, the *WSSA 2019* does no longer provide any support or control in the determination of tariffs for rural water supply, these duties have been indirectly reintroduced and assigned to the RUWASA by the *Water Supply and Sanitation (Registration and Operations of Community Based Water Supply Organisations) Regulations, 2019*, s. 26: “(1) The community organisation shall propose water tariff and other charges in accordance with the guidelines for tariff setting developed by RUWASA. (2) Water tariffs and other charges shall be approved by the Board of RUWASA.”

RUWASA will also have a role in the establishment process of new community organizations, as it will replace the LGAs in the provision of assistance in drafting the Constitution or Memorandum of Agreement of the organization. Likewise, it will be responsible for the approval of the Constitution, whereas the LGA will only be consulted (URT, 2019, s. 34).

Furthermore, a completely new power will be vested in RUWASA, which will be entitled to evaluate the optimal size of community organizations and, where necessary, to cluster existing COs “in order to achieve efficiency and economies of scale” upon consultation with respective COs and other relevant authorities (URT, 2019, s. 36). In this regard, the nature of this new possibility is inherently connected to a top-down approach, as the initiative of this merger belongs entirely to the RUWASA (GOT, 2019, ss. 32-39).⁸

In conclusion, RUWASA will supervise the arrangements between COs and private service providers by approving the terms of any agreement and its subsequent amendments (URT, 2019, s. 37).

Similarly, the other relevant shift of responsibilities regarding rural water and sanitation services is that from the PMO-RALG to the Minister of Water and Irrigation: this change mirrors the new institutional set-up, according to which RUWASA will take over many functions previously given to local government authorities.⁹

New governance structure of COWSOs

Another significant innovation introduced by the new WSSA regards the Community Owned Water Supply Organizations.¹⁰ The governance structure has been redesigned as shown in *Figure 2*; the single governing body¹¹, executive organ of the community organization, will be replaced by two separate boards, the *Community Water Committee* and the *Community Water Management Team*.

⁸ It is important to underline that this provision is completely different from that of clustering the demand of services by cooperating among management entities: in that *bottom-up* process, the single ME retains its full autonomy in deciding to invest part of its funds for a more efficient service provision. For further details, see Mangione R., Pozzobon C., (2019), *Rural Water Supply Management: a focus on COWSO strategy implementation, private sector participation, monitoring systems and performance of the water schemes in Iringa Region – Tanzania*, p.27.

⁹ Compare WSSA 2009, ss. 5-8, and WSSA 2019, ss. 5-8

¹⁰ In WSSA 2019 they have been renamed as “community-based water supply organizations”

¹¹ In WSSA 2009, s. 33(3): “[Management] Board” or “Committee”

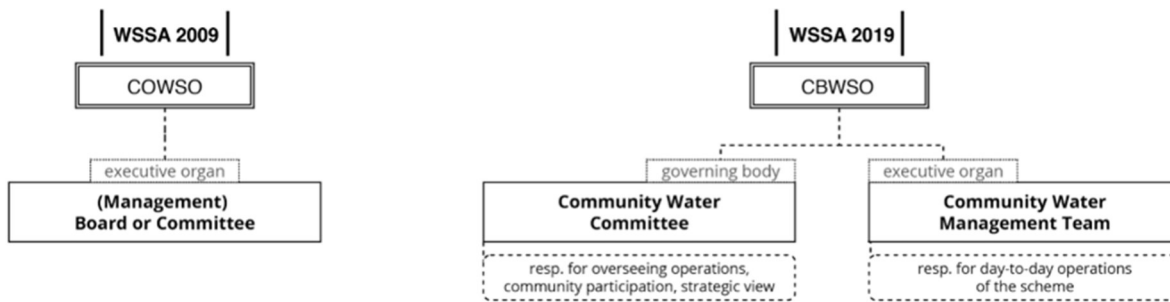


Figure 2: WSSA 2009/2019 COWSO management structure

The first is the governing body, responsible for overseeing its operations, mobilizing and sensitizing community participation in water management and, in general, determining actions aimed at facilitating the proper exercise of every function (URT, 2019, s. 34(3), and II Schedule, ss. 2(h) and 3(2)). It is composed by a Chairman and seven members, giving voice to various categories of stakeholders¹², elected by the members of the Organization, plus the Supervisor of the Organization, recruited on a competitive basis. Differently, the executive organ, responsible for day-to-day operations, will be the Community Water Management Team (URT, 2019, s. 34(4)), whose limited dimension and composition reflect its operative role of technical guidance of the water service provision. Its members are the Supervisor and the Treasurer - for each of which a standard minimum level of certified expertise has been clearly set – plus any other person belonging to the staff as the Organization deems necessary (URT, 2019, II Schedule, s. 4).

General remarks on the Water Supply and Sanitation Act 2019

We can observe that the reformed Act attempts to address some of the main challenges faced in the rural water supply.

First, the establishment of RUWASA and the rearrangement of competences aims to create a sort of *decentralized centralization*, in which supervision, coordination, and strategic planning lie with the centre, whereas day-to-day operation and service provision are carried out by community-based organizations. This model should allow overall better coordination of rural water services managed locally and supervised and supported by the national level. Such a framework hopefully overcomes the fragmentation determined by the previous conferral of many powers to local government authorities.

Then, the *two-tier* management model of community organizations – whose board is split into governance layer and executive layer – targets the issues of technical capacity of the members and

¹² Namely, educational and health institutions, Village and Ward Executive Officers, women, water users and one counsellor, see *WSSA 2019*, Second Schedule, s. 3(1)

representativeness of the various stakeholders of the water scheme area, mirroring the complexity of rural water supply sector with quite a simple management model. As regards the certified standard level of expertise required to become members of the Community Water Management Team, it can guarantee the presence of well-trained staff. Conversely, it may be not always easy to find such professional profiles for all the local schemes.

Finally, the newly adopted law targets the problem of the offences against waterworks and systems which undermine the service supply with a repressive approach, as the increased penalties are clearly aimed at discouraging misbehaviours.

Alongside the analysis of the policy and regulatory framework, a field research has been developed to understand to what extent and with which concrete actions those prescriptions have been implemented in Iringa Region. In the following sections, the methodology and some of the results of such study will be presented.

Methodology

In our research, we adopted an integrated methodological approach that joined together quantitative and qualitative aspects. The data collection was carried out between June and September 2018, whereas the analysis of the legislative sources considers all the documents released up to November 2019. The questionnaires used were drafted along the lines of the ones used in 2015 in the research investigating the same topics in Dodoma region. This choice was made together with LVIA in order to have comparable data and results.

These questionnaires were used to collect the data by conducting interviews and survey interviews at the two different administrative levels that are responsible for the implementation of the rural water supply policy. Interviews were carried out on one hand, with the representatives of the District Water Departments, which hold a coordination role, in Iringa, Kilolo and Mufindi Districts and in Mafinga and Iringa Municipalities. On the other, the local Management entities operating at Village level, where day-to-day operational activities are carried out, were interviewed.

The first questionnaire, which included 52 questions (39 closed-ended and 13 open-ended), targeted the District level; the main interlocutor was the District Water Engineer, often accompanied by another officer from the District Water Department (DWD) such as the DWE assistant or the technician of the DWD. The questionnaire was used as an outline for an interview with the DWE and the data were recorded in tables, which were prepared in advance. At the end of the planned set of questions, we left some space for an open discussion about the main challenges and the strategies that the District puts in place to face them. This questionnaire was divided into four sections:

COWSOs formation & registration, Private sector involvement in the water supply system, Monitoring and Supervision, Cooperation among management entities.

The second questionnaire, composed of 25 questions (19 close-ended and 6 open-ended), was submitted to the water management entities in the villages and to the water users. The first 20 questions were addressed to the members of the water management entities and were used as an outline for conducting survey interviews. The last 5 questions, on the other hand, directly targeted water users and they were handed out to random people met at the water distribution points (DPs). At the end of the survey interviews, some time was dedicated to the main challenges that the management entities face and the strategies they put in place to deal with them. This second questionnaire was structured around the features to be included in the construction of a performance indicator, which was one of the goals of the research.

This performance indicator was constructed as a monitoring tool by LVIA and the two students that carried out the research in Dodoma region in 2015. The indicator was built on three sub-indicators, investigating the *functionality* of the schemes to verify whether they are able to provide water, their *stability*, which assesses the long run sustainability of the water scheme, and the *satisfaction* of the water users coupled with the transparency in the *communication* of information about the water schemes to all the relevant stakeholders. Each sub-indicator was built with a composition of two elements that received different weight in the calculation of the final value; to give more weight, the value was multiplied by two.

In particular:

1. The *functionality* sub- indicator [(DP)*2 + EM] included:
 - a. The percentage of functioning distribution points (DP) appropriately transformed on a continuous scale going from 1 to 5.
 - b. The existence of a bank account and/or bookkeeping activities for revenues and expenditures. This variable was called ‘Economic Management’ (EM) and took values 1 (no bank account nor bookkeeping), 2 (either bank account or bookkeeping) or 3 (both bank account and bookkeeping).
2. The *stability* sub-indicator [(S)*2 + ME] was formed by:
 - a. The amount of saved money divided by the total number of DPs. This variable ‘Savings’ (S) was then appropriately transformed in a continuous variable going from 1 (the minimum amount in the sample) to 5 (the maximum amount in the sample).
 - b. The type of management entity. This value ‘Management Entity’ (ME) took values 1 (PO without contract or Village Water Council or Village Government), 2

(unregistered COWSO - in the process - or PO with a contract with VG/Water Committee) or 3 (registered COWSO or PO with a contract with COWSO).

3. The *satisfaction/communication* sub-indicator $\{[(\sum_{i=1}^n \text{Sat}_i)/n]*2 + I\}$ was composed by.
- a. The opinion of water users on the water supply. This variable ‘Satisfaction’ (Sat) was measured by asking the selected water users their evaluation of the service provided on a scale from 1 (very bad) to 5 (very good).
 - b. The sharing of the most important documents and information about the schemes’ performance among different administrative levels. The variable ‘Information sharing’ (I) takes value 1 (no sharing), 2 (either internal or external sharing) or value 3 (both internal and external sharing).
 - c. ‘n’ is the number of water users interviewed

These sub-indicators all resulted in a number between 0 (lowest level) and 10 (highest level) and this aspect allows them to be easily comparable. The final water schemes performance indicator is calculated by summing *functionality*, *stability* and *satisfaction/communication* sub-indicators and dividing the result by three (basically an average of the three sub-indicators).

Data analysis

In this chapter, space is dedicated to the elaboration and interpretation of the collected data both at the district and village levels. The following *Figure 3* shows the geographical location of the studied villages in the Iringa Region¹³. The sample was composed of 5 Management Entities (MEs) per district with the exception of Iringa Municipality, that is a mainly urban area, where 2 MEs were visited. As a matter of fact, in this administrative subdivision, there is an Agent per water scheme that acts on behalf of the Water Authority which is based in Iringa City and serves the whole municipality; this makes the relationship between the MEs and the communities not comparable to the rest of the sample.

As a whole, in the five districts of the Region, 22 Management Entities were visited for a total of 87 villages covered by the water schemes.

¹³ Please note that the names on the map are conventional. They can be the names of the villages in which the interviews were carried out, those where the offices of the Management Entities (ME) are placed, or the ones of the Wards of the MEs. DPs stands for “distribution points”.

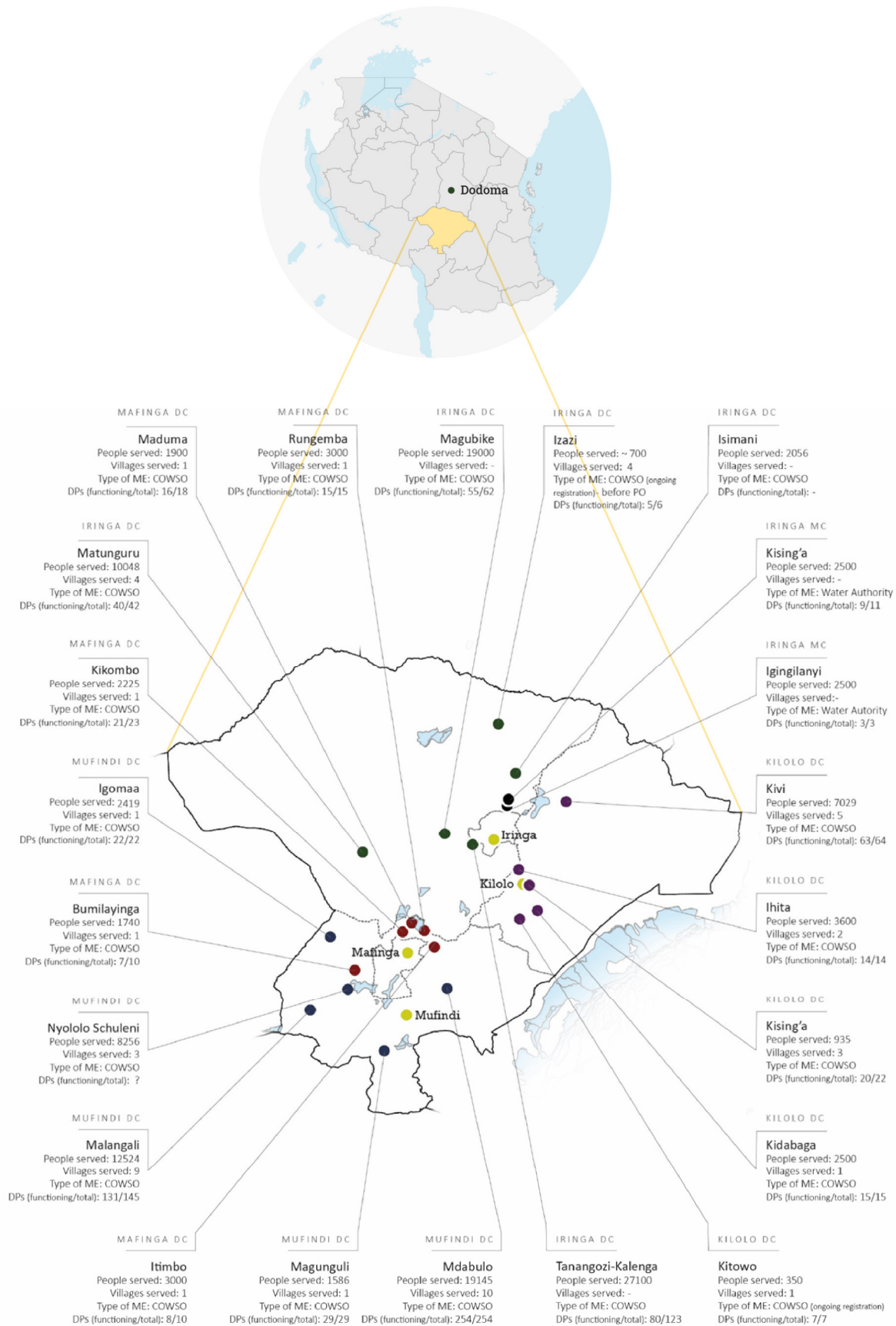


Figure 3. Geographical location of the sample

Looking at the main characteristics of Iringa region, it is located in the southern Highlands of the country bordering Dodoma, Mbeya, Morogoro, Njombe and Singida regions and its territory's elevation goes from a minimum of 900 m to a maximum of 2300 m above sea level. The overall availability of water resources in the region is quite high as it is home to the Mtera Dam and both the Little and Greater Ruaha Rivers and the large majority of water supply for human consumption is by gravity water schemes.

Moreover, Iringa presents a high percentage of fertile and arable land and agriculture accounts for 85% of the regional GDP. For this reason, it belongs to the Southern Agricultural Growth Corridor of Tanzania (SAGCOT), which represents the “food basket” of Tanzania (Chimilila, et al., 2017). Considering the demographic aspects of the region, according to the last national census of 2012, the people living in the region were 941238 and, even though Iringa is not the Tanzanian region with the highest rate of population growth, its population is growing at a rate of 1,2% annually and it is expected to double in the next 60 years. As far as the main economic activities characterizing Iringa region are concerned, as mentioned above agriculture is the most relevant sector (maize and beans and tea are the most cultivated products), followed by trade and repairs (contributing about 7,1% to the region GDP) and the livestock sector (consisting in 4,5% of the GDP). Administratively speaking, Iringa region is divided into three District Councils (Iringa District Council, Mufindi District Council and Kilolo District Council), one Municipal Council (Iringa Municipal Council.) and one town council (Mafinga Town Council). The Councils are further divided into urban wards, which are in turn subdivided into streets, and rural wards, which are composed of villages and hamlets (National Bureau of Statistics of Tanzania, 2013).

District data analysis

Main issues in COWSO policy implementation

All the District Water Engineers (DWE) underlined different problems hindering the successful implementation of the COWSO policy. First of all, the lack of financial resources; the allocated funds do not allow appropriate coverage of the costs that the District Water Department staff has to bear to reach the villages to follow and support the formation and registration process, as many are located in remote places. Also, the lack of well-trained staff and human resources is perceived as a major challenge.

As per the DWEs, another issue is the lack of awareness in some villages about the COWSO strategy and the negative local perception towards this alternative water management entity.

Villagers often do not understand the reason why they should establish a COWSO that would fix a price on water, while without it they can get water for free. Opposition from the Village Government, which does not want to give up on the control over water management, is also an issue. Lastly, a DWE underlined how this policy contains too many rules and technicalities that are too complicated for the villagers and so it is not welcomed favourably.

In order to face such problems and promote COWSO formation, the DWEs adopted different strategies, such as the provision of financial incentives, technical help or a new water scheme. Last, making sure to have a specific budget line for COWSO formation and registration, so that the resources are enough for the activity, is another strategy.

Private sector

As mentioned in the paragraph dedicated to the legal framework, the role of the private sector in the rural water supply is not thoroughly described or regulated. This fact also emerged during the data collection, as the majority of the DWEs (3 out of 4) showed to have little or no direct experience in dealing with private operators in rural water management. Nevertheless, all of them consider private involvement as a positive opportunity: they believe that private actors may guarantee better technical skills, faster decision-making processes, long-term sustainability (due to their business-oriented approach), and more effective revenue collection.

Monitoring and supervision

Through the analysis on the monitoring and supervision (M&S) plans and techniques put in place at the District level, our overall perception is that this dimension is not given adequate attention and funding. This topic was investigated by focusing on: the type of M&S (field monitoring, contact the schemes,...), the frequency of M&S activities, the kind of support provided to the single management entities, the reporting activities (from the ME to the District), and the sanctions and incentives connected to the report compliance. Only two of the four DWEs affirmed to have a monitoring plan at the district level, that include the obligation for every single water scheme to send periodic reports on the general condition of the scheme. However, such reports often fail to be prepared by the local water management bodies, resulting in poor overall M&S.

Field monitoring is the most commonly implemented form of M&S among the different district water offices (4 out of 4). On one hand, this choice is surprising as this modality of monitoring is quite costly both in terms of time and funds. In fact, it requires that the district officers physically

go to the villages' water schemes to check their conditions, problems and performance. On the other hand, a direct inspection of the sites by the district officers is the best way to verify their actual situation. Another form of monitoring detected within the area is to attend COWSO meetings and to invite their members to quarterly meetings at the district. Nevertheless, what emerged is that there are no overall standard procedures for monitoring as they are mostly carried out on scheme request or on an emergency basis. In fact, even the two DWEs who claimed to have pre-arranged monitoring plans affirmed that this activity depends much on the availability of funds, usually scarce. Focusing on the availability of funds for M&S activities, even if all the districts affirmed to dedicate a specific budget line to this aspect, not all of them proved to have pre-agreed criteria for the allocation of these funds. One interesting aspect is the way in which Iringa district manages these resources by following a Payment-by-Result (PbR) approach. Such a model aims at rewarding the best performing schemes with an incentivizing perspective. Within the M&S framework, the districts provide different types of support. All four districts carry out technical assistance to the schemes, three of them also give financial support and only one allocates specific funds for replacement material.

The DWEs were asked in an open-ended question to list three indicators of good management of the water schemes to investigate their awareness on what are the most important elements that make a water scheme function properly. Even though the other answers collected were all different, we organized them into three categories:

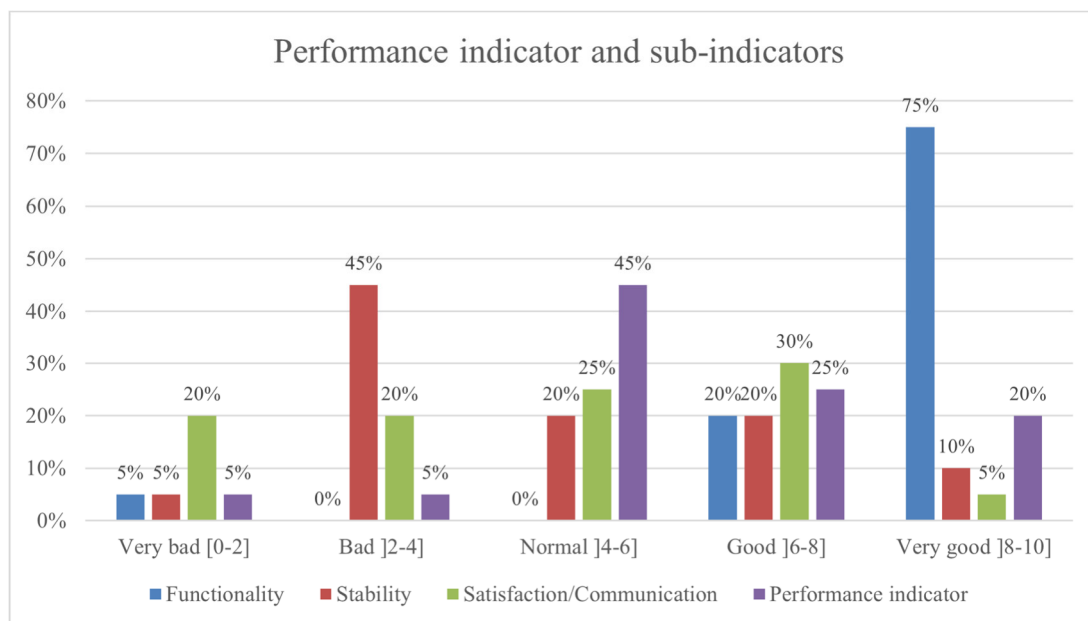
1. *Financial indicators*: having a bank account and implementing a good use of funds;
2. *Functionality indicators*: maintaining a good functionality of the scheme, having a skilled local technician and providing a satisfactory service to water users; and
3. *Participation indicators*: running the meetings both with the community and within the management entities in a proper way.

Such awareness showed that the problems in the planning and implementation of M&S activities are not linked to the lack of knowledge on the matter, rather to the absence or scarcity of financial, human and expertise resources to implement an effective M&S.

In conclusion, the monitoring and supervision approach that emerged in Iringa region resulted to be based on emergencies, losing its role of foreseeing and preventing major damages and problems of the water schemes in a long-term sustainability perspective. In fact, all the districts presented a systematic lack of standardized plans and consolidated procedures.

The data collected were used to calculate the performance sub-indicators and indicator (as explained in the *Methodology* section) and the results of the overall calculated performance of the

20 water schemes of the sample are shown in *Graph 1* together with the disaggregated data of the three sub-indicators.



Graph 1. Percentage frequency of the Performance indicator and sub-indicators of the sampled water schemes in Iringa region (20 water schemes)

What emerges is that 90% of the sampled schemes have a performance score which is “Normal” or higher, meaning that the majority of the observed local water management entities reach satisfactory levels of water supply management. However, only 20% of the schemes reach an optimal performance level, while the rest still present some critical aspects. These criticalities will be explored in the next paragraph, part of which is dedicated to the main challenges faced by the local water management entities.

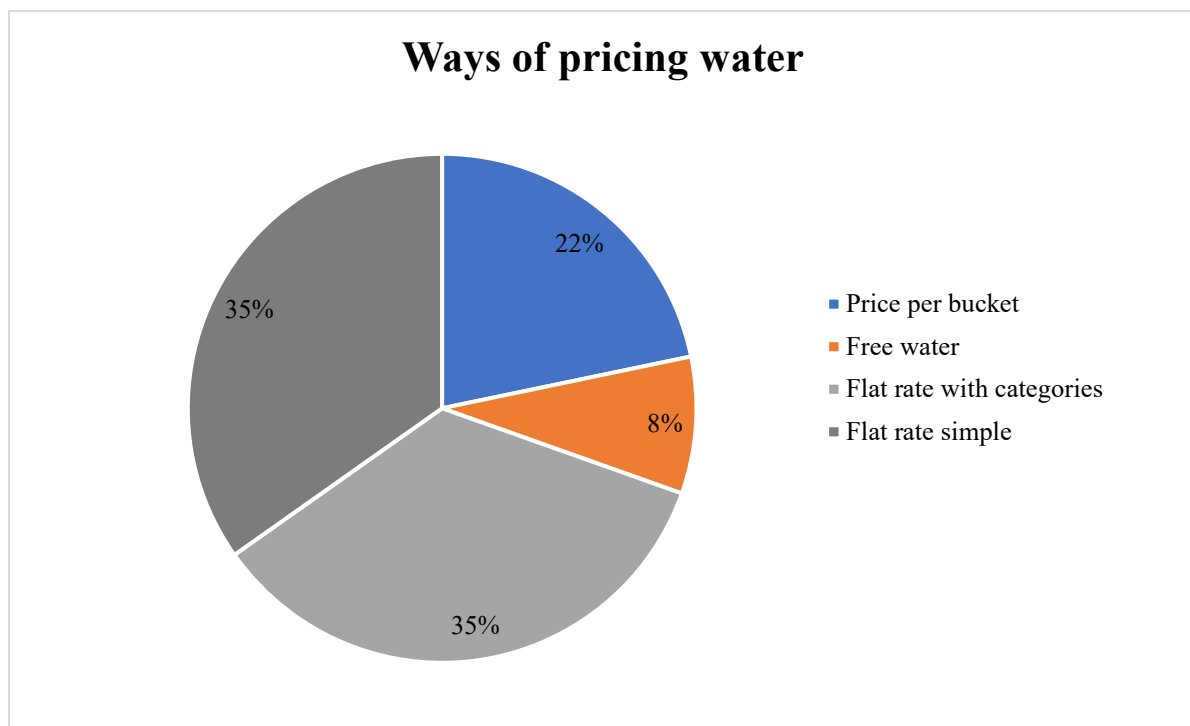
Data analysis at Village level

The collection of data at the Village level was mainly dedicated to gathering the information needed for the construction of the performance index. Nevertheless, we believe that there are three aspects that deserve to be reported and analysed in this research, as they contribute to enriching the understanding of the rural water supply system in the Iringa region. These three aspects that emerged during the interviews carried out with the 20 local water management entities are:

- the organization of the revenue collection in the villages;
- the main challenges faced by the local water management entities; and
- the strategies they adopt to solve them.

Pricing water: flat rate vs price per bucket

The field research detected two main ways of setting the price of water: on one side, there is the *price per bucket* method according to which the more water you use the more you pay. On the other, there is the *flat rate* system, namely a fixed amount of money that each water user pays on a specific time base (monthly, yearly,...) and so it leaves the users free to use different quantities of water for the same price. This second typology can be split into two sub-categories: on one side, there is a “*simple*” *flat rate*, which sets a single fixed amount of money for the village population. On the other side, there is the more complex *flat rate “with categories”*, which determines different tariffs for different types of users: for example, it can distinguish between public and private taps users, between people with different income, between the type of activity for which the water is used and more.



Graph 2. Ways of pricing water

Graph 2 shows that in Iringa region the majority of the schemes, 70% (green), adopt a flat rate system and only 22% (blue) use the price per bucket method. Looking at the average price of a bucket of water in the villages of the sample, we can see that it is 85,4 TZS, being the minimum price 20 TZS and the maximum price 500 TZS.

Then, there is an 8% (red) providing water for free and this percentage includes two water schemes: the first is run by an international NGO, which does not want the users to pay any money for water,

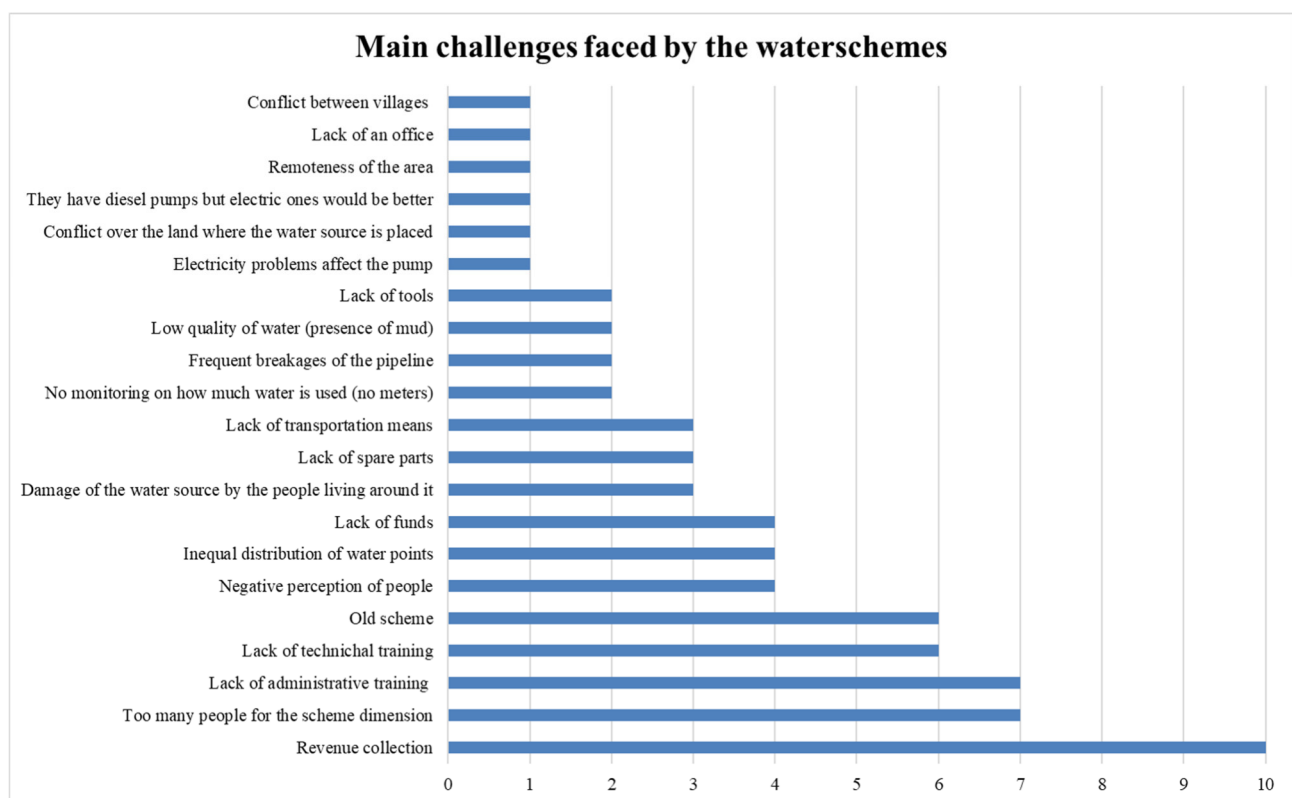
and the second was a very young COWSO, which was not yet sure about how to establish a fair price for water.

An example of a monthly flat rate with categories is that of Magunguli (Mufindi DC), where the tariffs are based on the type of economic activity that the users carry out; the more water is required for a specific activity, the more expensive is the rate.

Another interesting pricing model is that of Mdabulo (Mufindi DC) and Kising’ a (Kilolo DC), where tariffs are organized as a monthly flat rate with several categories, based on the expected capacity to contribute of the users (namely: households, persons unable to work, businesses, and institutions).

Main challenges faced by local water schemes

The main challenges in running the water schemes mentioned by the local management entities are shown in *Graph 3* below.



Graph 3. Main challenges faced by local water schemes (frequency)

In order to systematize the issues that the local management entities are more likely to face, we organized them into five categories.

First, a high number of entities cope with *financial problems* (a systematic lack of funds) mainly caused by the difficulty of carrying out an effective revenue collection. The main issue is that, as

before the establishment of the management entity people could access water for free from natural but often unsafe sources, people are now not willing to pay for water. In many villages, it is difficult to raise awareness about the importance of fetching water from secure sources and also about the necessary and unavoidable costs that are connected to the management of a water scheme which, in order to be sustainable over time, requires the contribution of everyone.

Secondly, scarce *training* has been frequently detected. On one hand, many water management entities stated that they do not have suitable knowledge in the administrative field (such as secretary and treasury skills). On the other, there is also poor technical expertise.

The third group of challenges is connected to the *structural problems* of the water scheme, which are sometimes very old and encounter frequent failures. Also, the dimension of the scheme is often not sufficient for the people living in the village and the water points are not equally distributed so that the distances to fetch water are depending on where the house is located. Another aspect is the inadequacy of the electric supply in the villages that hampers the normal functioning of the water pumps.

A further aspect is the one connected to the *technical issues* of the schemes. Frequently, there is a lack of spare parts and tools to be used in case of breakages and there is no way to monitor how much water is used as the water meters on the scheme are absent, not enough or not all functional.

Last, some management entities face challenges in dealing with the peculiar *geography* of the village and of the water source location, which are sometimes placed in remote and hardly accessible areas.

Solution strategies

An open-ended question was devoted to investigating whether the local water MEs have developed a set of strategies in order to solve the problems they face daily. Such solutions, which show the local ability to find creative answers in situations characterized by scarce resources, are:

1. The establishment of *fines and disciplinary actions* for those damaging and breaking the rules about water use and protection¹⁴.
2. *Education* of the village citizens on a series of matters connected to the rightful use of water. First, on the importance of using clean water for health and sanitary reasons. Secondly, on the raise of awareness on how the water management works and how it needs everyone to contribute to its functioning (especially in financial terms through revenues). Finally, on the

¹⁴ This aspect is often complicated, as the tightness of the interpersonal relations in the villages is very strong and so reporting, fining or punishing a member of the community becomes very costly in social terms.

environmental conservation and water source protection, to limit those human activities damaging the water sources.

3. *Encourage cooperation* among the villages served by the same scheme in terms of management and maintenance.
4. Attempt to *attract privates and donors* in investing in the water scheme.
5. Protection of the water source from human activities by *planting trees* around it.

Conclusions

The rural areas of the Iringa region can be overall considered a good gate for an understanding of several relevant features and critical aspects of rural water supply management in Tanzania.

As far as the legislative innovations carried by the new WSSA 2019 are concerned, such act introduces significant changes at all administrative levels involved in the water sector.

Clearly, the reform of the sector does not directly affect the object of this research, as it was approved some months after the data collection and the modifications described are currently being implemented. Nevertheless, it is important to acknowledge that the context observed is changing in terms of institutional set-up, responsibilities and powers of the actors involved, system of sanctions and so on. The relevance of the analysis of the legislative innovations, apart for giving an updated oversight of the legal framework as soon as it changes, lies in the fact that the reformed Act attempts to address some of the main challenges arising in rural water supply and seems to share some of the critical remarks of this research (e.g., as regards the issue of training or the lack of coordination and unitary vision over the sector).

Notably, the establishment of RUWASA renovates the institutional landscape and respective responsibilities of the various actors by introducing the model of *decentralized centralization* we previously discussed. Thus, it will require a strong commitment to making it reach all the entities operating at the margins of such a decentralized system but holding a key role in the national rural water policy. Similarly, it is clear that the deterrence measures, whose strength has been significantly increased in the newly adopted legislation, also require a set of actions aimed at improving awareness and a sense of responsibility to prevent the infringements of the rules adopted. This kind of approach implies that much attention must be devoted to fostering the sense of ownership of local communities over the water schemes so that social control can play its role in discouraging misbehaviours against such an essential common good.

Moving to the COWSO policy implementation strategy, this new management model introduced in 2009 to empower and involve communities in water supply management reached many rural areas

but with different degrees of success. Sometimes, the burden of bureaucracy and the lack of adequate resources can be a cause of the slow and uneven implementation of the COWSO model. Nevertheless, many local communities show a strong commitment to run water schemes independently regardless of the frequently adverse conditions and we encountered interesting ways of managing rural water supply, showing that community-based organizations can be effective.

Looking at the role of private actors, the actual absence of private operators in the Iringa rural areas offers the possibility to develop a system in which their potential can be harnessed for public welfare. The design of a flexible and clear regulatory framework together with the implementation of an effective control system and the provision of specific training to local COs could result in an involvement of the private sector able to safeguard the local communities and guarantee the public control over water resources and services.

Then, as far as monitoring and supervision plans and techniques are concerned, the higher administrative levels are well aware of their importance to guarantee the sustainability of the water schemes management. Nevertheless, little and discontinuous actions are undertaken in this regard, mainly because of a lack of human and financial resources. The same cannot be said about local MEs, which are not always aware of the importance of establishing M&S tools in the day-to-day operation of the schemes, as the DWEs affirmed that the reporting activity from the local management entities is very scarce or absent. Therefore, there is a need for stimulating the development and adoption of simple but efficient M&S practices, fostering an approach aimed at foreseeing and preventing technical and management problems. Generally speaking, more systematic guidance and the provision of even basic templates and training for monitoring activities are required.

As regards the main issues faced by the management entities, besides the overall chronic funding shortages, many of the difficulties stem from a lack of specific expertise that the activities require. In some cases, this limit was clearly and explicitly pointed out by the same members of the MEs, meaning that the sources of the recurring problems were clear, but the needed skills were not in place. So, this kind of awareness summed with a strong commitment to perform water management duties in the interest of the whole community can be a fertile ground to develop specific actions aimed at training and updating the knowledge of COWSO members.

In conclusion, this exploration of the rural water supply situation in the Iringa region shows a complex, multifaceted and evolving environment in a geographically restricted but significant area. We believe that many of the aspects we tried to give an overview of could be interestingly studied more in-depth in order to discover and identify innovative and effective ways to provide clean water for all.

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Acronyms

CO	Community Organization
COWSO	Community Owned Water Supply Organization
DC	District Council
DWD	District Water Department
DWE	District Water Engineer
GOT	Government of Tanzania
LGA	Local Government Authority
LVIA	Lay Volunteers International Association
M&S	Monitoring and Supervision
ME	Management Entity
MOW	Ministry of Water
MOWI	Ministry of Water and Irrigation
NAWAPO	National Water Policy
NGO	Non-Governmental organization
PBR	Payment by Result
PMO-RALG	Prime Minister Office for Regional Administration and Local Government
PO	Private Operator
PPP	Public-Private Partnership
RUWASA	Rural Water Supply and Sanitation Agency
UDOM	University of Dodoma
UNITO	Università degli studi di Torino
URT	United Republic of Tanzania
SAGCOT	Southern Agricultural Growth Corridor of Tanzania
TZS	Tanzanian Shilling
WSDP I	Water Supply Development Program - Phase I
WSDP II	Water Supply Development Program – Phase II
WSSA	Water Supply and Sanitation Act

STUDY FOR A SUSTAINABLE MODEL OF SOCIAL IMPACT INVESTMENTS AIMED AT IMPROVING REFUGEES' WORKING CONDITIONS IN LEBANON

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Abstract

Social, economic and environmental analysis about the Lebanese agricultural sector are correlated to identify those fields in which a sustainable model of social impact investments can combine ecosystem restoration and dignified working opportunities, while enabling a solid development of farm businesses in Lebanon. The analysis of the social and historical context, worsened by the 2011 Refugee Crisis, shows a critical situation of exploitation of Syrian Farmhands, in parallel with an intense stress on natural resources and a stagnant investment and innovation phase. Six different fields of intervention are presented to illustrate the potential of investing on Lebanese agricultural farms with a pre-agreed distribution of the added value gained. Cropping strategies to increase yields, soil protection techniques, compost production, wastewater treatment and renewable energy production can be combined with financial education on business management and product diversification to generate new resources through ethical investments based on social responsibility.

Analisi socioeconomiche e ambientali del settore agricolo libanese vengono correlate per identificare i settori in cui un modello sostenibile di investimenti ad impatto sociale possa combinare ripristino ambientale e condizioni lavorative dignitose, permettendo al contempo il rafforzamento e lo sviluppo delle imprese agricole in Libano. Il contesto sociale e storico, fortemente influenzato dalla crisi dei rifugiati del 2011, mostra una situazione critica di sfruttamento dei lavoratori siriani, contemporaneamente ad un eccessivo sfruttamento delle risorse naturali e ad una fase economica stagnante in termini di innovazione e investimenti. Sei diversi campi di intervento vengono analizzati per identificare il potenziale di un sostegno finanziario a favore di imprese agricole libanesi attraverso una redistribuzione concordata del valore aggiunto generato. Tecniche per incrementare la resa agricola e l'efficienza produttiva, produzione di compost, trattamento delle acque reflue e produzione di energia rinnovabile possono essere combinate con percorsi di educazione finanziaria sulla gestione d'impresa e diversificazione delle attività economiche per generare fonti di reddito attraverso investimenti fondati sull'etica e sulla responsabilità sociale.

Keywords

Agriculture, refugees, investment, social impact, sustainability.

Introduction

The status of protracted displacement of Syrian refugees in the Middle East, particularly in Lebanon, leads to a situation of severe economic instability and labor exploitation, especially in

those areas with high density of refugee population coupled with the presence of sectors – such as agriculture – requiring low-cost labor force.

This context, while enabling an economic advantage for a few producers and landowners, exacerbates a situation of local conflict among communities due to a fierce competition on unskilled jobs. In some areas of the Bekaa Valley, for example, a Lebanese farmhand daily wage amounts to 25\$ against the 13\$ for a Syrian male farmhand and 4\$ for a Syrian female (Scalco 2017).

The informal agricultural work system in these areas is complex and involves different counterparts. In extensive productive systems, the refugees' job demand goes through the "Shawish", a consolidated network of Syrian supervisors managing also child labor (Mawad 2018). They are the main intermediary channel between refugee farmhands and agricultural producers and landowners (Scalco 2017).

The study here proposed aims to verify potential improvements in the agricultural system, e.g. in terms of consumption reduction and production efficiency, to increase the economical revenue of the existing fields. The final goal is to evaluate the feasibility conditions of a social investment model able to restore decent working conditions for Syrian refugees and creating at the same time growth-opportunities for the Lebanese agricultural producers and landowners.

The Refugee Crisis

The Syrian crisis has displaced millions of people, most of whom have moved into neighboring countries such as Jordan, Lebanon and Turkey. The Lebanese government, faced with a longer history of Palestinian camps and their militarization, has refused to allow the establishment of official refugee camps for Syrians, forcing them to either live in private rented accommodation in towns and cities throughout the country, or in informal settlements built on private, often agricultural land. These informal settlements are built and developed through a complex assemblage of humanitarianism, hospitality, security, economic and political considerations (Sanyal 2017).

According to Human Rights Watch, Lebanon hosts approximately 270,000 Palestinians and more than 1 million Syrian refugees are registered with the United Nations High Commissioner for Refugees (Unhcr) (Human Rights Watch 2017). The government estimates the true number to be 1.5 million. As a non-signatory to the 1951 UN Refugee Convention, Lebanon's residency policy makes it difficult for Syrians and Palestinians to maintain legal status, heightening potential exploitation and abuse and restricting access to work, education, and healthcare (Human Rights Watch 2017). The areas most affected by the refugee crisis are the Bekaa Valley and Akkar Region (Unhcr 2018).

Impacts of the Syrian Crisis on natural resources

The immediate response to the Syrian crisis from the Lebanese Government and the international community focused primarily on humanitarian assistance programs. Especially in those areas where large refugee settlements are established, this approach caused depletion of natural resources, alteration of habitats of fauna and flora as well as pollution (Moe 2014, Moe 2015). The situation is resulting in a dramatic increase of solid waste along rivers and coastline. An additional environmental impact resides in water pollution by leakage from sewage tanks built in informal settlements or dumping into rivers. Solid wastes accumulated in channels also results in obstruction of drainage systems which increases flood risks during winter. To cover the increasing local demand for food commodities, potatoes and vegetables growers extended their planted surface. Such increase in land cultivated for irrigated crops as well as the increase in domestic use has accentuated groundwater depletion (Moe 2014, Moe 2015).

Lebanon's agriculture

The agricultural sector has always been an essential component of the Lebanese economy although its contribution to Gdp does not exceed 4% (World Bank 2017). About 30% of the Lebanese population is involved in agriculture and agri-food businesses. Only 34% of this sub-population is entirely counting on agriculture. Out of the total Lebanese area, about 36% are agricultural lands, 13.6% are covered by forests and 57% are non-cultivated lands or natural pastures (Chalak 2015). Despite its limited extension of 10,452 km², Lebanon has a great topographical and landscape diversity: the presence of high mountains close to the coast and oriented north-south with numerous perpendicular valleys gives rise to around 22 bioclimatic zones and different types of habitats. The ecosystem's diversity allows the cohabitation of cold requiring crops and subtropical crops within a distance of less than 20 km. Moreover, due to the high population density and the mountainous landscape of the country, the arable land per capita is very limited (Chalak 2015).

Land fragmentation and production

According to the Agricultural Production Survey, conducted by the Ministry of Agriculture between 2008 and 2009, the total cultivated area was 251,600 ha. In the last ten years, the cultivated area has increased by 5%, with more than 23% increase of irrigated agriculture (Salman et al 2016). The

results of the agriculture census conducted by the Ministry in 2010 showed that almost 70% of total farm holders have less than 1 ha and cultivate less than 20% of the total agricultural area. The average holding size is around 1.36 ha. The fragmentation did not allow economies of scale for production and marketing.

The Bekaa valley is the main agricultural region that produces wheat and most of the cultivated crops in Lebanon. The coastal zone and the Akkar region support intensive production of citrus, fruits, bananas and vegetables. Lebanon exports fruits and vegetables, it is self-sufficient in poultry and produces only part of the needed pulses, wheat and sugar (Salman et al 2016). The evolution of the agricultural sector can be observed through Fao's historical data series (Fao 2018). Fresh fruit crops rapidly expanded between 2010 and 2012, though cropping yields have dropped preventing the growth of produced volumes. The same happened to fresh vegetables: even if harvested areas saw a positive trend through the last four years, yields have been decreasing since the beginning of this century, intensely affecting volumes generated.

Water Resources

Lebanon's net exploitable surface water and groundwater resources, water that Lebanon can technically and economically recover during average rainfall years, are estimated at 2.08 km³, consisting of 1.58 km³ of surface water and 0.50 km³ of groundwater (Fao 2017).

a. Water availability, scarcity and development

Annual rainfalls vary from 700 mm/year along the coastal zones and to 1500 mm/year on the high mountains, decreasing to 400 mm/year in the eastern parts and to less than 200 mm/year in the northeast. Above 2000 m, precipitation is essentially niveus and helps to sustain a base yield for about 2000 springs during dry periods. Precipitation in dry years can be as little as 50% of the average. Mean annual potential evapotranspiration ranges from 1100 mm on the coast to 1200 mm in the Bekaa Valley, with maximum values recorded in July (Fao 2017).

Constraints for development consist in the limited availability of water during dry months due to the very low water storage capacity, the difficulty of capturing the water close to the sea, and the shortcomings of the existing water delivery systems and networks. Annual internal renewable water resources were estimated at about 4.8 km³. Annual surface runoff was around 4.1 km³ and groundwater recharge 3.2 km³, of which 2.5 km³ constituted the base flow of the rivers. About 1 km³ of this flow came from the over 2000 springs, sustaining a perennial flow for 17 of the 40 major streams in the country. About 75% of the annual flow occurs in the five-month period from

January to May. A drastic decrease has been recorded in the last three decades. The geological conditions make construction of storage dams difficult, and the largest artificial lake in Lebanon is located in the south of the fertile Bekaa Valley on the Litani River, known as the Qaraoun Reservoir (Fao 2017).

b. Irrigation

According to Aquastat, Fao's Global Water Information System, surface irrigation, mainly of the basin and furrow type, is practiced on around 60,000 ha (Fao 2017). It usually comprises diversion or simple intake structures on streams or springs, open concrete main canals, and earth or concrete secondary canals (Fao 2016). Sprinkler irrigation is practiced on around 28,000 ha, especially where potatoes and sugar beet are cultivated in the central Bekaa Plain. Localized irrigation is practiced on less than 28,000 ha, especially in North Bekaa and in the coastal region. The main sources are surface water and groundwater (Fao 2016).

A survey conducted with Farmers in Al Qaa confirmed that the water table - usually situated at 150 meters at the beginning of winter - has dropped by 10 to 20 meters. Beside the environmental impact of depleted water resources, there has been an economic impact due to additional costs for energy to pump water from deeper aquifers. Farmers in the Hermel area indicated that the cost of pumping water from Assi River or underground wells depended on the price for diesel (Fao 2016).

Soils and land degradation

Several natural and human-induced factors contributed to land degradation in the country. Natural elements like a rugged topography and steep slopes, poor drainage, weak lithology and torrential rainfalls cause flash floods, erosion and landslides. These problems are boosted by human impacts, related to several activities such as deforestation, urban development and chaotic sprawl, inappropriate irrigation, soil pollution and groundwater depletion (Francis 2012). Potential erosion hazard maps (basing on soil depth, structure, texture, organic matter content and structural stability) show that most of the country faces high geomorphological risks (Cnrs 2018).

Soil salinity has increased due to water extraction on coastal regions, where groundwater meets the incoming saline wedge of the Mediterranean Sea; secondary soil salinity is caused by mismanaged crop rotation, poor fertilization and crop policies (Darwish 2005). Intensive agricultural practices led to pollution issues such as nitrate accumulation during the agricultural season followed by pollutant leaching in spring (Cnrs 2018).

A social investment model

Starting from the analysis conducted and the experience of Microfinanza Srl and Associazione Microfinanza e Sviluppo ONLUS in Lebanon, this work aims to verify the feasibility conditions of an investment model focused both on social and economic impacts, therefore able to improve the working conditions of Syrian refugees and generating at the same time opportunities of growth for agricultural producers and landowners in Lebanon.

Project assumptions

The envisaged model is based on three different aspects of the current situation, partially determined by the Syrian Crisis. First, Lebanon has faced an increase in production (Fao 2018) and consumption, due to the refugees hosted and the growing population (Gpd 2018). This factor is combined to a technological stasis and lack in investments, thus an increasing need in adequate technical and business resources (Agrytech 2018). These two aspects are strictly depending on the last one, which is the deterioration of the environment in terms of resource depletion, land fragmentation and pollution.

Targeted investments in local agricultural value chains can increase the gross economic yield of such sectors, their efficiency and at the same time their sustainability. The observed increase in needs and production, can be combined with financial instruments oriented to lessening pressures on both workers and ecosystems, minimizing those impacts which affect society and environment.

Existing Social Structure

The complexity of the agricultural system is related to the great variety of actors involved, to external factors hardly controlled and to a diversity of products, knowledge and techniques. Farmers and farm hands are at the last stages of value chains, and their income is strongly affected by actors who invest in each agricultural season. Corruption and exploitation are denounced at all stages, and a clear lack of transparency exacerbates the pressure on agricultural entrepreneurs. The social structure presented has been reconstructed through formal qualitative and quantitative interviews conducted in Bekaa Valley with 15 farmers and informal meetings with retailers, farmers, Ngos and others, Figure 1.

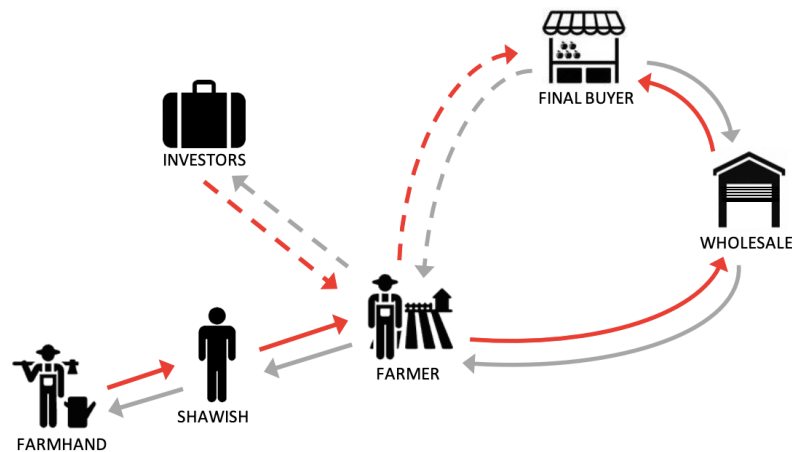


Figure 1. The complex agricultural system observed in Lebanon and the role of the Shawish and Wholesales as social actors.

Farmhands are the most abundant actors: workers are always needed to assist from sow to collection, with more than 90% of them being Syrian females ranging from 12 to 60 years old (underage kids are often found in crops that do not require particular skills). They are gathered through the Shawish, responsible for providing workers and handling all financial transactions between them and farmers. Generally, the Shawish is the person in charge of informal refugee camps, handling relations with landowners and sub-renting the area to Syrian families, having a strong control on their life.

This figure evolved from the previous *Wakil*, the community chief that was handling farmhands' villages before the refugee crisis. Lebanese agriculture, in fact, relies on Syrian workers since more than 15 years, but seasonal employees living in informal settlements moved permanently when conflicts started in their country. The situation is therefore worsened because of a high number of workers available.

a. Lebanese Farmers and cropping expenses

Lebanese farmers can be very different: some are landowners, although many of them only own a small percentage of the farmed land, generally less than 30%, with the majority usually needing to rent a piece of land. Some pay around 1,500\$/acre, although the amount can reach 2,500\$/acre for lands with access to river water and 3,750\$/acre for lands relying on private water sources. Small entrepreneurs barely sustain themselves due to the inconsistency in profit, and farming is generally their only source of income.

One of the main issues in agriculture is starting a new season: different inputs are needed to prepare fields and to sow new crops. In summer, purchasing water can be expensive and complicated, some municipalities have an annual rotation scheme for water distribution and in other cases water needs

to be pumped from wells or transported through water trucks. External inputs such as compost and fertilizers are also needed to support production capacity.

b. Investors, wholesalers and buyers

Most farmers don't have the necessary amount of money to start a new season, therefore an external support is usually indispensable. Wholesale markets are the most common investors, funding between 50% and 80% of the total cost, given that all of their harvested crops will be sold in the wholesale itself. Wholesales are also the main buyer, who will then reach final purchasers possibly having more than 200% profit. They are generally perceived as the most corrupted step exploiting small entrepreneurs, increasing the cost of inputs needed for a new season, charging up to 10% on each sale or cheating on the price or amount sold.

Landowners are also common investors; they share the land and pay for water, 50% of fertilizers, chemicals, seeds, fuel, transportation in exchange for 50% of the production or losses. Suppliers sometimes present seeds, chemicals e fertilizers needed for the farmer on credit (based on the market owner's demand), with a 15% to 20% interest rate.

c. External Factors

Many external factors have a huge impact on agriculture. Crops smuggled from Syria affect the price of local products since hiring farmers, renting and purchasing the inputs needed is strongly cheaper than in Lebanon. Legal imports can also affect trading, for example products imported from Egypt are often cheaper than Lebanese ones. Only some crops are supported by the government, providing funds for wheat and tobacco. Farmers can receive 250,000 Lebanese Pounds per acre of wheat.

Involving the main actors

Following a clear negotiation and the definition of ex-ante social and economic rules subscribed by all the actors, the added value gained from responsible investments should be redistributed among the stakeholders: producers (farmers), landowners, refugee farmhands and, possibly, the social investor. Changing the existing hierarchies and schemes which connect farm-laborers to working positions in agriculture is the key to strengthen the relations between agricultural entrepreneurs, intermediaries and singularly hired employees. This shared economical allocation aims to ensure an improvement in the economic conditions of each counterpart, not only safeguarding a financial redistribution but also a fair, unbiased work environment, thanks to the agreement established in

advance with the social investor, Figure 2. The final goal will be reviewing the role of each link of the commercial chain, from producer to consumer, with greater respect to human dignity.

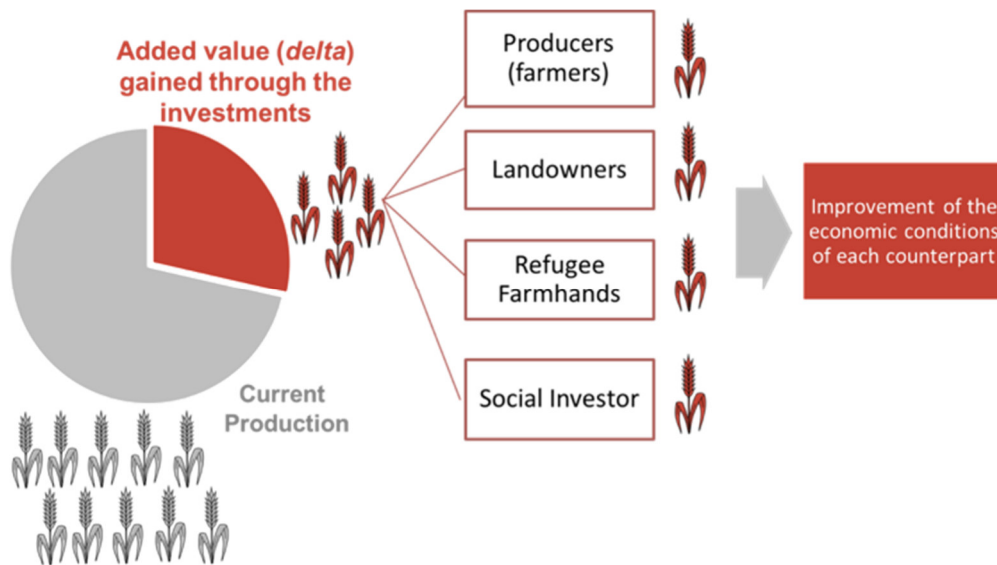


Figure 2. Graphical explanation of the pre-agreed distribution of the added value generated by sustainable investments.

Sustainable investment fields

To gain this added value through social investments, different sectors and action plans can be investigated. Environmental sustainability and agricultural efficiency are the key factors, their achievement is possible through different options.

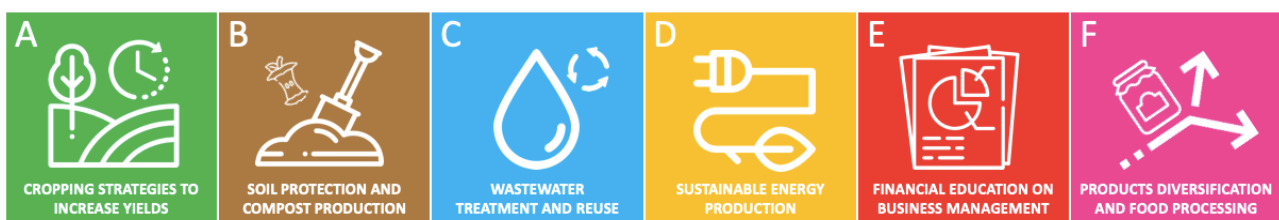


Figure 3. Fields of intervention for potential sustainable investments

Cropping strategies to increase yields

Traditional cropping relies on simple tools and knowledge often handed down from one generation to another. Needed are innovative systems that protect and enhance the natural resource base, while increasing productivity (Fao 2 2017). Different strategies can be adopted to increase agricultural

yields, focusing on soil analysis, climate studies, crop selection and assortment, scheduling and extension techniques.

One of the most important parameters to evaluate cropping yields is the water irrigation request W_{irr} , which is related to the water request W_{rew} of each plant, the effective rainfall R_{eff} and the effectiveness of the irrigation supply E_i .

$$W_{irr} = (W_{req} - R_{eff})/E_i$$

The water demand is the amount that each crop needs to get the agronomic desired outcome and coincides with the effective Evapotranspiration (ET). On the other hand, the irrigation water demand represents the difference between the crop water requirement and the effective rainfall. In fact, when the balance between water demand and effective rainfall is negative, an artificial input, irrigation, must be dispensed (Fao 2006). ET converts water from liquid to vapor, and it is based on the combination of the simultaneous surface evaporation and plant transpiration, influenced by several parameters:

- Weather (rainfall, radiation, air temperature, humidity, wind speed);
- Soil (chemical composition, drainage capacity, water retention, stratification);
- Crop factor (development necessities for different grow phases and species);
- Management and environmental conditions (fertilizers use, techniques/technologies adopted, etc.).

Evapotranspiration can be computed using meteorological data and the dependence on the species and phenological stages of the cultivation. Influencing the cited parameters, it is possible to mitigate the water demand for each crop and to increase the efficiency and suitability of the evaluated setting. Therefore, new agronomic strategies and approaches can be identified, and simple studies can support farmers in increasing yields, including:

- Soil Analysis - A soil characterization allows to investigate the agricultural potential for different crops, strictly depending on chemical and physical properties (Bonfante 2017); executing soil surveys when planning agronomic investments is a strategy to select the most appropriate crops in terms of roots adaptation and nutrient needs;
- Climate studies - Humidity, evapotranspiration and rainfalls are key factors when planning a cropping season and will affect production rates from sowing to harvesting; for an optimal

crop management, farmers can introduce agro-meteorological weather stations, varying from simple mechanical tools to automated sampling technologies, for example to schedule irrigation basing on soil water content and climate forecasts;

- Crop selection and assortment - It is not only important to identify the most suitable crops but also to introduce a wide species diversification through varied crop sequences and associations; a well-designed crop rotation or inter-cropping system promotes good soil structure, fosters a diverse range of soil flora and fauna that contributes to nutrient cycling and improved plant nutrition, and helps to prevent pests and diseases (Fao 3 2017);
- Season extension techniques - Season extension refers to any practice that allows a crop to be cultivated or harvested outside its normal production season; benefits from an extended production season include: higher productivity and income; retention of or gain in customers; extended employment for skilled farm-hands; an example can be the introduction of raised beds, biodegradable mulches or greenhouses (Pool 2010, Vox 2010).

Soil protection and compost production

Soil health is defined by Fao as “the continued capacity of the soil to function as a vital living system, within ecosystem and land-use boundaries, to sustain biological productivity, promote the quality of air and water environments, and maintain plant, animal, and human health” (Fao 2017). Soil management practices bring multiple benefits, they increase the organic matter content, keep soil surfaces vegetated, require fewer chemical inputs, and promote crop biodiversity. These make soils less susceptible to erosion and desertification (Fao 2017).

Intensive crop production depletes soil nutrients and requires external inputs, often resupplied with synthetic products. According to Faostat, Lebanon imported all of the amount of fertilizers used in agriculture until 2016 and distributes on soils chemicals such as Nitrogen N , Phosphate P_2O_5 and Potash K_2O , with time variable consumption rates (Fao 2018).

Organic waste, representing almost 50% of Lebanese waste production (Gmi 2018), can be treated and composted, through a well-known natural process. Compost is a rich source of organic matter, which plays an important role in maintaining soil fertility, and hence in sustainable agricultural production. In addition to being a source of plant nutrients, it improves the physic, chemical and biological properties of the soil (Fao 2 2015).

Investing in compost production is a good strategy to produce a valuable product for agriculture and to reduce environmental impacts of rural and municipal solid waste. A local example in Lebanon is Cedar Environmental Dynamic Composting, an accelerated technique which turns organic waste

into a humus like material through a reaction that takes only three days compared with up to ninety days in traditional composting techniques (Cedar Environmental 2015).

Wastewater treatment and reuse

In 2006, Lebanon generated more than 310 million m³ of wastewater and the amount treated was only 4 million m³, of which 2 million m³ were destined for agricultural purposes, and the rest disposed in rivers, or infiltrated by deep seepage to groundwater (Salman et al 2016) The potential for reuse of domestic wastewater is estimated at around 100 million m³/year.

Wastewater treatment is therefore an opportunity to have a local source for irrigation, possibly obtained through different technologies (Sswm 2018). One of these is anaerobic digestion, a simple biochemical process by which wastewater and organic products can be treated while producing energy in different scale plants. Combining wastewater with manure, crop residue, food scraps or other organic waste products, two key by-products can be obtained: biogas and digestate (Rich 2010). Output solids and liquids may be used as soil amendments or liquid fertilizers. Biogas can be used to fuel a variety of cooking, heating, and lighting applications, as well as to generate electricity.

Sustainable energy production

Lebanon suffers from a major gap between energy demand and supply, resulting in a 23% energy deficit. This gap is being supplied by privately owned generators providing electricity during cut-off hours. All these generators work on gas or diesel oil bought either directly from private fuel distributors or from gas stations. According to the Lebanese Ministry of the Environment (Moe), the energy sector is the main source (56%) of greenhouse gas emissions (Moe 2018).

Mitigation measures offer co-benefits to the sector through ensuring less reliance on imported fuel and reducing energy costs, air pollution and related health effects. The country is on track to provide 12% of its energy from renewable sources, currently mostly deriving from hydroelectric plants (Moe 2018). In order to increase the share of wind and solar energy in Lebanon's energy mix, a Derisking Renewable Energy Investment study for both technologies was conducted by the Lebanese Moe and Ministry of Energy and Water (Moew) to promote private sector investments in wind energy and solar applications (Moew 2018).

In particular, Lebanon has a favorable climate for photovoltaic power plants given the solar irradiance levels, the relative lack of dust or sand, and a relatively mild climate that ensures a more

optimal operation in terms of efficiency. Solar energy farms represent an option to weaken Lebanon's 'Generator Mafias', strongly opposing the energetic transition (Dziadosz 2018).

An example of linking agriculture and photovoltaic energy is an initiative by the World Bank, the Lebanon Municipal Service Emergency Project, aiming to ease the load on the municipal services, areas, and communities hosting Syrian refugees. The initiative funds photovoltaic systems connected to water pumps in the Bekaa area, replacing diesel engines (Moew 2018). Solar farms disconnect pumping costs from fuels market fluctuation and can overcome the need of fossil oils for water extraction.

Financial education on business management

An organized, innovative and effective approach is the key to keep an agricultural enterprise growing. According to Fao, most farmers believe that their major problems relate to three main sectors (Kahan 2013):

- Management: small-scale farmers often lack the skills needed to manage their farm as a business;
- Marketing: farmers sell their products at favourable and often undifferentiated prices in high competition markets, often being less able to satisfy high quantity or quality products demands and strongly needing marketing skills;
- Access to finance: it is often hard to receive agricultural credit; the main problem perceived is capital shortage, though the problem is often managing available resources through proper financial skills.

Financial education and literacy training can empower farmers and teach them how to reduce risks (World Bank 2011) and simple farm management diagnostic techniques can be applied at farm level to help recognize the critical problems limiting farm profitability (Kahan 2013), including:

- Constraints and opportunities analysis: identifying weaknesses and potentials to develop strategies for overcoming vulnerabilities and building on identified potentials.
- Enterprise budget evaluation: estimating of the output, cost and profitability of individual crops, cropping patterns or livestock enterprises.
- Gross margin evaluation: calculating an indicator of the profitability of farm activities and technologies, to analyze the ongoing performance and to estimate profitability activities.

- Benchmarking: studying and comparing the actual performance with others of similar size and farming system for financial and technical analysis to identify steps to improve performance.

Training in basic farm economics, financial literacy, organization, governance, business management, and financial skills also promotes the development of economically-oriented farmer associations or cooperatives. Effective organization allows to pool resources for purchasing and marketing, supports collective risk management efforts and provides a counter-party through which financial institutions may finance production of smaller farmers (Ifc 2011).

Products diversification and food processing

Products diversification represents a change in the underlying characteristics of a farm system, establishing a dynamic optimal mixture of farm production alternatives capitalizing on between-farm heterogeneity in terms of resource availability and qualities (Barghouti 2004). Successful diversification often results in a varied mix of activities leading to new input markets and emerging processing activities. This reduces community dependency on a narrow range of outputs and, as a result, vulnerability to shocks from climatic variability and market volatility (Barghouti 2004). Several diversification possibilities and strategies can be adopted by farmers; three of the 20 examples proposed by Fao in 2012 will be presented (Fao 2012).

Beekeeping: bees offer a large potential with minimal investments, not requiring land ownership or rental, and possibly started with equipment and tools sourced locally. Beekeeping offers diverse products, honey and wax among others, which can be sold in local markets as a source of income, but also provides complementary services such as crop pollination (Fao 2012). Local farmers can access export markets producing high-quality honey, if proper techniques are adopted and marketing strategies are strengthened. There is already an increase in honey sales in Gulf Countries, Europe, and Us (Acted 2018). There is scope for increasing honey production capitalizing on export markets of both Gulf Council Countries (Gcc) and of the countries of the Lebanese diaspora (Hamade 2016).

Growing Mushrooms: mushroom cultivation is a fast yielding source of food and a reliable source of income. Small-scale growing does not include any significant capital investment: mushroom substrate can be prepared from any clean agricultural waste. Mushrooms can be produced in temporary clean shelters and cultivated on a part-time basis, requiring little maintenance. Indirectly, mushroom cultivation provides opportunities for improving the sustainability of small farming

systems through the recycling of organic matter, which can be used as a growing substrate, and then returned to the land as fertilizer (Fao 2012).

Food processing: the processing of foods brings many benefits to small-scale farmers. It slows down the natural decay of foods, preserves them for extended periods and acts as a reserve against times of shortage, increasing food security. Processing adds value to crops and animal products and provides farmers with a portfolio of diverse products. Farmers can sell processed foods out of season when prices are higher, creating opportunities for additional income generation thus enabling them to earn an income over a longer period than solely at harvest time (Fao 2012).

Conclusions

The Lebanese agricultural sector has an expansion opportunity given by a potential increase in market demand, even though the system relies on a large-scale exploitation scheme. A strong impact on natural resources and a structured social scheme for taking advantage of low skill farmhands are the main existing issues, in parallel with the economic instability of Lebanese agricultural entrepreneurs.

Innovations and investments are needed to develop a sustainable increase in production, creating at the same time ethical growth opportunities for both Syrian Refugees and Lebanese Farmhands. The core of a social investment model needs to envisage improvements and diversification of local value chains, taking particular care of both social and environmental impacts.

The identification of six different sectors of investments shows the variety of chances to generate an added value in existing agricultural enterprises, which needs to be pre-esteemed through further numerical studies to evaluate the scale and the real virtuosity of any intervention. Investing in new strategies to increase cropping efficiency and extend agricultural seasons can be a strategy, which can be related to a diversification of products, possibly followed by processing. Working on available resources, ranging from organic fractions to wastewater, and on sustainable energy production allows to improve farm enterprises with a main-streaming approach. Every investment must be supported through financial education, which is the key to develop business management capabilities and to increase access to finance.

The complexity of this sector shows the need for external support: proposing Business Development Services represent a precious opportunity to sustain the economic growth and resilience of both refugees and host communities on an ethical basis.

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Acronyms

Aquastat	Food and Agriculture Organization of the United Nations Global Information Service on Water and Agriculture
Et	Evapotranspiration
Fao	Food and Agriculture Organization of the United Nations
Faostat	Food and Agriculture Organization of the United Nations Statistic Division
Gdp	Gross Domestic Product
Moe	Ministry of Environment of Lebanon
Moew	Ministry of Energy and Water of Lebanon
Ngo	Non-Governmental Organization
Unhcr	United Nation High Commissioner for Refugees

WARMIPURA: RECOVERY OF ANCESTRAL TECHNIQUES FOR DYEING WOOL AND NATURAL FIBERS IN NORTH-WEST ARGENTINA

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Abstract

WarmiPura is the name of a group of women belonging to the Diaguita - Calchaquies indigenous community located in Tafi del Valle (Argentina) producing handcraft tissues made of sheep wool coloured with natural dyes. The founder, Liliana Pastrana, has been working for the past fifteen years toward a recovery of traditional textile methods based on the extraction of natural dyes from wild plants.

When the harvest of autochthonous plants becomes too intensive, the availability of raw material results insufficient to face the needs and a significant loss of biodiversity may occur. In order to overcome this and other constraints, *WarmiPura* is evolving in an international venture, with the University of Florence (Italy) and the University of Morón (Argentina) as participants, aiming to fulfil their needs joining academic research and local know-how. The main objective of the project is to satisfy the demand of raw material for pigments extraction, according with economic and environmental sustainability, through the establishment and management of an experimental field for the cultivation of the required plants. In this paper some general aspects on *WarmiPura* group, the environmental characteristics of *WarmiPura* area of activity and the pool of utilized plant species were investigated, and the main practical approaches of the project supporting *WarmiPura* it is illustrated.

WarmiPura è il nome di un gruppo di donne appartenenti alla comunità indigena Diaguita – Calchaquies di Tafi del Valle (Argentina) che si occupa della produzione artigianale di tessuti di lana ovina tinti grazie all'utilizzo di coloranti naturali. La fondatrice, Liliana Pastrana, lavora da quindici anni per il recupero della tessitura tradizionale basato anche sull'estrazione di coloranti naturali dalle piante native. La raccolta intensiva di queste piante potrebbe portare ad una insufficiente disponibilità di materie prime per la produzione oltre che a possibili perdite di biodiversità. Per superare queste ed altre limitazioni *WarmiPura* sta partecipando a un progetto internazionale con l'Università di Firenze (Italia) e l'Università di Morón (Argentina). Il progetto cerca di soddisfare le esigenze produttive di *WarmiPura* unendo la ricerca accademica alle conoscenze locali. Il punto focale del progetto è garantire la richiesta di materie prime per l'estrazione dei pigmenti in un'ottica di sostenibilità economica e ambientale attraverso la costruzione e la gestione di un vivaio sperimentale per la coltivazione delle principali specie utilizzate dal gruppo. In questo articolo viene presentato il team *WarmiPura*, le caratteristiche ambientali della zona in cui opera, le specie vegetali impiegate ed i principali aspetti pratici del progetto che supporta le attività del gruppo.

Keywords

Berberis mikuna, Diaguita-Calchaquies, Biodiversity, Barcoding, Natural Dyes

Introduction

During the colonial period, in Argentina, there was a strong textile activity carried out by indigenous people and some local communities, namely the most isolated groups, have maintained their methods until today. Liliana Pastrana, in her book “Volver a lo nuestro... Rescate y preservación de las técnicas ancestrales sobre tintes naturales” (Pastrana, 2016), collected information related to plants, dyes extraction and dyeing techniques explaining how to obtain certain colours and where pigments are stored in plants. Tissue coloration is essential to give style, emotions, and beauty to the clothes and handicrafts, since especially in ancient time, colours were signs of social status, power, and identity. Many of the still used pigments are extracted from autochthonous species (plants, shrubs, and herbs) of Tafi del Valle environment. The latter aspect is not changed since decades and the current extraction and use of natural pigments is posing several problems in terms of genetic erosion. Objective of this investigation was to have a closer knowledge of WarmiPura activity, to have an insight of the approaches adopted to collect and use plant material for pigment extraction and, in relation to the local context, to define the boundaries and activities of a cooperation project in order to support WarmiPura activities in a frame of environmental, social, and economic sustainability.

Materials and methods

The investigation was carried on at different stages, which included bibliographic research, local monitoring, and interviews to Liliana Pastrana.

The bibliographic research was done both online and locally, with the support of the researchers of the University of Morón (Argentina). During December 2018, a team formed by researchers of the University of Florence and the University of Morón spend a week in the area of Tafi del Valle, interviewing Liliana Pastrana and visiting the areas of plant material collection. Special attention was dedicated to the native populations of *Berberis mikuna*, one of the species threatened by genetic erosion due to its massive exploitation.

The Social and Geographic Context

“Among women” is the meaning of the Quechua word “*WarmiPura*”. The team has been founded by Liliana Pastrana and consists of women of different ages (Figure 1) belonging to the Diaguita-Calchaquies community, located in Tafi del Valle - Tucumán province (Argentina) (Figure 2) dedicated to the production of handicrafts using natural pigments for locally produced sheep wool.

The information gathered by Liliana Pastrana was obtained by interviewing elderly women (50-108 years old) living in the surroundings of Tafi del Valle who have preserved the tradition of producing handcrafted clothes and decorations made by sheep wool.

WarmiPura represents a rural community that tries to organize itself and uses its own know-how to be resilient and increase its autonomy in one of the poorest provinces of Argentina. Actually, in the nearest urban area of Gran Tucumán unemployment rate is 10,7%, people living under poverty line are 40,4% and, at national level, the percentage of people in a state of extreme poverty has increased from 4,8% of 2017 to 7,7% (Figure 3) in 2019 (second quarter of 2019 data: source <https://www.indec.gob.ar/>).



Figure 1. WarmiPura group with their handcrafted products; Liliana Pastrana sitting in front of the group (picture by Liliana Pastrana).

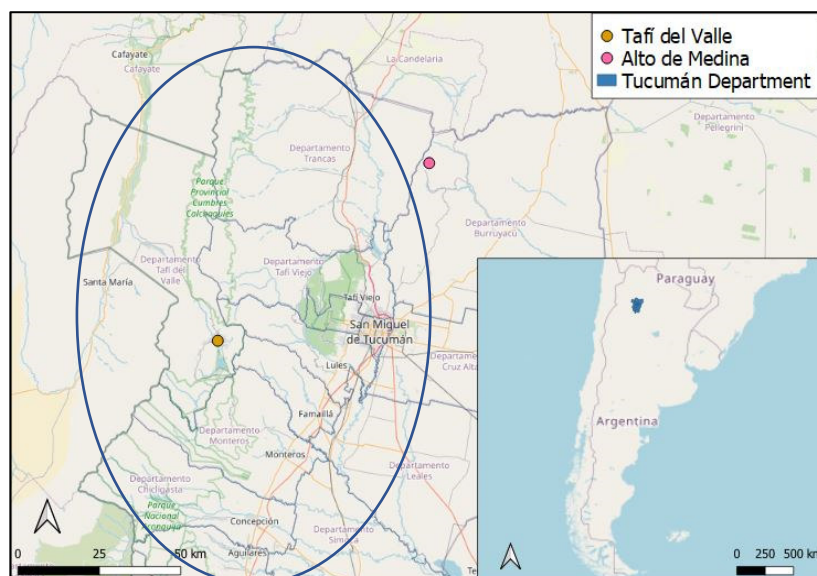


Figure 2. Tucumán province position (purple); Part of the Diaguita-Calchaquies territories (within the blue circle) from <https://www.argentina.gob.ar/derechoshumanos/inai/mapa>.

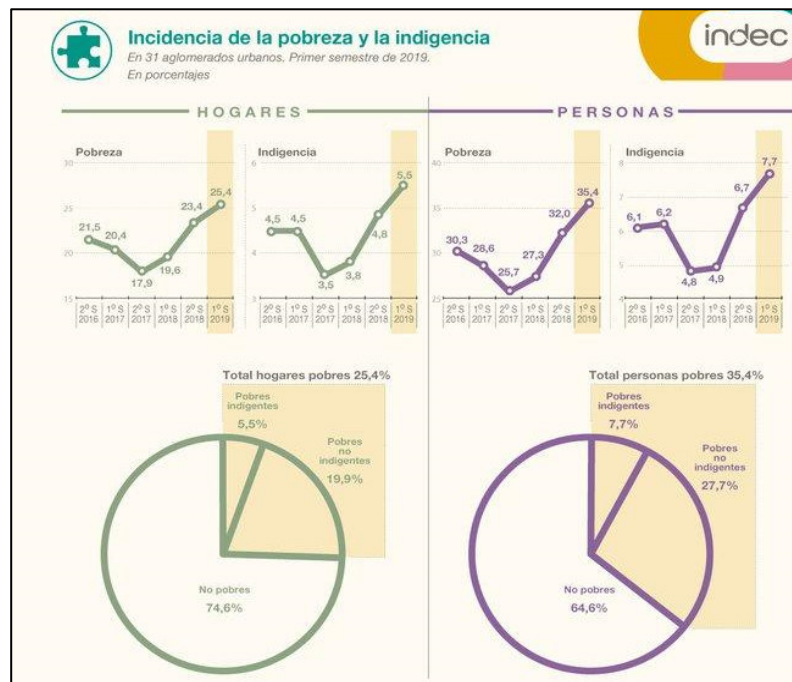


Figure 3. Infographic of Argentinian poverty and extreme poverty average (<https://www.indec.gov.ar>).

The Production of Dying Tissues

The process begins with the harvest of required plants (*Tab. 1*), or part of them, from the surrounding environment according with seasonality and availability. Many plants are considered autochthonous of *Taft del Valle* (such as *Berberis mikuna* and *Aliso*), while others are commonly used and spread in the region (e.g., *Jarilla* and *Yerba mate*). Pigments can be extracted from fruits, roots, stems, or leaves, depending on where they are stored by the plants. This aspect turns out to be crucial to maximize the extraction efficiency and becomes a very critical point for those plants having dye molecules in their root system, since this approach requires the uprooting of the plant determining a significant reduction of living specimens.

Next steps imply crushing of harvested vegetal material and boiling the obtained powder in order to solubilize the pigments. Successively, the previously washed wool is plunged into the warm dye solution and is fixed. Once the tissues are dyed, they have to dry out the water previously absorbed (Figure 4).

<i>Local names</i>	<i>Scientific names</i>	<i>Botanic Family</i>	<i>Pigment colours</i>
Aliso	<i>Alnus acumita</i>	<i>Bertulaceae</i>	Red
Ataco	<i>Amarantus sp.</i>	<i>Amaranthaceae</i>	Light purple
Azafran	<i>Chuquiraga juss.</i>	<i>Asteraceae</i>	Orange
Cebolla	<i>Allium cepa</i>	<i>Liliaceae</i>	Light orange
Chincho	<i>Shinus gracilipes</i>	<i>Anacardiaceae</i>	Light yellow
Eucalipto	<i>Eucaliptus sp.</i>	<i>Myrtaceae</i>	Dark brown
Frutilla	<i>Fragaria x ananassa</i>	<i>Rosaceae</i>	Light pink
Grateo	<i>Crataegus monogyna</i>	<i>Rosaceae</i>	Light orange
Jarilla	<i>Larrea cuneifolia</i>	<i>Zygophyllaceae</i>	Yellow
Mikuna	<i>Berberis mikuna</i> Job	<i>Berberidaceae</i>	Intense yellow
Molle	<i>Schinus polygamus</i>	<i>Anacardiaceae</i>	Green
Morera	<i>Morus alba</i>	<i>Moraceae</i>	Light purple
Nogal criollo	<i>Juglans australis</i>	<i>Juglandaceae</i>	Beige, brown
Pacar	<i>Enterolobium contortisiliquum</i>	<i>Fabaceae</i>	Black, grey
Palo azul	<i>Cyclopeis genistoides</i>	<i>Asteraceae</i>	Light blue
Poposa	<i>Xenophyllum poposum</i>	<i>Asteraeae</i>	Light yellow
Queoa	<i>Polylepis australis</i>	<i>Rosaceae</i>	Cinnamon-coloured
Retama	<i>Bulnesia retama</i>	<i>Zygophyllaceae</i>	Green
Remolacha	<i>Beta vulgaris</i>	<i>Amaranthaceae</i>	Bordeaux
Ruibarbo	<i>Rumex sp.</i>	<i>Polygonaceae</i>	Brick-coloured
Siempreverde	<i>Salix babylonica</i>	<i>Salicaceae</i>	Green
Suncho	<i>Baccharis salicifolia</i>	<i>Asteraceae</i>	Dark green
Tusca	<i>Acacia cavens</i>	<i>Fabaceae</i>	Grey
Yerba mate	<i>Ilex paraguariensis</i>	<i>Acquifoliaceae</i>	Light green
Zarzamora	<i>Rubus ulmifolius</i>	<i>Rosaceae</i>	Wine red-coloured

Table 1. List of plants used to dyes extraction (Source: “Volver a lo nuestro... Rescate y preservacin de las tcnicas ancestrales sobre tintes naturales” by Liliana Pastrana).



Figure 4. On the left: manual crushing of vegetal raw material; in the centre: plunging of wool into dye solution; on the right: dyed wool tissues drying outdoor (pictures by Liliana Pastrana).

Results

Characterization of Biodiversity

Local survey showed that the most endangered species of the area, due to overexploitation and increase of the pasture areas, was the shrub locally known as “mikuna”, from which a brilliant yellow berberine pigment is extracted. Hence, particular focus has been placed on the identification of “mikuna” (*Berberis mikuna* Job) and the distinctness between “mikuna” and another plant known as “sacha mikuna” (meaning “false mikuna”). Both of them are shrubs thriving in the upper Yunga forest. The first one (“mikuna”) was widely spread in the area where WarmiPura is located, while the second (“sacha mikuna”) has been found just in Alto de Medina (Figure 3) far from Tafi del Valle and unknown to WarmiPura group.

Berberis mikuna description. “Mikuna” is the name used by the community of Tafi del Valle to identify a particular plant belonging to the *Berberidaceae* family, classified as *Berberis mikuna* in studies carried out in 1942 by Job. The genus *Berberis* L. in Argentina consist of 18-26 species (Orsi, 1984; Zuloaga et al., 2008; Landrum, 1999) and there are two main geographic areas of distribution: the subtropical regions of Tucumán and Salta in the North-West as well as the Patagonian steppe and sub-Antarctic forest in the South.



Figure 5. *Berberis mikuna* blossoms (picture by Massimo Gori).



Figure 6. "Sacha mikuna" leaves and fruits.

The Joint Venture

The cooperation among the Argentine community (Diaguita-Calchaquies) and the academic world is the pathway chosen by the founder of the project Liliana Pastrana, after many years of work and promotion of its culture and traditions, to face constraints and needs of their production process. For this purpose, a joint venture has been established between the following researching department and experts:

- Department of Plant Physiology (FAyCA-UM - CONICET) - <https://www.unimoron.edu.ar>;
- Dipartimento di Scienze e Tecnologie Agrarie, Alimentari e Forestali (DAGRI) -Università degli studi di Firenze (UNIFI) <https://www.dagri.unifi.it/>;
- Agronomist engineer Oscar Dantur, local advisor.

The following points are practical steps considered as essential to raise up the quality of production:

- the establishment of *in-situ* and *ex-situ* collections of endangered local species.
- the definition of a propagation protocol and the installation of a plant nursery.
- the establishment of a cultivation field to provide raw materials for extraction.
- the building of a basic infrastructure for extraction, dyeing, tissue drying and production.
- the formal constitution of a cooperative to further develop local handcrafted.
- the development of a business plan focused on the economic, environmental, and social sustainability.

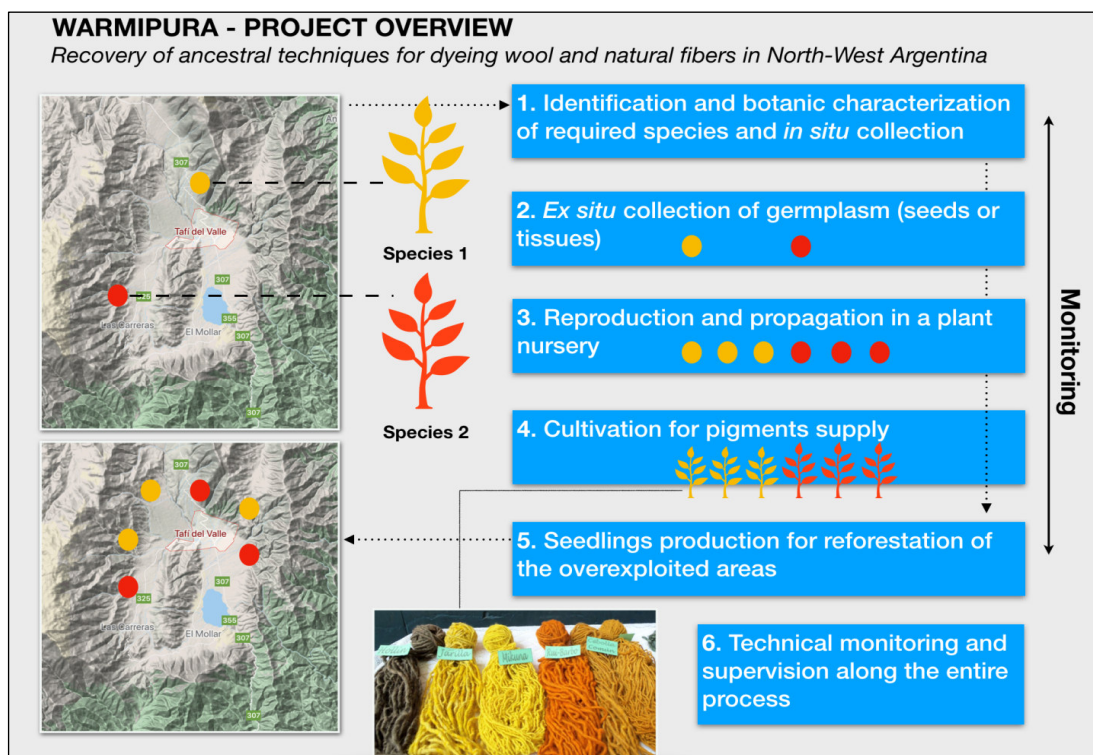


Figure 7. Steps of the project.

The integration of the latter 6 items will bring the actual production in a new framework, as illustrated in Figure 7, increasing organization, availability of some plant species, stabilizing production, regulating the harvest and will also allow to monitor the environment status.

Research activities will focus on: i) morphologic and genetic characterization, identification of the species and assessment of genetic resources; ii) ethnobotany, soil and environment, plant resistance and system resilience; iii) plant reproduction and propagation; iv) cultivation techniques and strategies for the production of raw material; v) dye extraction techniques; vi) environmental and economic sustainability, vii) commercialization of native products.

Discussion and conclusion

Warmipura project is at the beginning and, as indicated in the previous sections, several weaknesses of the production chains have been outlined. Among others, WarmiPura is still carrying out both production and commercial activities without a dedicated building and a proper location. A basic laboratory in which the group can develop and sell all the product could give the possibility to increase sales and to arise incomes. WarmiPura have the aspiration to become a corporate model-based project; this will require the implementation of a management plan. The support of research institutions is crucial for the proper and sustainable development of WarmiPura future activities. The bi-national research team is dealing with one of the main issues related to the use of native plants for pigment extraction, and it is trying to propose adequate solutions to produce the raw material (namely, roots, shots and leaves of a list of specifically selected plants), nevertheless other expertise is needed for a sustainable development of WarmiPura activities in the future.

A holistic view of the process would require the participation of teams dealing with several disciplines, among which chemistry of natural dyes, handicraft design, circular economy and international marketing and social promotion. At this regard, it is worth noticing that WarmiPura represents an interesting case study about sustainable agriculture, scientific research, and international cooperation.

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Acronyms

CONICET	Consejo Nacional de Investigaciones Científicas y Tecnológicas
DAGRI	Dipartimento di Scienze e Tecnologie Agrarie, Alimentari Ambientali e Forestali
FAyCA	Facultad de Agronomía y Ciencias Agroalimentarias
UM	Universidad de Morón
UNIFI	Università degli Studi di Firenze

AGROSMART: COMPREHENSIVE FACILITATION PLATFORM FOR CLIMATE SMART AGRICULTURE

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Abstract

Small holder farmers are one of the most vulnerable subjects of the effects of climate change. Due to their attitude to plan and to follow natural rhythms, they are strongly affected by the increase in variability due to the changing climate. On this issue technology can help to increase resilience realizing climate smart agriculture. Standing to FAO, climate smart agriculture helps to guide actions needed to transform and reorient the agricultural system to effectively support development and ensure food security in a changing climate. AGROSMART offers the possibility to farmers to have adaptive crop management following the changes in environmental conditions: being based on a sensor network to monitor soil, air and meteorological conditions. Through an integrated database, the collected information allows farmers to follow up climate variability by a simple cell phone. The work will describe the main structure and the basic components of the platform and their connection with the climate smart concepts. The cooperative approach of the build-up phase will be also exposed. At its degree of development AGROSMART can offer a scalable model for climate smart farming on which technology and natural resource protection co-exist to improve and grant food security at a small farming scale.

I piccoli agricoltori sono uno dei soggetti più vulnerabili agli effetti del cambiamento climatico. A causa della loro attitudine a pianificare e seguire i ritmi naturali, sono fortemente influenzati dall'aumento della variabilità dovuto al cambiamento climatico. Su questo tema la tecnologia può aiutare ad aumentare la resilienza realizzando una *climate smart agriculture*. Secondo la FAO, la *climate smart agriculture* aiuta a guidare le azioni necessarie per trasformare e riorientare il sistema agricolo per supportare efficacemente lo sviluppo e garantire la sicurezza alimentare in un clima che cambia. AGROSMART offre la possibilità agli agricoltori di avere una gestione adattativa delle colture in base ai cambiamenti delle condizioni ambientali: essendo basato su una rete di sensori per monitorare le condizioni del suolo, dell'aria e meteorologiche. Attraverso un database integrato, le informazioni raccolte consentono agli agricoltori di monitorare la variabilità climatica da un semplice telefono cellulare. Il presente lavoro descriverà la struttura principale e i componenti di base della piattaforma e la loro connessione con i concetti di clima intelligente. Sarà anche esposto l'approccio cooperativo della fase di costruzione. Al suo grado di sviluppo AGROSMART può offrire un modello scalabile per un'agricoltura intelligente per il clima in cui coesistono tecnologia e protezione delle risorse naturali per migliorare e garantire la sicurezza alimentare su piccola scala.

Keywords

Climate Smart Agriculture, Climate Change, Adaptation, Small farming

Introduction

Recent estimations of the United Nations (FAO) (FAO, 2017) give some interesting insight into the state of food security in the world: 15 million people in the world today are chronically hungry. After declining for over a decade, according to estimates dated to 2017, the world must, by 2050, produce 49 percent more food than in 2012 as populations grow and diets change.

Currently, around 80 percent of the world's low-income people live in rural areas and depend mostly on agriculture, fisheries or forestry as a source of income and food. In this scenario the continuous rise of temperature due to climate change and unpredictable weather events is threatening the progress towards eradicating hunger and ensuring the sustainability of our natural-resource base to achieve the 2030 Agenda for Sustainable Development. Furthermore, climate change led, land degradation and desertification, and water scarcity, which impacts rural poor - and mostly young, women and children, as first victims.

Small holder farmers are among the most vulnerable subjects of the impacts of these phenomena. Due to their attitude to plan and to follow natural rhythms, they are strongly affected by the increase in variability due changing climate. Adverse events increase the risk of crop damages and unfruitful yields. Disasters and crises indeed don't just have immediate, short-term effects on small holders: they undermine livelihoods and national development gains that have taken years to build.

Climate change has then a negative impact on food security and is important to increase farmer resiliency in order to grant the common right to a sustainable food system.

The empowerment of small farmers goes toward the synergistic implementation of the Sustainable Development Goals, particularly on SDG 2 and SDG 3: they cannot be addressed even if simultaneously coping with climate change.

On the vision of this nexus even if agriculture is several times considered part of the problem, can turn as a part of the solution: the efforts toward the enhancement of farmers resilience led towards the increase in practice of climate smart agriculture.

The concept of Climate Smart Agriculture

Climate-smart agriculture (CSA) is an approach that helps to guide actions needed to transform and reorient agricultural systems to effectively support development and ensure food security in a changing climate (FAO,2019). As presented by FAO at the Hague Conference on Agriculture, CSA aims to tackle three main objectives: sustainably increasing agricultural productivity and incomes;

adapting and building resilience to climate change; and reducing and/or removing greenhouse gas emissions, where possible (FAO,2019) .

The CSA approach starts from considering agricultural practices on the integrated landscape. Such approach follows the principles of ecosystem management and sustainable land and water use. as well as the assessment of repercussions on energy and local resources: on this way it fosters sustainability into its different dimensions (social, economic, and environmental) in the context where it will be applied.

Landscape management and the evaluation of environmental impact are the key elements that puts CSA in the vision of integrated agriculture climate solutions. By an integrated and holistic crop management, which considers carbon footprints and climate interrelationship and landscape protection, the CSA approach helps to foster cropping as possible carbon sinks, rather than carbon sources. Yields indeed are brought to render their ecosystem service potentials not only in terms of carbon sequestration and food security, but also in relation to the co-benefits for the communities that such approach brings.

Even this greater attention to ecosystem management CSA aims to a sustainable increase of agricultural productivity and incomes from crops and livestock while preserving the environment. Such effects will turn in a raise of food nutritional security leading to higher levels of food and nutrition self-sufficiency. A key concept related to raising productivity is sustainable intensification of production that will increase food production from existing farmland while minimizing pressure on the environment. (Sahu et al. 2020).

The CSA to be implemented need stakeholders from local to national and international levels to identify agricultural strategies suitable to their local conditions (Fig.1).

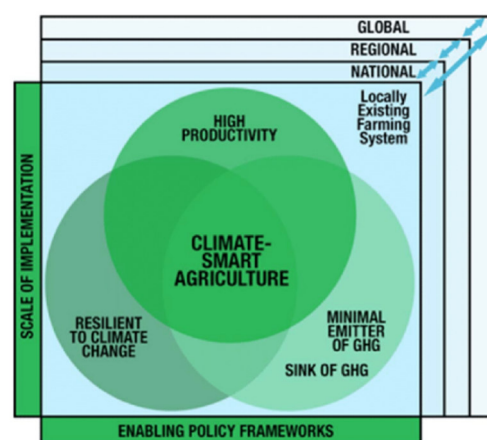


Figure 1. Climate Smart Agriculture at the crossroads of governance levels (Sigh et al., 2011).

Practices, policies and institutions cannot be necessarily innovative, but they have to be thought in the context of climate changes. What is really new is the fact that the multiple challenges faced by agriculture and food systems are addressed simultaneously and holistically (FAO, 2019). The problems of the implementation of climate smart agriculture are that the main information on climate change frequently is unfamiliar or inaccessible to farmers, herders, and fishers. Furthermore, by now the most part of projects of CSA are held by organizations, educational establishments, local NGOs in a fragmented and under-informed scenario.

So, climate smart agriculture can be effectively supported in its implementation by integrated platforms which help farmers to better understand climate change and to adapt to the variability of climate change adverse events. With an integrated approach that creates a nexus between knowledge sharing, remote sensors, renewable energy and biodiversity recover.

Such nexus is crucial to build farmers' resilience in managing climate related disasters such droughts, hailstorms, erratic rainfall, and floods. Furthermore, it helps to implement the adaptive cropping (Maggio and Sitko, 2019) and precision irrigation.

All these factors contribute to realizing a better crop diversity finally bringing to a higher level of food security even in less predictable conditions (Iijima, 2018).

The role of ICT to facilitate CSA implementation

Information and communication technologies have potentially the opportunity to strongly support agricultural and ancillary sectors growth. They represent a great innovative effort that can contribute in timely, accurate, pertinent information services to all categories of farmers. Particularly they can also attract youth farmers.

ICTs can be also very important to implement precision farming and soil health management, and for monitoring pesticides and diseases. Several cases of the use of ICT in agriculture can be found in literature in India and Africa (Panda,2018), and in particular strong interest lies in the Success of mobile based Agricultural Extension.

The advent of android phone/smart phone and its compatibility with different mobile apps has created opportunities for great applications of ICT in agriculture (Panda, 2016). As discussed in the previous paragraph the CSA application strongly depends on Knowledge management.

Referring to Knowledge management (KM) as the process of creating, sharing, using and managing the knowledge and information, ICT can play an elective role in KM, and thus to help farmers and communities to implement the three pillars of CSA.

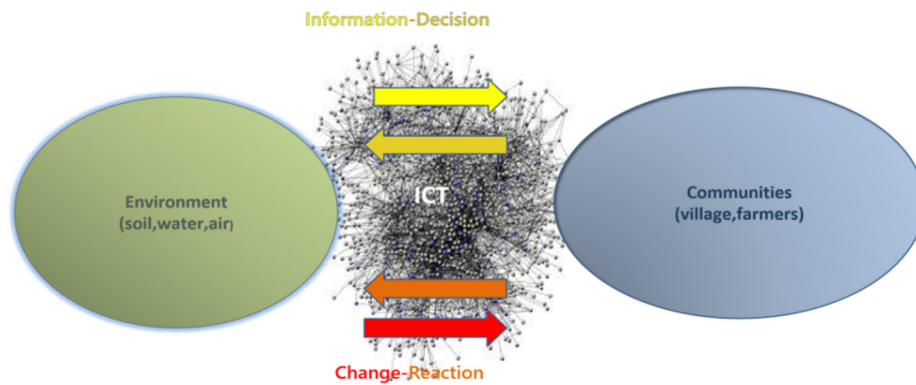


Figure 2. Feedback-loops between “communities”, “decision-makers” and “environment” (Vito, 2018).

In a theoretical framework ICT system act upon “feedback-loops” between “communities”, and “environment” (Fig. 2) catalyzing participation, empowerment and the perception of local knowledge. Through ICTs the “boundary conditions” of a context are better known due to the strengthening of the information-decision mechanism. Going much deeper, the action-reaction mechanism, considerations about resilience could be also advanced.

The reinforcement of the action-reaction mechanism and the catalyzation of the feedback-loops between environment-communities-decision makers could reflect on faster and better responses of communities to environmental changes like extreme events and climate change. Thus, explained in other words this means an enhancement of resilience.

Even if the extreme interest in ICTs, the major challenge for their real application on CSA, is how to involve farmers and how to address the heterogeneity of the farmers community. CSA application brings a radical change in the cognitive domain of farmers, even if traditional knowledge is integrated. It also implies a spatial change in crop lands, passing by big extensive courts to smaller connected yards (Panda,2016). The use of ICT for CSA can improve the quality of the yard production especially when usual farming calendars cannot cope with the unpredictability of climate change conditions.

By sensors, and data sharing platforms it is possible to provide real time data and perform automated alerts to support crop planning. Furthermore, ICT platforms can give access to information about plant features that could help in better crop choices and selection, standing the environmental conditions that could constantly monitored by sensor nodes (Patil and Kale, 2016). The application of ICT for CSA indeed requires attention also to social socio-economic conditions, facilities availability, social capital etc., of the farmer’s community and thus appropriate strategies of facilitation technology ownership are needed.

Network reliability could be an issue for the real effectiveness of these applications, furthermore ICT services should be built upon local access points, taking care about possible digital divides especially for the most vulnerable groups like women and low-income farmers (Aker et al., 2016).

AGROSMART: a platform for climate smart agriculture

AGROSMART is a proposal for an ICT platform in support of Climate Smart Agriculture. It is based on a sensor network that allows to monitor soil, air, and meteorological conditions: through an integrated database, the collected information is made accessible to farmers to follow up climate variability by a simple cell phone.

The stored data also help to pilot a set of solar pumps for a sustainable and variance-compliant irrigation.

The irrigation system is thus in support of an agro-ecological vision of farming, that will help to increase biodiversity and crop richness.

The interaction with the platform is indeed bilateral as the farmers can insert crop management tips, experiential feedbacks and advice based on the local land knowledge. In such a way AGROSMART offers a complete toolkit that uses the information exchange as a paradigm of resilience enhancement.

AGROSMART represents a scalable model for climate smart farming on which technology and natural resource protection co-exist to improve and grant food security at a small farming scale.

Agriculture is at the central point of both SDG 2 and SDG 13 and offers the possibility of acting on climate change on the idea of agriculture as part of the solution.

Particularly, AGROSMART will have 3 main impactful effects on this issue:

- It fosters climate smart agriculture at different level: the open-access structure of AGROSMART allows its services to be used by different groups of farmers, from the biggest to the small holders, offering them the possibility to both find and provide useful information, contributing to provide feedbacks and tips that finally lead to progresses in implementing CSA for the whole users community.
- It improves the cross connectivity of the levels giving the bi-directional interaction that AGROSMART provides to users, farmers of different groups can interact among each other and furthermore they can interact with experts, scientific sources, data providers creating connection and trust in implementing innovative techniques related to CSA.

- It creates the enabling environment for a network of actors to catalyse CSA: implementing connectivity among multiple users and experts it finally turns into a network of practitioners of CSA. Such environment creates the condition to activate more and more users by cross-contamination of new farmers by former farmers that had experienced the platform.

Beside the technological fashion, AGROSMART, wants to create resilience and CSA implementation by coupling an ICT platform with a Community of Practice (Wenger, 2010).

Community of Practices (CoPs) is a concept often used to define informal learning groups (Li et al., 2009), made by volunteers and professionals who share a common interest or concerns to final grow in their practice (Wenger, 2010).

The peculiarities of learning process in (CoPs) are they pass from the possession of knowledge to experience knowing, from holding information to micro-learning by doing, from unwilling subjects to motivated members (Wenger, 2010).

ICT platforms can create the enabling structure for communities of practice, allowing the networking and also adding the possibility to receive data from environmental variables. For these reasons, AGROSMART can represent an innovation toward a community based, and experience learning capillary implementation of CSA. Such features can lead to a more reactive and long-term resilience of farmers, fostered by the support of an ICT platform for adaptive agriculture (Bakare, 2020).

Basic Structure

Figure 3 resumes the basic concept structure of the possible platform for AGROSMART

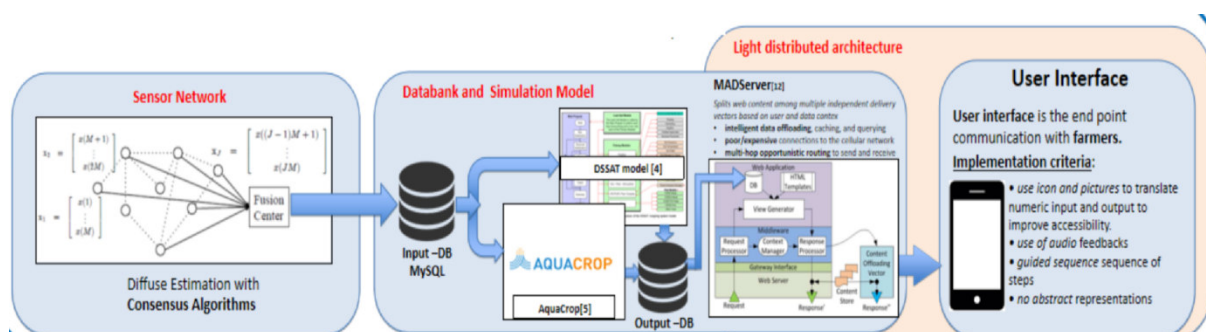


Figure 3. Basic Structure of AGROSMART

At the ground level a network of sensors represents an environmental information source, and the mobile devices are the endpoints. In between a set of predictive models withstand wider decision support systems for farmers taking the inputs from the sensors and the outputs for the mobile

devices. Field sensors are important elements in order to furnish data for testing and validation of the simulation models. They can gather different types of data, from the soil to the atmospheric variables in order to feed the predictive algorithms of the model part. At the end point the information is provided to farmers appropriate interfaces, allowing them to remotely exploit data coming from simulation models to perform agricultural strategies that are more adaptive to climate change. Beside the mere exploitation of data, Web 2.0 social media communities (Facebook, Youtube and instagram profile, Website), fosters the connection of different users under AGROSMART framework.

The actual structure of AGROSMART allows it to be the base for CSA Communities of Practice by joining *information* and *competences* with *experiences*, that are the key pillars of the CoPs capacity building implementation (Wenger, 2010).

Co-creative generation

The generation of the basic structure of AGROSMART, happened through a co-creative process among representatives of different stakeholders (university, farmers, professionals, engineers...).

The seed group was made by 10 members, and very heterogeneous in terms of nationality, cultural background, and education. The idea came responding to the collective question to build something about SDG13 related to agriculture (Figure 4). The group composition wanted to match different expertise and needs in order to figure out the best multi stakeholder solution.

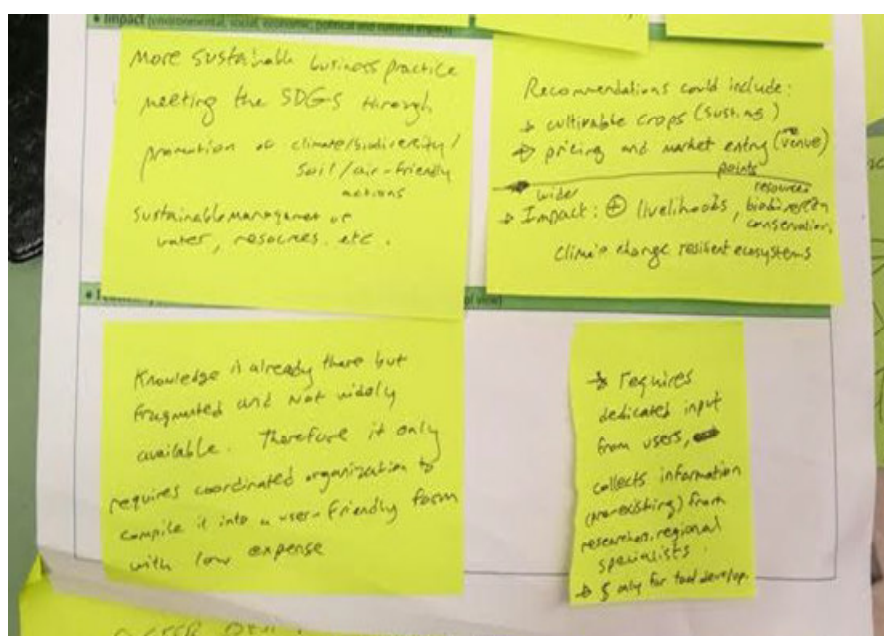


Figure 4. Post-it work on Co-creation with AGROSMART

The development process consisted in essential 3 phases:

A. Problem identification: seed group members have been called to define the main problems related to agriculture in unpredictable conditions, envisioning SDG13. Lack of information, availability of data, crop mismanagement resulted as the main identified problems.

B. Solution Brainstorming: the group has been asked to come out with a solution for the identified problems that could help to foster SDG 13 on the field. Through facilitation tools and co-creation methodologies like open-space (Maruani and Amit-Cohen,2007), fishbowl and mind-mappings, the group of different stakeholders came out with a first draft of the idea of AGROSMART.

C. Implementation strategy: the draft IDEA of AGROSMART has been refined in a third phase. Furthermore, in the implementation phase, after the technological set up, an implementation strategy based on the Community of Practices has been designed.

The collaborative challenges of designing a multi-stakeholder solution have led to the current version of AGROSMART. Co-design methodologies have been used to enhance the collaboration skills among the seed-group members.

The final outcome of the process resulted in a very cross-disciplinary solution, that valorized the synergies among different points of views.

The community-based approach

Beside the technological tool, the creation of Communities of Climate Smart Farmers couples the AGROSMART platform: the introduction to the new technology, the ownership will proceed by collective session on the use of the tool and sharing the information on Climate Smart Agriculture with support of the Community Based Organization (CBO, 2020). In general Community based organizations (CBO) act on the local level in order to enhance life quality of its residents. The principal objective of CBO is to create and empower social equality under several aspects.

The communities can be supported by the platform which allows the exchange of peer-to-peer knowledge on best practice, experiences, case studies and difficulties on the implementation of climate smart solutions, but also can be the place to gather together farmers and transfer them knowledge, skills and capacity on CSA and AGROSMART.

Conclusions

Rural areas are expected to face the major impacts on water availability and supply, food security, infrastructure, and agricultural incomes, due to climate change. The subsequent high variability of climatic conditions reflects in a change in timing of plant growth, causing hard management of production cycles for the farmers.

The impact of this phenomenon is particularly strong in low-income countries, where instruments to develop effective agricultural adaptation strategies could lack. In these scenarios, a possible support comes from ICT technologies. The role of ICT to enhance food security and support rural livelihoods is increasingly recognized and was officially endorsed at the World Summit on the Information Society (WSIS) 2003-2005.

These technologies in association with mathematical models, should provide useful tools to predict high variable environmental conditions, hence allowing a better harvest management. AGROSMART enhances this feedback loop between environment and communities.

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**BOA_MA_NHÃ, MAPUTO!
EXPLORING THE WATER-ENERGY-FOOD NEXUS
IN THE MAPUTO METROPOLITAN REGION AND PROVINCE**

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Abstract

The paper presents the premises and some ongoing results from “Boa Ma Nhã, Maputo!”, a transdisciplinary research project based at Politecnico di Milano in partnership with Eduardo Mondlane University (Maputo, Mozambique) and the Italian Agency for Development Cooperation. The project is focused on the districts of Boane, Moamba, and Namaacha, questioning their role in consideration of the ongoing metropolisation of the Maputo Province, where the relation between urban and rural, national and transnational, local and global has become critical. Among the most pressing challenges, the main ones are related to the changing rural-urban socio-economic conditions and the local effects of climate change, including water competition, food insecurity, and access to energy. The research project embraces these challenging issues, mainly untackled by local planning tools, by proposing a multi- and inter-disciplinary approach to address the development of the growing peri-urban environment of Maputo in an integrated way and considering the interdependencies between internal/transnational migrations, demographic transitions, the increasing scarcity of natural resources, climate risks, natural hazards, local economic patterns (formal and informal). Particular attention is devoted to the Water-Energy-Food Nexus, considering the potential evolution of the agriculture sector, backbone economy of the region, in relation to the whole food system and its multiple environmental, economic, social, and cultural implications.

Il saggio presenta l'impostazione e alcuni risultati preliminari di "Boa_Ma_Nhã, Maputo!", un progetto di ricerca interdisciplinare curato dal Politecnico di Milano in collaborazione con l'Università Eduardo Mondlane (Maputo, Mozambico) e l'Agenzia Italiana di Cooperazione allo Sviluppo (Aics). Il progetto ha come campo di ricerca i distretti di Boane, Moamba e Namaacha, e il loro ruolo rispetto al processo di metropolizzazione della Provincia di Maputo dove le relazioni tra urbano e rurale, nazionale e transnazionale, locale e globale pongono sfide rilevanti. Le più urgenti sono legate alle condizioni socio-economiche tra rurale e urbano, agli effetti locali dei cambiamenti climatici, tra cui la competizione per l'accesso e l'uso delle risorse idriche ed energetiche e l'insicurezza alimentare. Il progetto di ricerca affronta queste problematiche, trascurate dagli strumenti pianificatori vigenti, proponendo un approccio multi- e inter-disciplinare per leggere e immaginare uno sviluppo più sostenibile ed integrato del territorio peri-urbano della città di Maputo, considerando le interdipendenze tra migrazioni interne/transnazionali, trend demografici, sicurezza alimentare e idrica, rischio climatico e disastri naturali, e dinamiche economiche (formali ed informali). Particolare attenzione è dedicata al nesso Acqua-Energia-Cibo, considerando la potenziale evoluzione del settore agricolo come spina dorsale dell'economia locale, in relazione all'intero ciclo alimentare e alle sue molteplici implicazioni ambientali, economiche, sociali e culturali.

Keywords

Southern Africa, food security, water competition, transcalarity, interdisciplinary methods.

Premise: “Boa_Ma_Nhã, Maputo!” Project

“Boa_Ma_Nhã, Maputo!” (Polisocial Award 2018) is a research project based at Politecnico di Milano¹, carried out in partnership with the Eduardo Mondlane University (Maputo, Mozambique) and the Italian Agency for Development Cooperation (Aics, Maputo), with the support of the NGO Progetto Mondo MLAL, and the Faculty of Agricultural Sciences and Technologies at the University of Milano.² This paper aims at presenting the general framework of the project, its methodological approach and some preliminary results from a preparatory assessment phase. It highlights the need of setting a transdisciplinary and transcultural platform to deal with the challenges of local sustainable development when appropriate planning tools are lacking. This approach also aims at fostering cooperation for the co-production of knowledge and conditioning the metropolitan agenda towards a better awareness.³

The project is focused on the Maputo Province - and in particular on the western districts of Boane, Moamba, and Namaacha - and crossed by the “Maputo Corridor” (one of the most important infrastructures in the Southern African region, connecting Maputo with Johannesburg). More than 3,000,000 inhabitants live in this area, representing over 13% of the Mozambican population and over 40% of the urban population of the country. However, the lack of information regarding existing cross-scalar patterns that have been producing this territory in the past decades makes Maputo an “unknown Metropolis”, fragmented in terms of administrative boundaries and governance (Andersen et al., 2015) and shaped by a complex tangle of informal or unmapped economic and spatial flows and systems. Among the main challenges that this territory has been facing, some are more evident and urgent, such as the changing rural-urban balance due to demographic growth, migrations and progressive urbanization, the local effects of climate change, deforestation, food and water insecurity, land grabbing, socio-economic and weak territorial governance. All these conditions make the peripheral districts of the fast-growing Maputo Metropolitan Region a fragile territory in need to be framed in a synergic inter-scalar vision for a more sustainable and integrated territorial development.

Due to the scarcity and inconsistency of the available statistical data and the lack of updated digital cartographies, a series of actions in terms of research methodologies and planning tools have been

¹ Four departments are involved: Architecture and Urban Studies (DAStU), Civil and Environmental Engineering (DICA), Electronics, Information and Bioengineering (DEIB), and Energy (DENG).

² See the “Acknowledgments” section for more details.

³ The project has been completed in July 2020, almost a year after the presentation of this paper at CUCS Conference 2019. Due to the publication timeframe, this paper presents the early results (assessment stage) of the project as per the original aims of the authors, at the same time keeping as a references the final outcomes of the research.

designed and implemented in support of local actors to fill in the knowledge gaps, while coping with present urgent issues. “Boa_Ma_Nhã, Maputo!” research project embraced all these challenges by proposing a multi- and inter-disciplinary approach to tackle the development of the growing peri-urban environment of the City of Maputo in an integrated way, overcoming the traditional sectoral approach, and considering the interdependencies between issues such as migrations and demographic trends, unplanned urban growth, food and water security, climate change and natural hazards, local economic patterns (formal and informal), land tenure, cultural diversity, mobility and infrastructure.

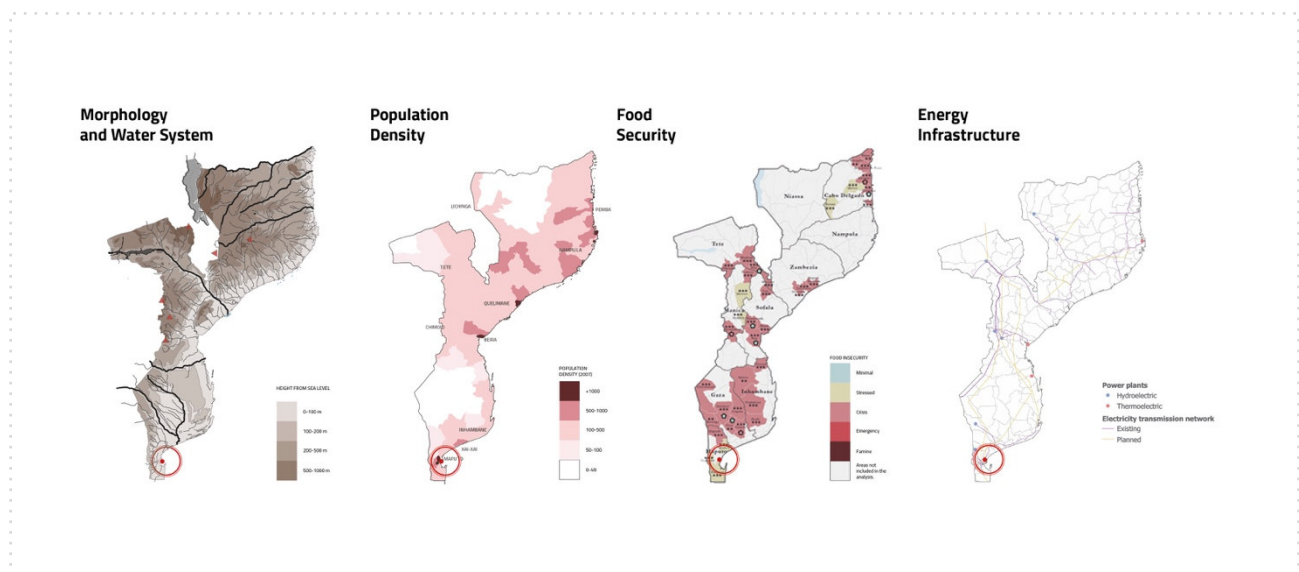


Figure 1. Locating Maputo. Main geographical framework in relation with national population density, climate and infrastructure networks. Source: Mo.N.G.U.E. Polissocial Award 2016.

More specifically the project aims to:

- Contributing to Pimi project⁴, in order to fill the knowledge gaps and co-producing new knowledge in support of future research and planning activities, with the aim of overcoming rational-comprehensive/technocratic planning perspectives;
- Testing an integrated and replicable methodological approach to produce specific guidelines to support decision makers dealing with the challenges of sustainable development in fragile contexts of the Global South;
- Verifying the methodological approach through a locally relevant pilot project, involving local actors and investing in education and local rural entrepreneurship with the aim of producing measurable impacts.

⁴ “Programa de Investigação Multisectorial Integrada (Pimi) Estudo para a Promoção do Desenvolvimento Territorial Integrado da Região de Boane, Moamba e Namaacha”, a project initiated by FAFP, Mondlane University and Aics Maputo. See the “Acknowledgments” section for more details.

The project gives particular attention to the Water-Energy-Food (W-E-F) Nexus, considering the potential evolution of the agriculture sector, backbone economy of the area, and the whole food cycle and its multiple environmental, economic, social, and cultural implications. The project also assumed the UN Sustainable Development Goals (SDGs) (United Nations, 2015) and the UN-Habitat framework for urban-rural linkages as main cultural and policy-oriented framework and reference (UN-Habitat, 2017).

An Integrated Methodological Approach: Building a Common Research Ground

Since the early research operations performed by the “Boa_Ma_Nhã, Maputo!” team, multi- and inter-disciplinary methodological approaches have been specifically designed and implemented, with the aim to integrate a transcalar and multi-sectoral planning framework for the study area (Smith and Jenkins, 2015). The research team includes experts in physical planning and urban design, governance analysis, landscape design, sociology, civil, hydraulic and environmental engineering, energetic engineering, electronics and information engineering, combining hard and soft sciences. The general methodological approach proposed by the project includes both qualitative and quantitative multi- and inter-disciplinary methodological approaches, and it has been articulated in remote and on-site research activities. A key research operation has been the spatialization and representation of the collected data (i.e.: demographic trends and urban growth, land cover and land uses, food production patterns, climate data, hydrographic systems, energy networks and resources, etc.) into synthetic cartographies, which are presented in this essay, to be a common ground to visualize correlations among different phenomena and conceptualizations. The team initially worked mainly within a GIS environment, combining information from a variety of international (institutional or independent) databases - such as, among many, Global Forest Watch and WorldPop - and qualitative / quantitative data from national authorities such as the *Centro Nacional de Cartografia e Teledetectao* (Cenacarta), the *Instituto Nacional de Estatística* (INE), and local authorities. The project team also adopted Participatory Action Research methods, which emphasizes the co-generation of knowledge between researchers, the projects partners, interviewees and other actors to implement and assess the result of the research process with the academic / scientific community of reference and with the local stakeholders.

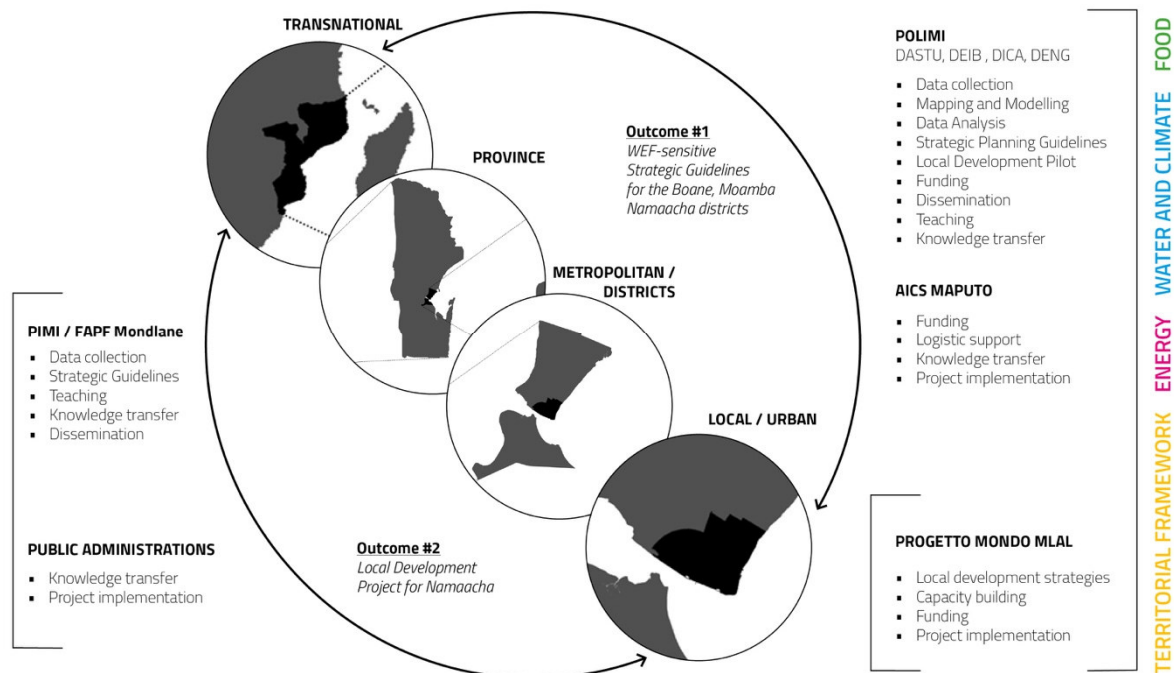


Figure 2. Research operations, actors and territorial scales. Source: Elaboration by “Boa_Ma_Nhã, Maputo!” team (A. Buoli), 2019.

Transcality: setting a telescopic framework of correlations

Along with the relevance of using an integrated methodological approach to deal with the complexity of the challenges mentioned above, the research project adopts a trans-scalar territorial perspective on the Maputo Metropolitan Region. In particular, it is relevant to stress the inconsistency of existing administrative boundaries in relation to the most important transcalar and cross-boundaries relational systems impacting the territory of study⁵, and in particular the three districts of Boane, Moamba and Namaacha, such as:

- the transnational scale of the Umbeluzi, Incomati and Maputo water Basins, of the cross-border trade along the Maputo-Johannesburg Corridor, and of the existing and planned natural protected areas between Mozambique, South Africa and eSwatini;
- the national and macro-regional scale of mobility infrastructures and energy production and distribution networks;

⁵ In administrative terms and for the purpose of demographic analysis, the Province of Maputo does not include the City of Maputo (*Cidade de Maputo*), that represents a different territorial unit.

- the administrative interplay between the provincial and district level at which the main public services and facilities are managed and provided to citizens, as well as the scale of the metropolitan region of Maputo;⁶
- the local and neighbourhood scale of everyday socio-spatial practices.

Working in this trans-scalar and fragmented territorial setting represents a main productive challenge both in methodological and epistemological terms, and a testbed for the development of innovative trans-disciplinary research tools. Among them, maps have a potential crucial role. Existing planning tools can rely on scarce, borders-limited and sectoral cartographies, unable to play a role as facilitating tools to assist decision making processes. “Boa_Ma_Nhã, Maputo!” includes an cartographic effort aims at re-composing the mosaic of the current planning tools in force in the study area, visualizing and investigating potential synergies, conflicts and emerging issues. Moreover, layering this mosaic with the transdisciplinary data-visualization produced within the assessment phase of the project, is meant to further improve the contribution to local territorial authorities and the definition of metropolitan frameworks of cooperation.

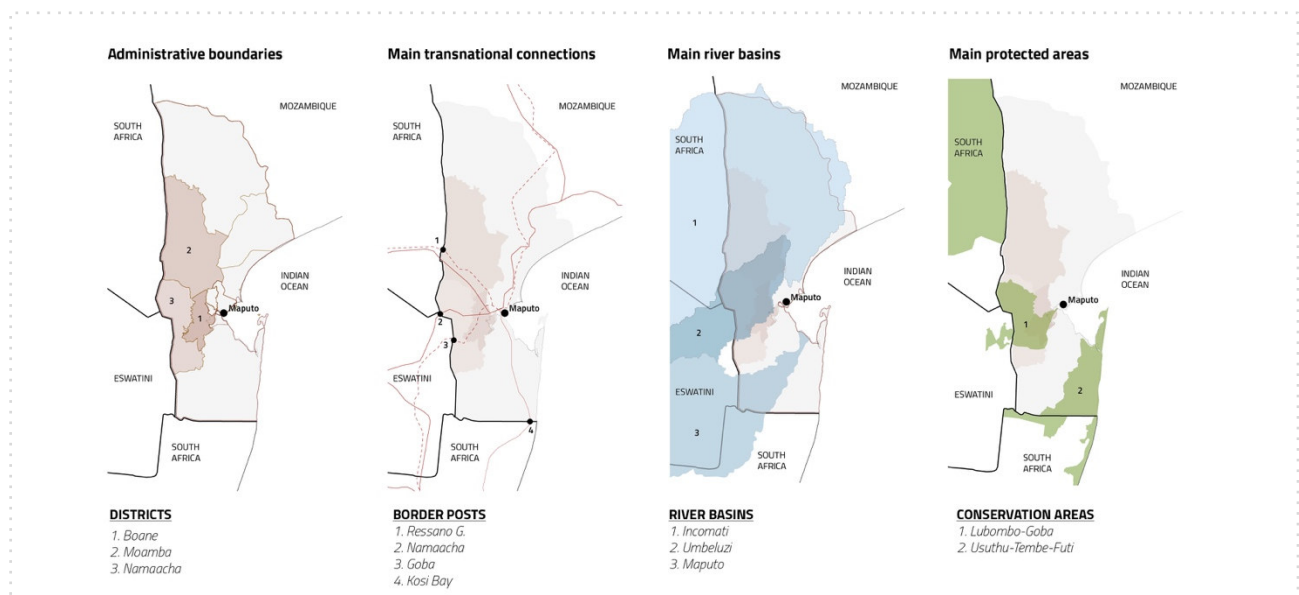


Figure 3. Transnational research framework: administrative boundaries, border posts and main connections, river basins and protected areas. Source: Elaboration by “Boa_Ma_Nhã, Maputo!” team (A. Frigerio), 2019.

⁶ The so-called “Greater Maputo” is a still undefined territorial entity which includes Maputo City (excluding Inhaca), Matola City, the eastern portion of Boane City, and the southern half of Marracuene District (Jenkins, 2012; Macucule, 2016).

The W-E-F Nexus in the Maputo Metropolitan Region

In accordance with the aim of overcoming the locally diffused rational-comprehensive/technocratic planning perspectives and their limits, the project roots its methodological approach in the systemic, metabolic and integrated framework proposed by the Water-Energy-Food (W-E-F) Nexus, keeping together different scales and disciplines. The W-E-F Nexus approach, embraced by Fao (Fao, 2014) and other important international organizations, has undergone different conceptualizations, according to scope, objectives and understanding of drivers. However, the conceptual framework that systematically links natural environment and human activities through trade-offs and synergies is a crucial lens to investigate the complexity of territories and to set more integrated and cost-effective decision-making and planning processes by challenging existing borders, policies and procedures at the various scales.

Looking at the Maputo Metropolitan Region and its Province and the urban-rural dynamics pushed by climate-change and socio-economic drivers, the W-E-F appears to be a crucial conceptual and methodological perspective to understand the current conditions of this territory and to properly plan its future development accordingly with local resource availability and needs. The increasing competition, observed in the study area, for resources such as water, energy, agriculture, fisheries, livestock, forestry, mining, transport and other sectors is determining impacts for livelihoods and the environment that are difficult to be predicted and controlled. In addition, the lack of a clear governance framework to implement effective W-E-F and sustainable development policies in the province appears to be one of the main obstacles towards an integrated vision for these territories.

Maputo Metropolitan Region: an unbalanced territorial growth

Mozambique's capital city, Maputo, and its province are located in the southern part of the country on the east coast of Africa. National boundaries overlap with geographical characters that shape the province and its landscape. In particular, the Lebombo Mountains, a long narrow mountain chain, range with volcanic origins, stretch north-south separating the Kaapvaal Craton (South Africa and eSwatini) from the sedimentary basin of Southern Mozambique, setting a natural border. Maputo Bay, where the three main rivers of the province (Umbeluzi, Incomati, Maputo) reach the ocean, is the most relevant geographic feature in the region. It forms a valuable harbour, accessible to large vessels at all seasons of the year, and was thus perfect for European traders to settle, kicking off Maputo urban history (Jenkins, 2012). The city has grown for two centuries as one of the most important port cities in Eastern Africa, especially thanks to the convenient connection with Johannesburg and the Gauteng's region mining industries. Today, the city has crossed its

administrative limits, merging with Matola, to host more than 2 million people, a number that has doubled in the last ten years (INE, 2018).

	2007	2017	Variation % (2007-2017)
Boane	102.457,00	210.498,00	105,45%
Moamba	56.746,00	83.879,00	47,81%
Namaacha	41.954,00	48.933,00	16,63%
Magude	54.252,00	63.691,00	17,40%
Manhiça	192.638,00	208.466,00	8,22%
Marracuene	157.642,00	230.530,00	46,24%
Matutuíne	37.239,00	44.834,00	20,40%
Matola	672.508,00	1.616.267,00	140,33%
Maputo Province	1.205.709,00	2.507.098,00	107,94%
Maputo City	1.120.360,00	1.080.277,00	- 3,6%

Table 1. Evolution of the population in the Maputo Province.

Source: Elaboration by “Boa_Ma_Nhã, Maputo!” team (A. Buoli and A. Frigerio) based on INE (2018), República de Mozambique / Ministério da Administração Estatal (2014a,b,c), Maputo Province (2017).

Available data from the WorldPop database for 2003 and 2013⁷ show an increase of the urbanized areas along the northern axis between Maputo and Marracuene, southward close to Boane and along the main infrastructures and rivers in the province, towards the inlands and the borders with South Africa and eSwatini. Sprawling low density patterns are rapidly consuming land and the Greater Maputo is expanding over agricultural fields and forests, concentrating urbanization around the bay and along the main infrastructure lines and rivers, while the rest of the province is mostly non-urbanized nor cultivated and characterized by natural landscapes. Differentiated growth rates characterize the Greater Maputo Metropolitan Region and the rest of the province. Macucule (2016, p. 203) refers to this territory as “a continuous urbanization, a proto-metropolisation (...)” and synthesizes the main socio-economic dynamics which are shaping it: “the increase in the household income and in the use of cars, stimulating the option to increasingly live away from the centre (in Matola Rio, Boane and Maracuene), the large and multinational industries (Mozal, large retail and industrial markets), the increasingly strong connection of the local markets with South Africa” (*ibidem*). Additional factors of *metropolisation* are related to “international migration of people and capital linked to the advent of mineral resources in Mozambique and strong real estate investments (housing, commerce and services) in the centre which, together with the construction of the new ring road, are increasing the polarizing potential of the city of Maputo” (*ibidem*). Direct

⁷ Data from: European Commission, Joint Research Centre (JRC); Columbia University, Centre for International Earth Science Information Network - CIESIN (2015).

observations in different areas of the province highlighted a punctual and discontinuous distribution of settlements and small villages along the main roads among small semi-urban centres, the railway lines, and the (major and minor) rivers of the province: a combination of dispersion and agglomeration factors of urban activities (*ibidem*, p. 205) seems to be at play with different degrees and outcomes.

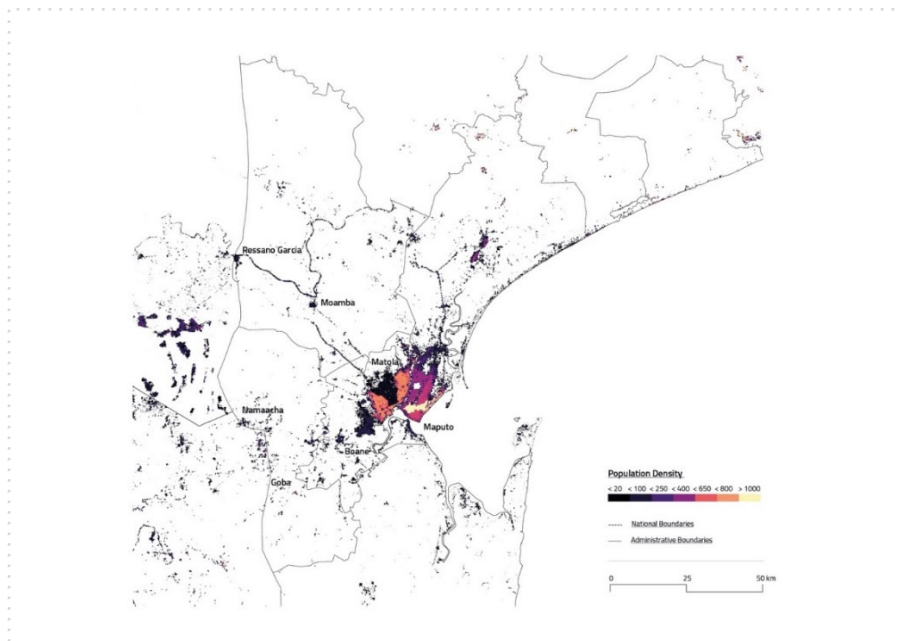


Figure 4. Density of Population (2015). Source: Elaboration by “Boa_Ma_Nhã, Maputo!” team (A. Buoli and A. Frigerio) based on European Commission, Joint Research Centre (JRC); Columbia University, Centre for International Earth Science Information Network - CIESIN (2015).

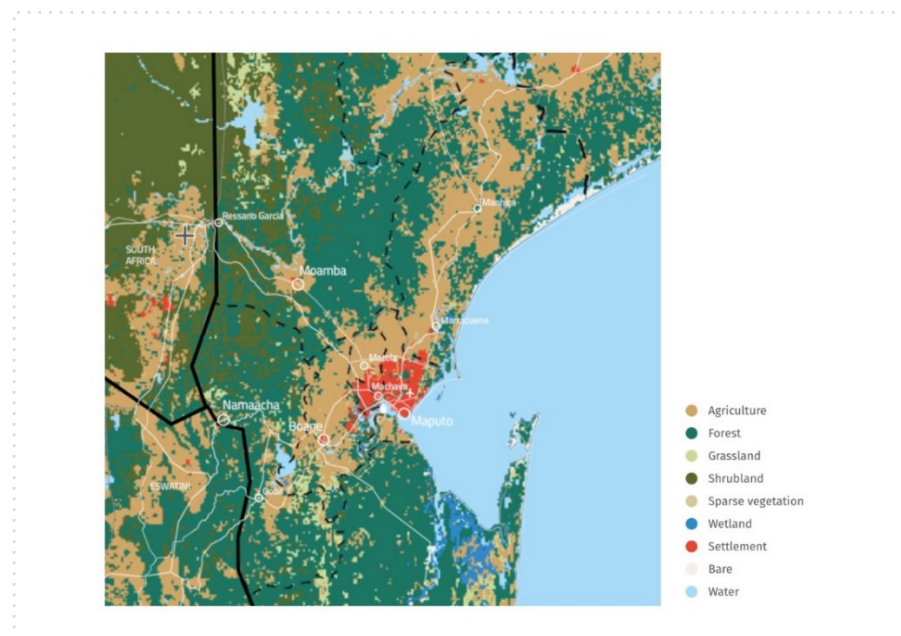


Figure 5. Land Use. Data © ESA Climate Change Initiative - Land Cover led by UCLouvain (2017). Source: Elaboration by “Boa_Ma_Nhã, Maputo!” team (A. Frigerio and A. Buoli) based on Global Forest Watch.

Processes of urban dispersion appear to be related to both structural conditions – also due to the administrative configurations and a (weak) territorial governance system in place – and the acceleration of demographic dynamics, especially in relation to the increase in the average income of households that has been promoting urban sprawl with consequent territorial fragmentation (*ibidem*, 206-207). At the same time, the main public (social and cultural) services and facilities – and therefore the highest degree of urbanity related to their concentration and interaction – are mainly localized in the city of Maputo (and especially in the *cidade de cimento*, the urban core of the city) or in the (medium and small) urban centres of the province (Jenkins, 2012, p. 24).

Moreover, rural-urban migrations are increasing. Most of the rural population rely on subsistence agriculture, but climate change and production costs are affecting the sustainability of traditional farming. Food security, in fact, is one of the most critical issues for Maputo's future, with most of the food consumed in the city being imported from abroad, according to more or less formal dynamics (Piscitelli, 2018). Growing food in the province is getting more and more difficult due to the scarce fertility of soils and to the lack of water caused by climate change, governance problems, water competition and absence of infrastructure.

The presence of foreign investors in agriculture is limited, but they get the best lands and the scarcely available water to grow water intensive cash-crops for export. Local entrepreneurship in agriculture, instead, is very limited, even because of the difficult accessibility of rural population to markets and services. Scarce connectivity across the province, depending on the limited density of its road network, isolates the majority of rural populations living further than 2 km away from any classified road. Fuel has a high cost, making mobility, mechanization and energy access another crucial challenge. In this framework, especially for the rapidly growing young generations, migrating from rural areas to the capital city seems to be the only choice, increasing the demand for the already critical offer of urban services and basic infrastructure, and thus abandoning rural and natural landscape to a socio-ecological desertification.

Food (In)Security, Water Competition, Energy Access and main Environmental Challenges in the Boane, Moamba and Namaacha region

Agricultural production between subsistence, intensive exploitation and the irrigation gap

Agriculture is the main economic activity in Mozambique providing income for more than 70% of the population, contributing by 31,8% to Mozambique's gross domestic product (GDP) and absorbing 81% of the total work force (World Bank, 2015). However, food security is a crucial issue for the development of the country.

The agricultural sector is mainly dominated by smallholder farmers, using family labour (99%), that practice subsistence rainfed agriculture in plots ranging from 0,5 to 1,5 ha (World Bank, 2015). They account for 95% of the country's agricultural production and produce mainly staple food crop production (maize, pigeon peas, cassava and rice) for household consumption. The remaining 5% of agricultural production is carried out by about 400 commercial farmers, mainly producing cotton, cashew, tobacco, sugar cane, coconut, sesame, soybean and fruit.

Mozambique is regarded as having great potential for agricultural production. In fact, even if the agricultural area covers 63,5% of the country area (78,6 Mha), less than 12% is used for a total of 5,7 Mha, mainly harvested with banana (31,8%), maize (18,6%) and groundnuts (6,9%). Furtherly, irrigation could potentially involve about 3 million hectares in the country, but currently only 90.000 ha are irrigated (De Sousa et al., 2017). Traditional irrigation system including furrow or surface irrigation are the most widespread thanks to the low input required in terms of energy compared to pressurized systems. Since the 60s the harvested area has doubled with a sharp increase after the year 2004 (Faostat, 2019). Current crop yields are much lower if compared to European countries and are also lower than the majority of sub-Saharan countries (Faostat, 2019). The highest increases in crop yields are registered for potatoes, onions and tomatoes, crops that also see a rapid increase in harvested areas (Faostat, 2019). Previous studies highlight how Mozambique's low yields are mainly due to a lack of irrigation water and to the fact that the country's soil is nutrient-poor (Muller et al., 2012). In the country less than 2% of total agriculture is currently (2010) irrigated (Aquastat, 2019), mainly with traditional irrigation systems. The majority of smallholders have limited inputs, and yields are generally low because of difficulties in accessing credit and markets. Furtherly, lack of refrigerated, logistic and infrastructure aggravated the low agricultural production.

The situation in the southern regions is furtherly worsened by a lack of nutrients in soils, reducing the crop yield even more. Thus, the agricultural sector is highly vulnerable to shocks, extreme events and market prices. Therefore, smallholder agriculture can be vulnerable and unsustainable in the long term due to low yields, labour-intensive technologies, and exposure to climate shocks (Silici et al., 2015).

Boane

About 35.000 ha are harvested in Boane district each year, mainly for vegetables, bananas and citrus of which 7.000 ha are irrigated (SDAE, 2011). Smallholder farmers usually have less than 1ha each and still practise subsistence agriculture with low inputs and consequently low yield. Farmers complain about scarce soil fertility and the too high cost of fuel, however the *Centro de*

Investigao e de transferencia de tecnologias Agricola de Umbeluzi organizes courses for them, both devoted to agricultural practices and livestock. Furtherly, it is in the intention of the government to promote the use of local seeds and organic fertilizers and to provide the most potential areas for agriculture with electricity. Livestock in the district is mainly devoted to cattle, sheep, pork and poultry (egg and meat) (SDAE, 2011). In the last years, we are assisting to a restriction of livestock due to a reduction of rangelands due to city and villages expansion.



Figure 6. Irrigation system in Boane district. Red dots represent water withdrawal for irrigation purposes. Source: Elaboration by “Boa_Ma_Nhã, Maputo!” team (D. D. Chiarelli) based on information provided by the Instituto Nacional de Irrigação, Ministério da Agricultura e Segurança Alimentar.

Moamba

Out of about 200.000 hectares potentially suitable for agriculture, in Moamba only 20% are currently harvested mainly by smallholder farmers (<1,5 ha). Specifically, 21.630 ha are rainfed and 8.427 ha are irrigated (Cenacarta). Soil fertility in Moamba district is very low and the climate is dry with low precipitation. The main harvested crops are maize, nuts, beans, sugarcane and tubers (potatoes and cassava) (SDAE, 2011). Once a year there is a local peasant fair, while normally the production is sold in the capital market. More than for agriculture, the area of Moamba is very

exploited for livestock. In fact, more than 60.000 ha are used for livestock production: Moamba is the second most productive district in the Province of Maputo with 52.000 beasts.

Namaacha

Vegetables, maize, nuts, tubers and bananas are the main crops harvested on 14.792 ha rainfed and only 1.986 ha irrigated (SDAE, 2011). The district of Namaacha, however, sees in fruits, vegetables and poultry production a way forward for the next years. Every year, during the sowing period, courses to farmers are provided in order to help them in field managements and seeds choice. Farmers usually harvest small pieces of land (i.e. < 1 ha) and complain about aridity, but also for parasites that kill crop production. The extension services in the district have 4 extensionists and 1 supervisor who assist about 2.600 producers (836 men and 1.764 women) and 39 associations (1.015 members), of which about 29 are legalized. From 2011 the association Hanhane of Machauatimuca manages an irrigation system of 10 ha with the possibility to enlarge it in the future. The great potential of Namaacha agriculture is only limited explored by few farsighted entrepreneurs that recognize in organic fruit production and sophisticated irrigation systems (i.e. drip irrigation system in greenhouse) a way for running their business, as for the case of a strawberry farmer that is now covering the demand of three supermarkets in Maputo (Figure 7).



Figure 7. Strawberry production in Namaacha. Photo by A. Frigerio (2019)

Throughout the region, banana and sugarcane are the two main crops production carried out by foreign investors. Examples of those investments, mainly by South African companies are Bananalandia (located in Boane district) and Agrisol (located in Moamba district - data collected through fieldwork). Both sugarcane and bananas are crop intensive plants whose crop water requirement range around 12.000 – 13.000 m³/ha, and they require irrigation during the dry period. Specifically, our research shows how only about 50% of the water demand is supplied by rainfall, while the remaining is provided with irrigation, mainly sprinkler systems. Those fields are also receiving high input in terms of nutrients (i.e. fertilizers) and pesticides in order to maximize the profit and the production, mainly devoted to external markets.

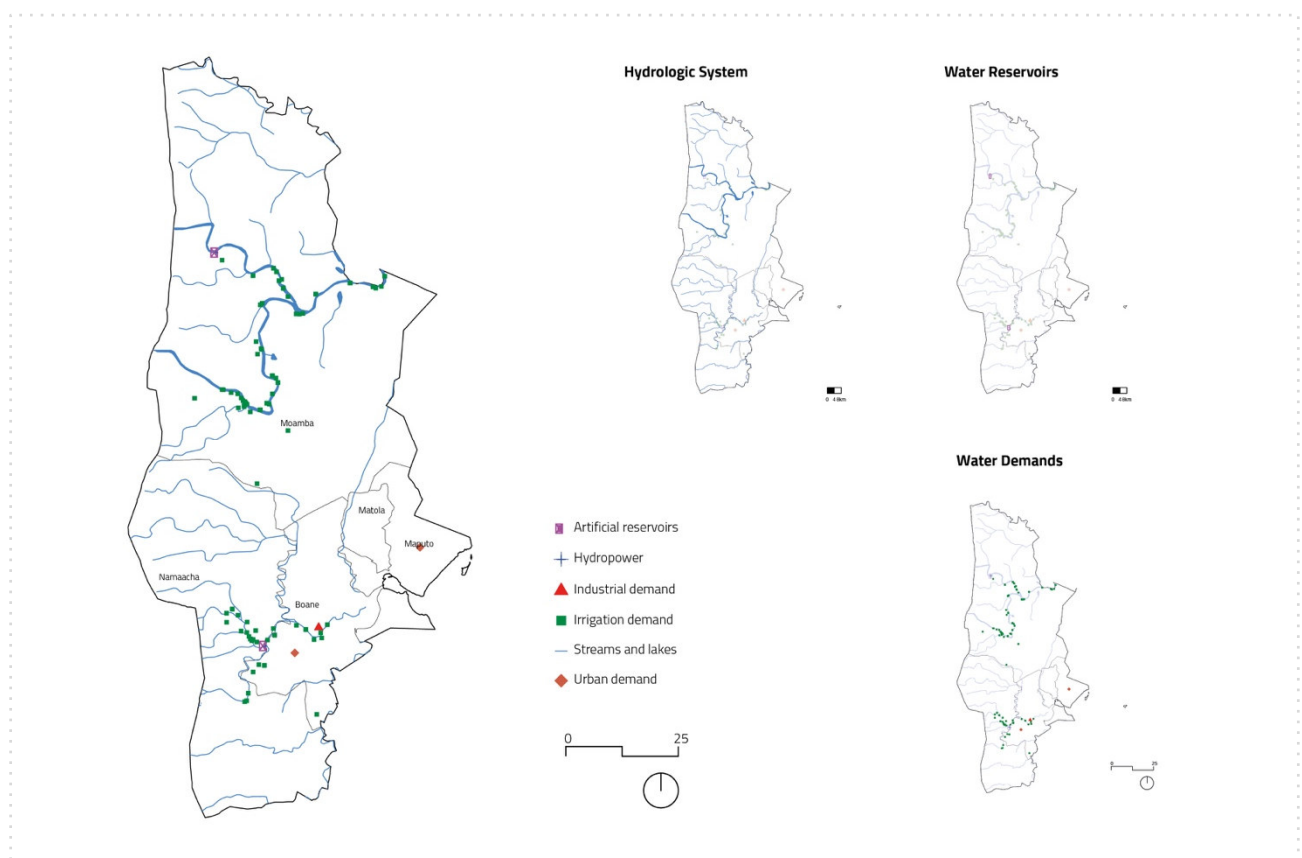


Figure 8. Hydrologic System, Water Reservoirs and Water Demands in the Boane, Moamba and Namaacha districts. Source: Elaboration by “Boa_Ma_Nhã, Maputo!” team (A. Amaranto), 2019.

Dealing with Water Competition: between Scarcity, Weak Management and Climate Crisis

The main source of water supply for urban, industrial and agricultural uses in the metropolitan area of Maputo, including the three districts of Boane, Moamba and Namaacha is the transnational Umbeluzi water Basin, extended across Mozambique, eSwatini and South Africa.

The main reservoir of the basin for the area is the Pequenos Libombos Dam, in Namaacha District but climate change and water competition are reducing water availability, threatening water

security. There are two major dams in the Umbeluzi river: the Mjnoli Dam (152 Mm³) and the Pequenos Libombos Dam (382 Mm³). Mjnoli was built in 1978 for securing water supply for the sugar-cane plantations in eastern eSwatini, while Pequenos Libombos was constructed in 1987 with the goal of ensuring urban water supply for the city of Maputo. A percentage of the releases from Pequenos Libombos is also used for agricultural and industrial purposes

The second relevant source of water in the province is the Incomati water Basin, that will soon contribute to Maputo's urban water supply thanks to new infrastructure developments on Corumana Dam, now exclusively used for energy production. The new dam Moamba Major, now under construction, will also provide water for agriculture and energy production. The *Administração Regional de Água (ARA) Sul* is the water agency responsible for the river basins in southern Mozambique. Considering the fundamental role covered by the Umbeluzi River for the Maputo domestic water supply, ARA-Sul is strongly involved in hydrological modelling, flood management and forecasting. It is also responsible for the operation of the Pequenos Libombos Dam.



Figure 9. Pequenos Libombos dam water withdrawal for agricultural purposes. Source: Elaboration by “Boa_Ma_Nhã, Maputo!” team (D. D. Chiarelli), 2019.

Research conducted in remote and on-site revealed the persistence of a water-related crisis during the last 5 years that has driven local authorities (in particular the Maputo Regional Water Company - AdeM) to reduce “the water supply to the Greater Maputo Metropolitan Region, the satellite

industrial suburb of Matola and Boane district after a prolonged drought which started in March 2015 affecting Mozambique and other parts of southern Africa” (APANews, 2016)⁸.

Namaacha is the only one among the district located upstream the dam. Therefore, the water supply for the district is not regulated by the management of the reservoir, but only depends on the Mjnoli Dam (which however usually releases enough water through the year). The main limitation for water distribution in the district is represented by technological developments: the pipeline network reaches only a small portion of households, and it is often required for people to walk to the city well or to the Umbeluzi river for water supply.

The three districts of Maputo, Boane and Moamba are the primary beneficiaries of the releases from the Pequenos Libombos dam, which was initially built solely for urban water supply. The development of agriculture and industries in the area did not change the water supply priorities: whenever a water shortage occurs, agriculture is the primary sector affected, followed by industry. In recent years, the World Bank founded a project for the expansion of the water distribution network in the city.

Focusing on agriculture, in the studied areas approximately 70% of the maize water requirement, the most widespread crop in the country, is satisfied by precipitation during the wet season. In the district of Moamba water gap is higher: only 67% of crop water demand is satisfied by rainfall, while in Namaacha we reached 72,3% (Figure 10).

A more detailed analysis at a monthly scale during the dry period is however necessary to assess impacts of water withdrawal on the ecosystem and water security of local population. Currently, there are almost 300 irrigation schemes in the three districts, covering more about 6.500 ha, mainly for horticultural, maize, sugarcane and banana. Irrigation schemes are mainly possible when local farmers organize themselves in cooperatives or associations, or in large-size fields of foreign investors, mainly devoted to banana and sugarcane plantations, while only a few are used by small-scale farmers. Detailed maps of irrigation are provided by the national irrigation service (INIR) (Figure 11).

⁸ Retrieved from: <http://apanews.net/en/pays/mozambique/news/mozambique-climate-change-drought> (Last accessed 29.01.2020)

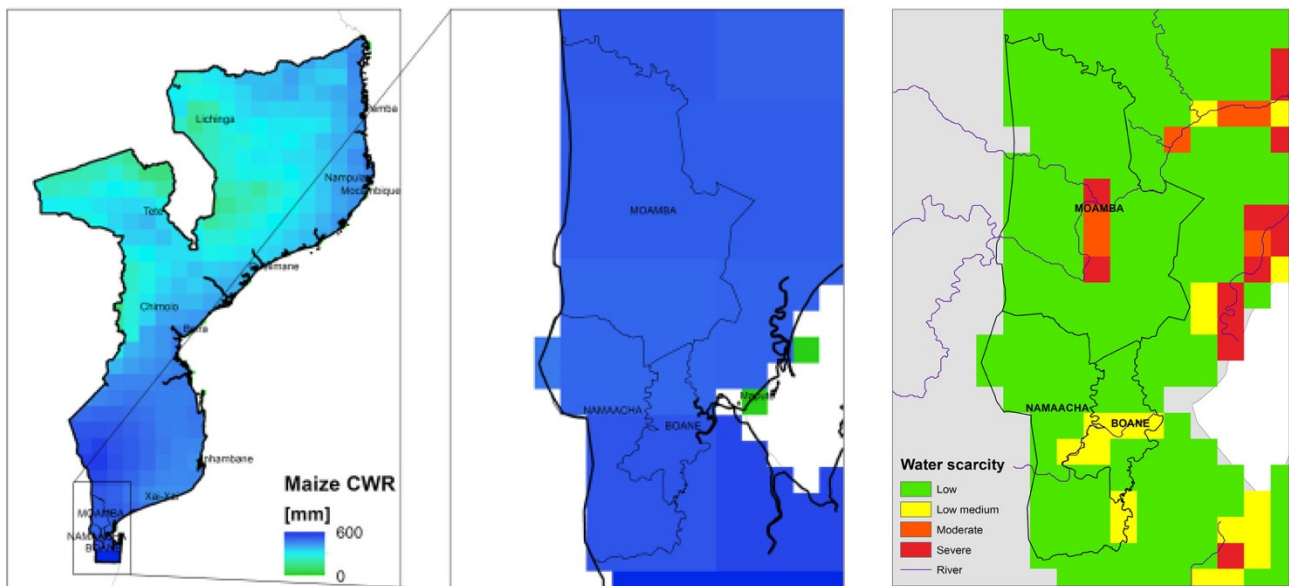


Figure 10. Crop water requirement and rainfall water required by maize production in the country and in the three districts / Water scarcity map. Source: Elaboration by “Boa_Ma_Nhã, Maputo!” team (D. D. Chiarelli), 2019.

Aside cash crops, as bananas and sugarcane mainly harvested by foreign investors for which water is properly and continuously provide, small farmers usually survive thanks to rainfed agriculture. Figure 11 reports the location of irrigation scheme in the three districts. They are mainly widespread in the area of Boane, along the Umbeluzi river, that represents an important area for the provision of food during the dry season. By conducting interviews with sellers at the local markets in Namaacha during the dry period (August-September) it was clear how products sold come from the area of Boane, where the closeness with the Umbeluzi river allows farmers to have a double cropping season, that is impossible otherwise. Thus, improving irrigation system is a necessary strategy in order to increase crop production of local farmer ensuring a double cropping during the year.

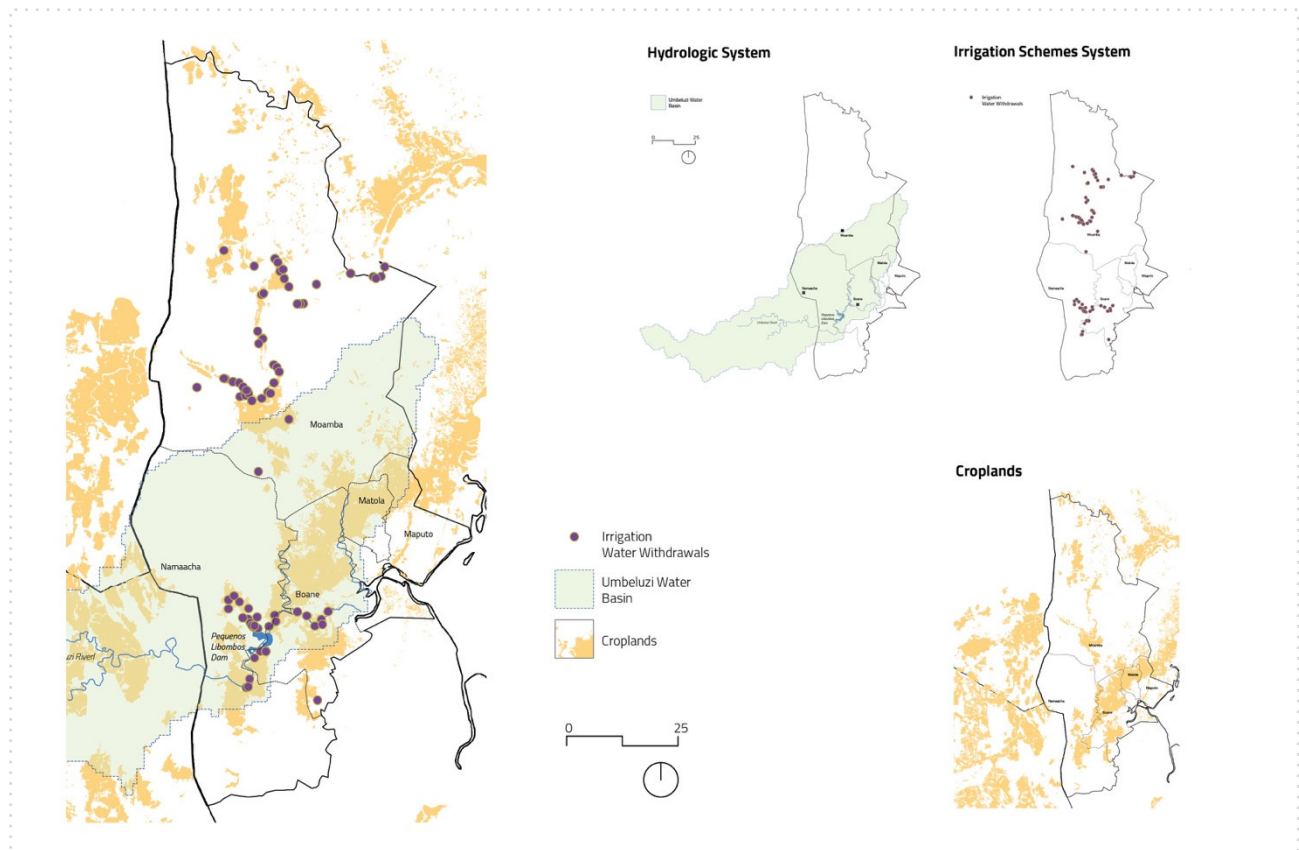


Figure 11. Agriculture and food production in the Maputo Province: a. hydrologic system, b. irrigation schemes and c. croplands in the Boane, Moamba and Namaacha districts. Source: Elaboration by D. D. Chiarelli based on high resolution cropland map (Thenkabail, 2013) and information provided by the Instituto Nacional de Irrigaçã, Ministério da Agricultura e Segurança Alimentar.

Energy Production and Access: Competing for Resources overlooking Self-Sufficiency and Renewables

More than 75% of the national population lacks access to electricity but this value dramatically increases in rural areas, reaching almost 95% (World Bank, 2016). Access to electricity is also strongly dependent on the region in Mozambique, with an alarming unbalance from northern and central provinces (around 17%) to southern (56%) (Electricidade de Mozambique, 2015). The Maputo area in particular is the most developed region in the country in terms of electricity access. According to the EDM data, 91% of the population living in the capital was connected to the national grid in 2015, while in the surrounding districts, this value decreases to 79%. These data suggest that 100% of the population in the Great Maputo will soon be reached by the national grid. According to the 2007 census data (INE, 2007) in the Maputo Province, 29% of the households reported electricity to be their main source of energy supply. In the same year though already more than 35% of the population was connected to the grid. If we compare this 6% difference with the absolute numbers in terms of population, this means that more than 15 thousand households in the

area preferred other energy sources to electricity. Reliability of the grid represents an issue in all sub-Saharan Africa, since it critically affects economic development. IEA (2014) reported that local SMEs may lose up to 25% of annual sales due to electricity outages. In terms of energy infrastructure, currently the major power station located in this territory is the Corumana Dam, in Moamba district, with a nominal capacity of 16 MW. The government though, is planning to deploy additional capacity with a diversified energy mix solution. According to Mireme master plan (Mireme, 2018), three 30 MW solar projects will start in Boane respectively in 2024, 2032 and 2038. In Moamba, the Government planned the construction of a 110/33 kV substation, interconnected with the existing network, while Moamba Major dam project (15 MW) is expected to be operative in 2020, and a 30 MW biomass plant is currently under feasibility study. In Namaacha, in the end, a 30 MW wind farm is expected to be operative in 2027. Waiting for these new developments, hydroelectric production is still the main source for electricity, with a relevant role in the water competition framework of the region. At the same time, the need for alternative energy sources pushes informal charcoal production worsening deforestation patterns and the ecological impoverishment of local landscapes.

Possible future trends and guidelines in the food production chain

Crop diversification and organic production has been highlighted by local experts as a way to enhance small-scale agriculture in the region, improving food security. These suggestions are identified in order to provide more resilient strategies for production that is less connected with the local market of a single product and could be at the same time competitive with the production coming from eSwatini and South Africa. Thanks to irrigation and cheaper production cost, products from South Africa are sold at a lower price than the same products harvested in Mozambique, where small farmers are only able to get one unique harvest during the wet season. Improving irrigation system is a necessary strategy in order to increase crop production of local farmer ensuring a double cropping during the year. Irrigation systems are usually possible when farmers organize themselves in associations or cooperatives in order to ensure their maintenance, while the initial financial input is anyhow provided by external private companies or associations. An example is represented by the “25 de Setembro” cooperative in Boane that is currently including more about 35 farmers mainly harvesting horticultural, vegetables and maize. Improving the knowledge of local farmers is another important key point to stress. Empirical research on-site showed that agrarian schools and universities are present in all the three districts, but usually

diplomats and graduate students found working position at the local institutions more than returning back to the field, thus without a return of acquired knowledge on the ground.



Figure 12. “25 de Setembro” Cooperative in Boane. Photo by Maria Chiara Pastore, 2019.

Openings and Conclusions

Research conducted by "Boa_Ma_Nhã, Maputo" team during the assessment stage of the project, and presented in this paper, allows to define the Maputo Province and the three districts of Boane, Moamba and Namaacha as relevant testbeds in the Water-Energy-Food nexus framework. Research results show, in fact, dynamics and conditions typical of a multi-stakeholder interdependent system, where different agents compete for the use of multiple resources, e.g.: (1) food needs to be provided for a constantly expanding city, but also needs to be produced for exporting and sustaining economy; (2) water is required for irrigation of local and transboundary crops, but also for hydropower production and urban supply. In this fragile context, the existing valuable ecosystems and high biodiversity of the region are threatened by climate change and anthropic pressure. In particular, deforestation, pushed by logging for valuable timber species and for charcoal or by “slash-and-burn” agriculture, has completely changed local landscapes. Community forestry and re-

afforestation programs are promoted by the government to save the socio-ecological value of forests as poverty reduction anchors, but the long-term perspective of these initiatives make them difficult to be accepted by local populations, that rather prefer fast return activities to face daily challenges.

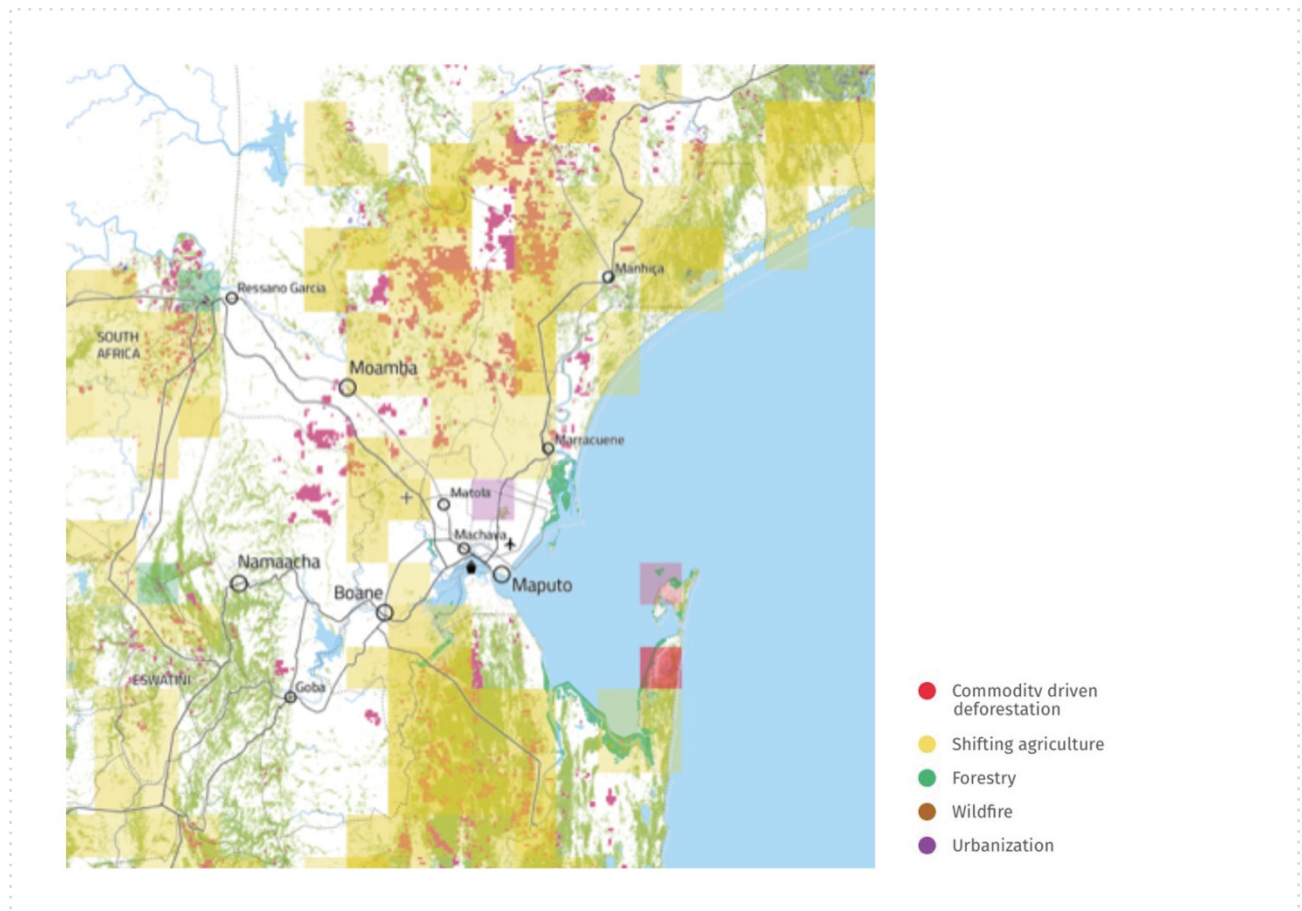


Figure 13. Deforestation. Tree cover loss by dominant driver (2001-2015). Elaboration by “Boa_Ma_Nhã, Maputo!” team (A. Frigerio and A. Buoli) based on Global Forest Watch.

At the same time, the three districts of Boane, Moamba and Namaacha are providing crucial services for the survival and growth of Maputo in terms of water, energy and food provision, as well as important educational services and ecological assets. Actions are required to increase awareness about such interdependencies and linkages among existing assets, processes and projects to facilitate sensitive decision making, people awareness and engagement into effective governance and planning tools.

The challenges and potentialities conditioning Maputo’s growth and presented in this paper attest an unbalanced territorial development that needs a strategic reframing of the role of the districts neighbouring the capital’s metropolitan area. The districts of Boane, Moamba, and Namaacha should understand their role and drive their future growth according to a balanced rural-urban cooperation performed in synergy among them, and in the larger framework of the Maputo

metropolitan region development, and in light of the integrated management of the basic agro and eco-systemic resources and assets in place.

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Acronyms

Aics	Agenzia Italiana di Cooperazione allo Sviluppo
Cenacarta	Centro Nacional de Cartografia e Teledetectao
Fao	Food and Agriculture Organization
FAPF	Faculdade de Arquitectura e Planeamento Físico
INE	Instituto Nacional de Estatística
Mo.N.G.U.E.	Mozambique.Nature.Growth.University.Education
Pimi	Programa de Investigaçao Multisectorial Integrada
W-E-F	Water-Energy-Food

**SHAPING WATERS.
VISIBLE AND INVISIBLE INFRASTRUCTURES IN THE EVERYDAY MANAGEMENT
OF WATER RESOURCES IN CENTRAL TANZANIA**

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Abstract

This short article is based on the results of a research that is part of the Sani Project, led by the Ngo Lvia, and aims to evaluate the participation and role of the *Community Owned Water Supply Organizations* (Cowso), in the management of water for domestic use in some rural areas of the Central Tanzania. In the project economy and for methodological reasons it was decided to conduct qualitative and participatory visual research in a single context characterized by a newly formed Cowso (2019), in order to explore the social and political processes that reveal the logic of appropriation and transformation of the resource into a common good.

Questo articolo è tratto dai risultati di una ricerca che si inserisce nel progetto Sani guidato dalla Ong Lvia. La ricerca mira a valutare la partecipazione ed il ruolo delle “Community Owned Water Supply Organizations” (Cowso) nella gestione delle acque ad uso domestico in alcune aree rurali della Tanzania centrale. Nell’economia del progetto e per ragioni metodologiche è stato deciso di condurre una ricerca visuale qualitativa e partecipativa in un singolo contesto caratterizzato da una Cowso di recente formazione (2019), al fine di esplorare i processi sociopolitici che rivelano le logiche di appropriazione e trasformazione della risorsa in un bene comune.

Keywords

Water, management, community, rural areas, development

Introduction

This research is part of the Sani project¹, conceived and implemented by the Italian Ngos Lvia and Cuamm – *doctors with Africa*, in partnership with Hydroaid, with the University of Turin, (Unito), the Interdepartmental Centre of Research and Technical and Scientific Cooperation with Africa (Cisao), the University of Dodoma (Department of Geography), the District Council of Kongwa, the District Council of Chamwino, the District Council of Iringa and the District Council of Mufindi. The very nature of this partnership describes a “configuration of development” (Olivier de Sardan 1995) that deserves to be questioned. What is important to note, and which has directly influenced the methodology used in this research, is the co-presence of academic institutions, international development actors and local authorities. An analysis of the Sani project and of its specific actions in particular, as well as the extent of the reflection that derive from it, must put under examination

¹ Sani – Integrated Support for the Right to Water, Hygiene and Nutrition in Central Tanzania (2017-2020).

such configuration. Recognizing the nature of this configuration actually means recognizing and calibrating the responsibility of each partner in the process of social change brought by the project. Not all partners, in fact, have the same relationship to the territories concerned. The Districts seem to be the closest subject to the contexts of intervention. But this proximity must not be denied even to the project leader and its main partner, the Ngo Lvia and Cuamm. Despite their international vocation, the long experience of these organizations in Tanzania as well as their widespread commitment in project management, makes them real local development actors. This expertise reveals a prominent position consolidated over time, which implies important effects on project management, on the political responsibility associated with it and on the local imaginaries of well-being and social change.

The partnership with the universities tries to guarantee, in the dialogue between development processes and evaluation of project activities, a degree of scientific validity and rigor that only a position external from the contexts of intervention can provide. This distance of the gaze is not, however, synonymous with pure exteriority: as a fully-fledged project partner, the University cannot claim to be considered external actor without denying its ethical and political responsibility. As project partner, the University of Turin, represented here by the authors of this article, intends to recognize its role within the project and therefore intends to propose a participatory and innovative methodology, which we will present in this article. Our intention is to take a full part in the project, guaranteeing, on the one hand, the scientific nature of the analyses produced through a rigorous method that respects the ethical implications of fieldwork research and, on the other hand, the *circularity* of the data and results at the internal network of actors generated or implemented by the project itself.

The object

Water is a resource inseparable from social relationships and cultural representations in which it is immersed. Behind its materiality and visibility, water weaves relationships, condenses meanings, builds bonds between people and places, communities and landscapes. These bonds are not always obvious or tangible but this does not make them less efficient and important. Our approach therefore starts from the assumption that water is a good to be revealed, deeply relational, full of meanings and power relations. This premise is not intended, however, to lead to a purely relativist vision, which would reduce our research to a contextual description, to the study of an isolated and incommensurable case. The central concern of our work starts precisely from the desire to build a constant dialogue between the numerous and often innovative legal and institutional reforms that

regulate water management in Tanzania, the translation of these policies into a project of international dimensions such as the Sani and the concrete forms of implementation or incompleteness that take shape at a ground level. This dialogue aims, ultimately, to produce an interpretative framework that can be used outside the specific context investigated during our research.

We chose to set our research in Hogoro and Nyerere, two villages in the district of Kongwa, with a total population around 10000 people. Very close one another, just separated by a road and sharing the same water scheme and life. These villages were exemplar for the study because (1) the water scheme was managed by a Cowso; (2) the Cowso had been trained and encouraged by Lvia, the Ngo running the project Sani, where our study was insert; (3) they had a conflictual situation about how to manage water and in the acceptance of Cowso as an organization; (4) besides we were intentioned to live there, the village wasn't too far to make possible to come back from time to time to share the information collected with the Ngo staff, have access to the archive and plan the new steps together.

The methodology

We followed a qualitative research methodology, inspired by three main pillars as schematized in the Figure 1. The process of data collection has been carried on mainly using an ethnographic approach. We spent most of the time living in the two villages of Hogoro and Nyerere, following the daily activities of the Cowso, and trying to trace and unveil the deep and complex grid of relations between them and the main social actors of the “visible” and “invisible” infrastructure of waters. The process of data gathering undertook through, interviews, focus groups and participant observations has been accompanied and inspired by a participatory action research process² (Par), along all the experience and particularly in the final part. This means that the investigation was aimed not just to describe a situation, “how it is”, but was interested also in using the data collected and the experience gained to discuss with all the actors involved, the participants, the Ngo, the policy makers, at different scales, “how it could be”. Generating cycles of discussions, using the data collected and the themes which came up as a way to stimulate debates, proposals, ideas, that became new data, new information to be used in their turn, meeting after meeting, during the mentioned cycle process. While the third and final pillar is about the visual perspective an essential

² This way of conducting a research is aimed to make possible the raising of solutions during the very process of investigation, making possible for the actor involved, especially for the most vulnerable, to really have a role in the process, giving a sense to the world “participation”, mostly used improperly in this kind of works (Baum 2006; Chevalier 2019).

element of our work through which we captured the relevant moments and scenes during participant observations, guiding as well the reconstruction of the social and technical map of Waters, through *photographic transect walks*³ or *mental maps* sketching.

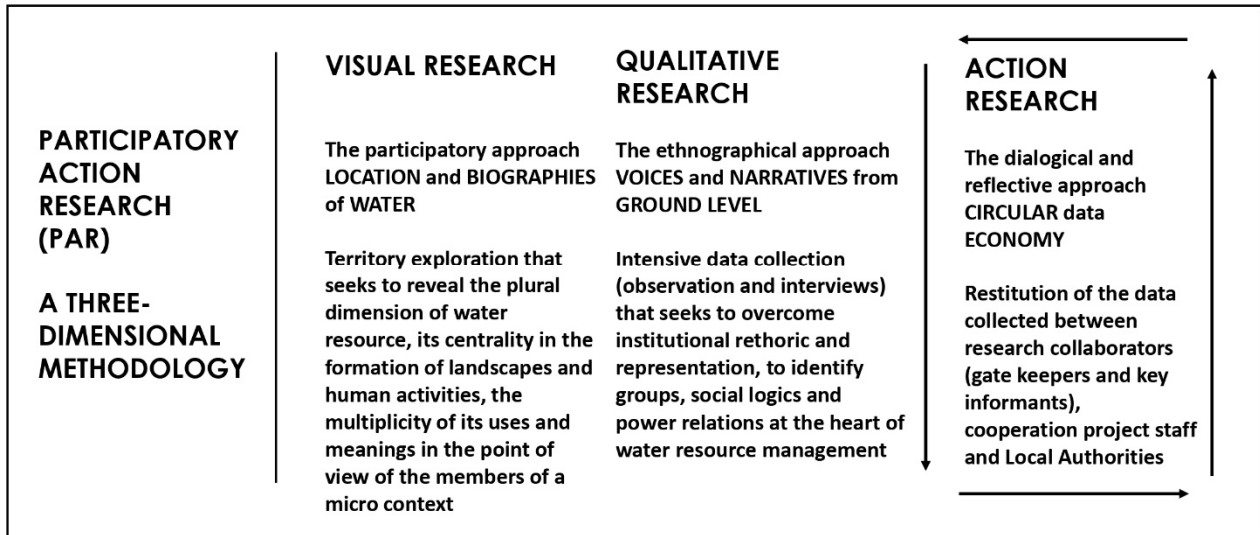


Figure 7. The table shows the theoretical umbrella used to design the research, based on three methodological pillar: the ethnographic approach, the action research process and the visual perspective.

Research findings

Geographical and political diversities

The research reveals an important diversity of waters both in the representations of the various social groups and in the configuration of the territory and its relationships between natural resources and human activities. Such a diversity requires a double shift: (1) The geographical exploration of the location of waters reveals a diversity of landscapes, uses and meanings. The distribution points of the water scheme widely overcome their technical function to become places of life and socialization, the real squares of the village. Furthermore, the project to build a new source (*kisima*) is the subject of a political dispute rather than a technical necessity. In fact, the claim by the population and the Local Authorities, of the need for a new infrastructure and a new Cowso, so that the two adjacent villages become independent, hides a political will expressed in terms of appropriation of the water infrastructure. (2) The identification of the ground/local level with a *community* must be called into question. Management and practices related to water at a ground

³ As transect walks we mean going around with the participants following specific, or in some case improvised tours to get information about the ecological, social and technical environment, “[...] observing, asking, listening, discussing, identifying different zones, soils, land uses, vegetation, seeking problems, solutions and opportunities; and mapping and diagramming the zones, resources and findings” (Chambers 1994, p.960). To this we used the photos to capture the information alongside fieldnotes.

level reveal differences, divisions, or even conflicts between social groups, unequal subjects, interests and logic of appropriation that do not allow us to reify the *local community* as a single, homogeneous and coherent actor.

Juridical-institutional incompleteness, social practices and power relations

The multiplicity of actors involved in the governance of the resource imposes a close look to concrete practices. Such a look reveals and accepts the presence, at a local level, of a juridical-institutional incompleteness of the norms, laws and policies produced at national level beyond appearances. The path designed by the latter, in particular the Water Supply and Sanitation Authorities, Wssa (2009), and the Rural Water Supply and Sanitation Agency, Ruwasa (2019), which stimulate the creation and the empowerment of Cowsos in a “decentralized centralization” (Mangione et Pozzobon 2019) perspective, is not only sporadically unfinished in most of the local context. Everywhere, as in the study case, the landing of national policies implies a wide range of social practices, interpretations and forms of negotiation with the actors present, which requires an analysis of articulated power relationships, often of long duration. In this perspective, foreign Ngos are not mere technical variables at the service of a higher cause (policies) but local actors that play a role of great responsibility in promoting social and political changes. Recognizing this role makes possible to take full advantage of a privileged and authoritative position capable of balancing the widely documented tendencies of this incompleteness, which range from punctual form of arbitrariness of local powers to systematic and widespread micro-corruption. But incompleteness is also synonymous with processualism: it opens up spaces of possibility, of empowerment and definition of new groups (Cowsos) and actors (among members of Cowsos).

Visible and invisible infrastructures

A purely technical vision of management leads to an emphasis on limited knowledge and interventions, focused exclusively on the water scheme and its ordinary administration. This drastically reduces the breadth of practices, meanings and forms of collaboration and solidarity that come to life around a good collectively and symbolically central to everyone's life. Such “invisible infrastructures” (Simone 2004) concern both practices integrated to the management of the scheme and alternative forms of interaction, exchange and profit around the resource. For example, we have documented numerous forms of facilitation towards elderly, disabled or poor people, which are not foreseen by the rules and by management contract but which are practiced in a widespread way in

the daily distribution of resource. There are also markets parallel to the public service, forms of exchange and credit that cannot be underestimated also from the point of view of the management of the village water scheme, (the Figure 2 shows the broader spatialization of the waters, parallel to the “official” and “formal” water-scheme). The study therefore shows as an extreme scheme-centred technicalization of the resource leads to a total de-politization of the role of the Cowso which goes hand to hand with a naturalization of the (dis) service they provide. The rhetoric and practices of development interventions often contribute to reinforce this technicalization and de-politization. One of the main symptoms of this process is the excessive bureaucratization (Hibou 2012) of the role/lexicon of Cowso at the expense of the enhancement of these invisible infrastructures and of a broader reflection on Cowso’s political agency as water consumer association.

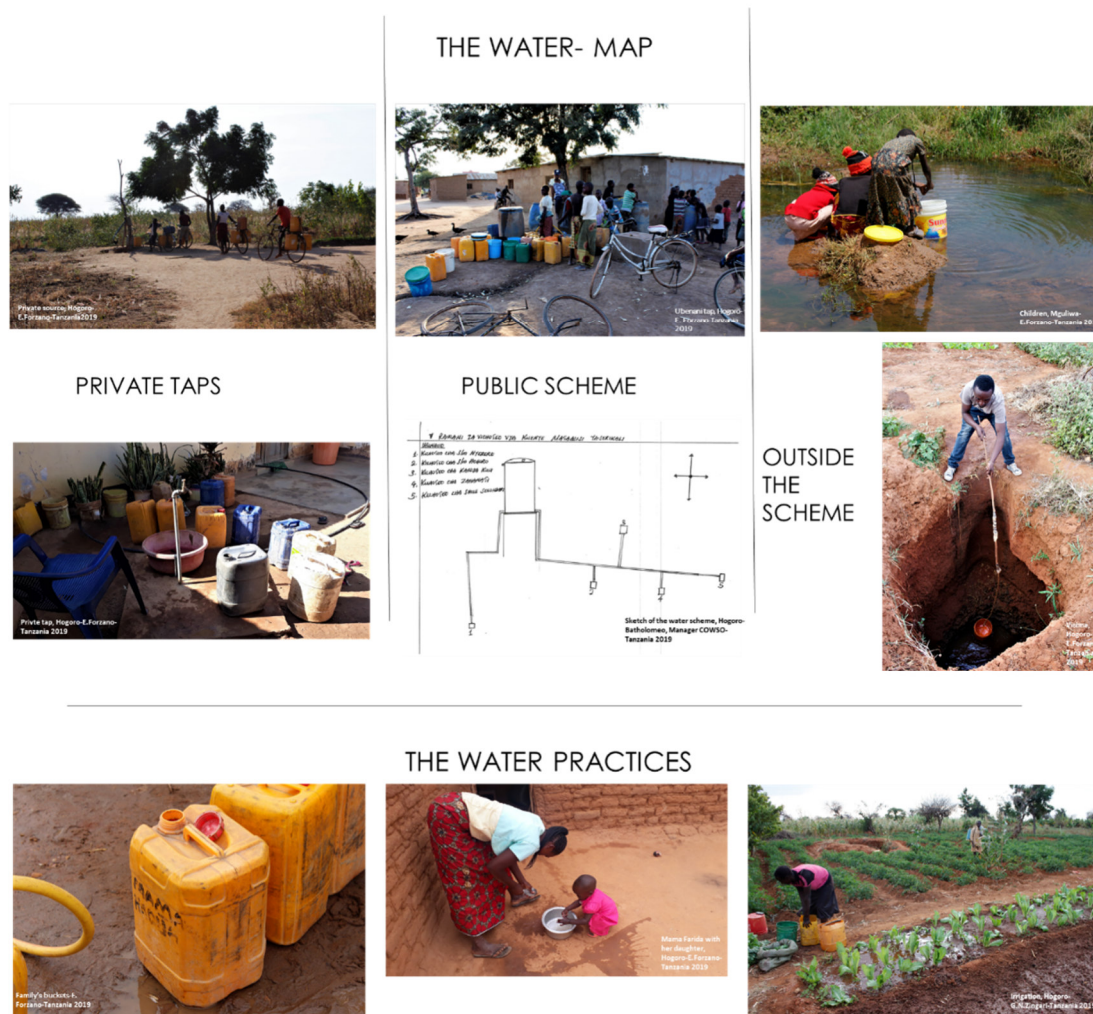


Figure 8. A brief scheme of the socio-technical map of water. On the upper part the three main “waters”, the one of the formal scheme, the one owned by the privates, connected to the public scheme but escaping the control of the public and any form of legal regulation. The last one of the first line is instead an example of “natural” sources, following again other rules and dynamics. On the bottom part an example of the water practices, from the activity of fetching

water that occupies an important space in the society, to the water usage for the house's purposes or for the agricultural activities. (All the pictures have been taken by the authors during the fieldwork).

Shaping Cowso

The main obstacle of the process of formation of Cowso as social institution, is the fact that their members move in a space (the water scheme) that remains strongly influenced by the local administrators and by part of the local community. Their role frequently is not recognised, their activities are often hindered or just ignored by most of the village. They do not operate calculations and decisions that can be isolated from the circumstances of each single intervention of maintenance or administration. Their actions remain tactical, not strategic (De Certeau 1990), in a fragmented perspective that is not able to capitalize on its own advantages, its position, preparing expansion and independence with respect to the Village Authorities. The consolidation of the Cowso does not take place through a declared recognition of one's rationality or skills, but through a laborious daily shaping process. The Cowsos are not the object of real and public construction (as wished by the policy), but of micro and often hidden negotiating processes, (the Figure 3 shows an example the “face” and the quotidian of the water management activity). A greater coordination between Cowso and higher administrative levels than village/ward context could constitute a promising horizon in this sense.

WATER COMMUNITY- BASED MANAGING



Figure 9. On the top's line water managers of Cowsos of the regions of Dodoma and Iringa. On the bottom an example of daily Cowso's activities. (All the pictures have been taken by the authors during the fieldwork).

Conclusions

After this brief overview of the research, we can argue that in order to unveil the complexity of water management it is necessary to go beyond a purely technical and reductive perspective, rather trying to deeply study the social and cultural dimensions, the visible and invisible infrastructures shaping and reshaping the socio-technical map of waters.

On this regard, the methodology designed for this research has been a valuable tool to investigate these aspects in a flexible and open way, giving the chance to a “vulnerable” group of the local society to bring their voices to the policy makers, to put the information in circle in order to improve the work of all the actors involved in the resource’s management and usage.

All in all, the article described as water management doesn’t coincide with the water scheme, but is a broader matter that has to be addressed and understood in its complexity. The incompleteness of the national policy on water is a key aspect undermining the work of the community’s organizations: Cowsos are at the mercy of the local village’s authorities, squeezed between the responsibility of the management of the most important resource in the village on one hand, and the missed attribution of an actual independency in their activity on the other, as well as the recognition of their role. This strongly undermines the capacity of the Cowsos to do their job, to improve as organizations and reach a real autonomy, as well as a sustainable management of the resources. This gap in the application of the law, opens the space for a micro-scaled process of negotiation of the Cowso’s position in each village context, of whose result depend on the local history of power relations. Consequently, fracturing a national effort to improve the water’s management and supply in thousands of microscopic uncontrollable competitions.

At the same time, the iper-technicalization of the water-related issues, that most of the time characterises the perspective of the policy makers at each level, reduces the work of the Cowsos in terms of economic performances, avoiding or ignoring to assess if they are effectively able or not to do what they are asked to. The aforementioned de-politization and downscaling of the alleged role of the community water organizations, contributes once again to make more opaque and weaker their position among the local societies, exposing them to the possible abuse of the village authorities.

In conclusion, to overcome this impasse, it is crucial to focus on the social and cultural mechanisms that a village level determine the success or the failure of the water management, aiming to scale up an effective strategy able to fill the gap between national policy and reality. Therefore, we think that the only way to improve the management of water-resources relies in recognising the role of the Cowsos as democratic and independent institutions in charge to manage water as a public-good for the common interest.

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Acronyms

Cisao	Interdepartmental Centre of Research and Technical and Scientific Cooperation with Africa
Cowso	Community Owned Water Supply Organizations
Cuamm	Doctors with Africa
Lvia	Lay Volunteers International Association
Ngo	Non-Governmental Organization
Par	Participatory Action Research
Ruwasa	Rural Water Supply and Sanitation Agency
Sani	Integrated Support for the Right to Water, Hygiene and Nutrition in Central Tanzania
Unito	University of Turin
Wssa	Water Supply and Sanitation Authority

GESTION DES EAUX USEES ET DES BOUES DE VIDANGE A DAKAR PARTICULIEREMENT DANS LA ZONE HUMIDE DU TECHNOPOLE

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Résumé

La présente recherche a pour objectif d'étudier la gestion des eaux usées à Dakar et d'évaluer la qualité des eaux usées traitées par la station d'épuration (Step) dans la zone du Technopole et de donner les éventuelles causes du mauvais traitement. Le réseau d'égouts de Dakar dessert moins de 20% de la population et se limite au centre-ville alors que 96% de la population dans la zone périurbaine utilise l'assainissement individuel. Dans la zone du Technopole, la Step est sous dimensionnée par rapport à la quantité des eaux usées qu'elle reçoit par jour. Dans les conditions standards la Step doit recevoir 825m³/j alors qu'elle en reçoit environ 3000 m³/j. L'efficacité de traitement de la Step est de 87% d'élimination des matières en suspension (Mest), de 70% de la demande biologique en oxygène (Dbo₅), de 78 % de la demande chimique en oxygène (Dco), de 41% d'azote total, de 71% de phosphore total et de 61% de coliformes fécaux. La Step a de bons rendements d'élimination et fonctionne bien, mais elle est surchargée et ne peut pas garantir de bonnes valeurs des eaux usées traitées pour respecter les normes de rejet sénégalaises et de réutilisation des eaux usées dans l'irrigation.

L'obiettivo di questa ricerca è studiare la gestione delle acque reflue a Dakar e valutare la qualità delle acque reflue trattate dalle l'impianto di depurazione (ID) nell'area Technopole di Dakar e fornire le possibili cause dei maltrattamenti. Il sistema fognario di Dakar serve meno del 20% della popolazione ed è limitato al centro della città e alle aree di insediamento ad alto reddito, mentre il 96% della popolazione nell'area periurbana usa servizi igienico-sanitari individuali.

Nell'area Technopole, il ID delle acque reflue è sottodimensionato in relazione alla quantità di acque reflue che riceve al giorno. In condizioni standard, il ID deve ricevere 825 m³ / giorno mentre riceve circa 3000 m³ / giorno. L'efficienza del trattamento del ID è la rimozione di 87% di Solidi sospesi totali (Sst), di 70% della Domanda biologica di ossigeno (Dbo₅), di 78% della Domanda chimica di ossigeno (Dco), di 41% dell'azoto totale, di 71% delle fosforo totale e di 61% dei coliformi fecali. Il ID ha buone efficienze di rimozione e funziona bene, ma è sovraccarico e non può garantire buoni valori di scarico dell'acqua chiarificati per rispettare le norme di scarico delle acque reflue senegalese e il riutilizzo delle acque reflue nell'irrigazione.

Mots clés

Dakar, eaux usées, gestion, Technopole.

Introduction

Dans les pays en voie de développement, la question de l'assainissement se pose avec beaucoup de problème et une attention particulière doit être portée dans ce sens par les pouvoirs publics.

L'assainissement est central dans toute politique pour la gestion efficace et durable de notre environnement. En effet, les conséquences sanitaires, socioéconomiques et environnementales entraînées par une gestion inefficace ou hasardeuse de l'assainissement ont des coûts extrêmement élevés pour la communauté.

Le Sénégal est un pays d'Afrique subsaharienne confronté à de grandes difficultés pour gérer convenablement son environnement, en particulier les eaux usées. En 2015, le Sénégal n'a pas atteint l'objectif de 77% fixé par les objectifs du Millénaire pour le développement (Omd) d'améliorer la couverture en assainissement, qui était de 37% au niveau national (Ands, 2014).

La capitale sénégalaise Dakar, en raison de l'exode rural et la croissance de sa démographie rejette de grande quantité d'eaux usées dont la gestion pose des problèmes (Akpo, 2006). La majorité des eaux usées rejetées ne subissent pas de traitement et sont déversées dans la mer, dans les rues ou même parfois dans des zones qui devraient être spécialement protégées telles que les zones humides.

Les écosystèmes humides jouent des fonctions socio-économiques importantes pour le développement de la région de Dakar et de ses habitants. Ainsi, le traitement des eaux usées et leur réutilisation font parties des activités majeures développées dans la zone humide du Technopole dans le département de Pikine à Dakar. Cependant, la station d'épuration (Step) des eaux usées de la zone reçoit journalièrement des quantités d'eaux usées qui dépasse largement ses capacités de traitement. La partie privée Delvic dans la même zone de la station d'épuration qui gère la gestion des boues de vidange et le prétraitement des eaux usées ne respecte pas les accords mutuels avec le service public de l'office national de l'assainissement du Sénégal (Onas). Delvic envoie à la Step des eaux usées brutes de très grandes quantités et dont le prétraitement n'a pas permis d'atteindre la qualité requise. D'autres part la station de pompage de Las Palmas dans la ville de Guédiawaye envoie des quantités d'eaux usées mixtes qui dépassent les normes de recevabilité de la station d'épuration. Sachant que ces eaux usées après traitement par la Step sont jetées dans le lac ou généralement réutilisées dans le maraichage, ces pratiques engendrent des conséquences négatives sur la biodiversité de la zone et la santé de la population.

Contexte des travaux

Les travaux ont été effectués dans le cadre de la coopération internationale au développement entre l'université de Brescia (Italie) via le laboratoire de recherche sur les technologies appropriées pour la gestion de l'environnement dans les pays à ressources limitées (CeTAmb Lab.), les universités Cheikh Anta Diop et Amadou Makhtar M'bow de Dakar et l'office national de l'assainissement du Sénégal (ONAS). La coopération internationale pour le développement se doit de rester axée sur les pays en développement et les objectifs du programme de développement mondial reconnus sur le plan international. Elle doit se fonder sur des relations de coopération non hiérarchiques entre les partenaires internationaux et sur la complémentarité des ressources et des capacités, dans une optique de développement. Cette coopération a permis aux étudiants sénégalais et italiens de travailler ensemble dans un cadre d'échange de partenariat de recherche et de découverte. L'université de Brescia a fourni la bourse de la thèse, les cours du doctorat et m'a envoyé à chaque mission avec un étudiant italien en master au Sénégal. Les universités sénégalaises ont contribué à faciliter l'accueil des étudiants dans les laboratoires et les papiers administratifs. L'office national de l'assainissement du Sénégal a mis à notre disposition le laboratoire d'analyse des eaux usées et à l'accès à leurs données d'analyse des eaux usées de la Step des Niayes. Cette coopération a aussi permis de favoriser des opportunités la marge de manœuvre face à la réflexion d'une bonne gestion des eaux usées dans la zone Technopole de Dakar.

Situation de l'assainissement à Dakar

L'assainissement individuel est le système le plus répandu au Sénégal pour la gestion des eaux usées domestiques. Dans les départements de Pikine et de Guédiawaye (région de Dakar, Sénégal), qui comptent 1 592 994 habitants (Rgphae, 2015), la quasi-totalité de la population environ 96% utilise ce type d'assainissement. Cela se traduit par une production considérable de boues 1 130 m³ / jour (Onas, 2014). L'Onas est un établissement public à caractère industriel et commercial. Il a entre autres pour mission l'exploitation et la maintenance des installations d'assainissement d'eaux usées et d'eaux pluviales ; le développement de l'assainissement autonome.

L'assainissement individuel ne prend en charge que les eaux usées des toilettes. Les eaux usées grises (eaux de cuisson, eaux de lessive, vêtements, bains pour bébés ...) sont généralement soumises à un autre type de gestion ayant également des conséquences négatives pour l'environnement (nuisances et pollution). Voir la figure (Diop, 2002).

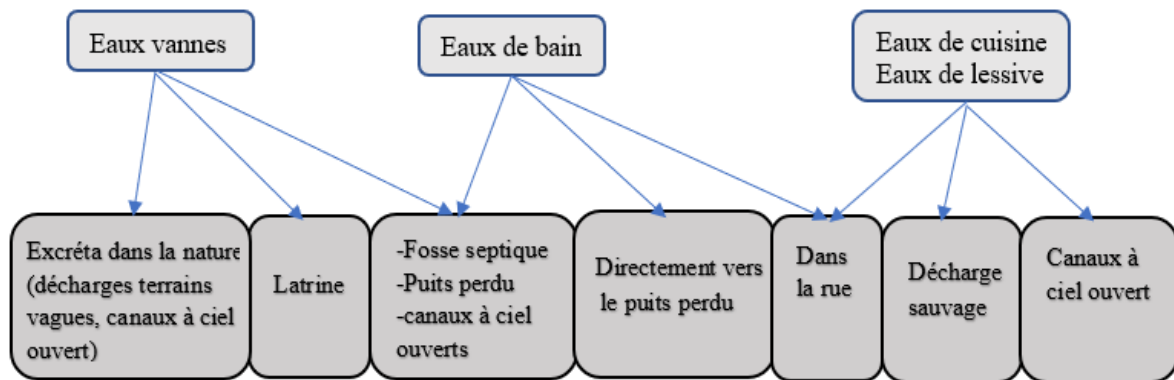


Figure 1. Systèmes de gestion des eaux usées domestiques développés par des populations des pays en développement (exemple du Sénégal).

Le réseau d'égouts de Dakar assure le service de l'assainissement de moins de 20% de la population et se limite au centre-ville et aux zones de peuplement à revenu élevé environnante. Certains réseaux d'évacuation des eaux usées sont orientés vers l'océan Atlantique. Ainsi toutes les eaux usées sont drainées à la mer. Les principaux canaux tels que le canal de Hann, Fann, Canal IV, rejettent toutes des eaux usées non traitées au niveau des baies de Dakar, Hann, Soumbédioune (N'diaye, 2007). Ces eaux usées non traitées ont contribué aujourd'hui à la pollution de la baie de Hann qui est en situation de dégradation très avancée mettant ainsi en état d'urgence de dépolluer cette baie par les acteurs publics de l'assainissement du Sénégal. Sur le plan de la santé les habitants de la baie de Hann sont submergés de maladies infectieuses dues à la proximité de la baie polluée. Dans le département de Pikine, les eaux souterraines de Thiaroye sont polluées par l'assainissement individuel non conforme (Ndao, 2017).

En moyenne, les pays à revenu élevé traitent environ 70% des eaux résiduelles municipales et industrielles qu'ils produisent. Ce pourcentage chute à 38% dans les pays à revenu intermédiaire supérieur, et à 28% dans les pays à revenu intermédiaire inférieur. Dans les pays à faible revenu, seuls 8% de ces eaux usées subissent un traitement, quel qu'il soit. Ces estimations vont dans le sens de l'appréciation souvent citée selon laquelle il est probable que plus de 80% des eaux usées du monde soient rejetées sans traitement (Wwap, 2017). Le Sénégal compte actuellement 13 stations d'épuration des eaux usées d'une capacité totale de traitement de 36 066 m³ / jour (Onas). La capitale sénégalaise rejetait plus de 200 000 m³ d'eaux usées par jour en 2006 (Akpo, 2006). Les travaux de Malick et Seydou (2010), estiment que la production d'eaux usées dans la capitale sénégalaise avoisine 67 millions de mètres cubes (m³) par année et seule une quantité faible fait l'objet de traitement au sein de stations d'épuration.

Le Technopole est notre zone de recherche. C'est une zone humide dont l'écosystème est très favorable à la vie animale et le développement des activités agricoles. C'est une zone très

représentative du problème de la gestion des déchets solides et liquides à Dakar. La zone abrite une station d'épuration appelée la Step des Niayes. La Step reçoit quotidiennement environ 3 000 m³ d'eaux usées et que sa capacité de traitement normale est de 925 m³. Le problème principal réside dans le fait que la Step est sous-dimensionnée par rapport aux quantités croissantes de boues non traitées et d'eaux usées, de sorte que l'eau qui sort de la Step ne convient pas à l'irrigation ni au rejet, conformément aux normes sénégalaises et aux directives de l'Oms et de la Fao, ce qui nuit à la qualité de l'environnement de la zone. Les analyses qu'on a effectuées sur ces eaux usées traitées ont confirmé la mauvaise qualité du traitement. La station reçoit les eaux usées venant du prétraitement des boues de vidange de la partie privée Delvic Sanitation Initiatives (Dsi) et des eaux usées de la station de pompage de Las Palmas de Guédiawaye. L'insuffisance du traitement des eaux usées et la pollution de l'eau à grande échelle qui en résulte indiquent que les surfaces irriguées par des eaux usées insalubres sont probablement dix fois supérieures à celles irriguées par les eaux usées traitées (Wwap, 2017). 10% des récoltes dans le monde sont irriguées par des eaux usées brutes (El Haite, 2010).

Le modèle de flux financiers pour la gestion des boues de vidange dans les quartiers sans assainissement collectif à Dakar s'effectue suivant le schéma de la figure 2 suivante :

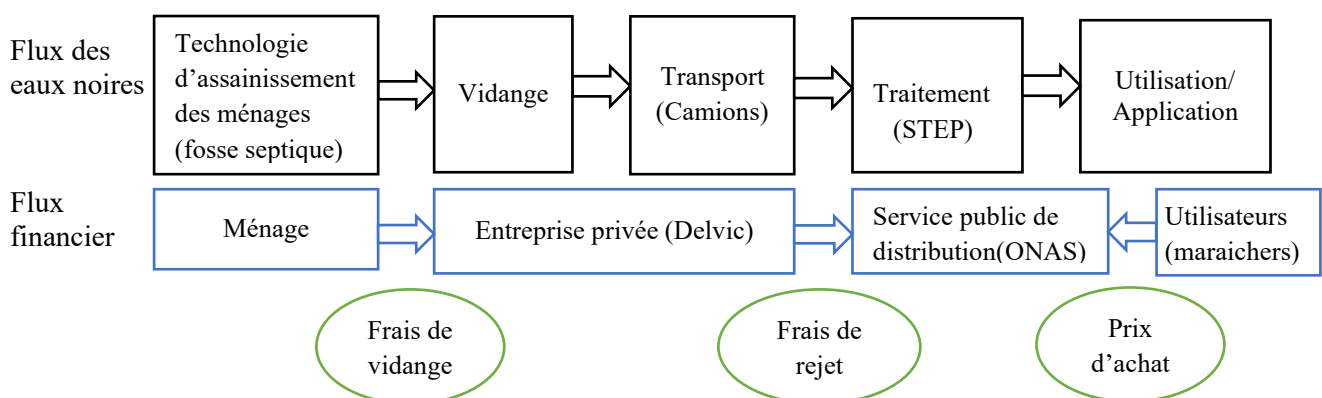


Figure 2 : Modèle de flux financiers pour la gestion des boues de vidange des toilettes des quartiers sans assainissement collectif de Dakar.

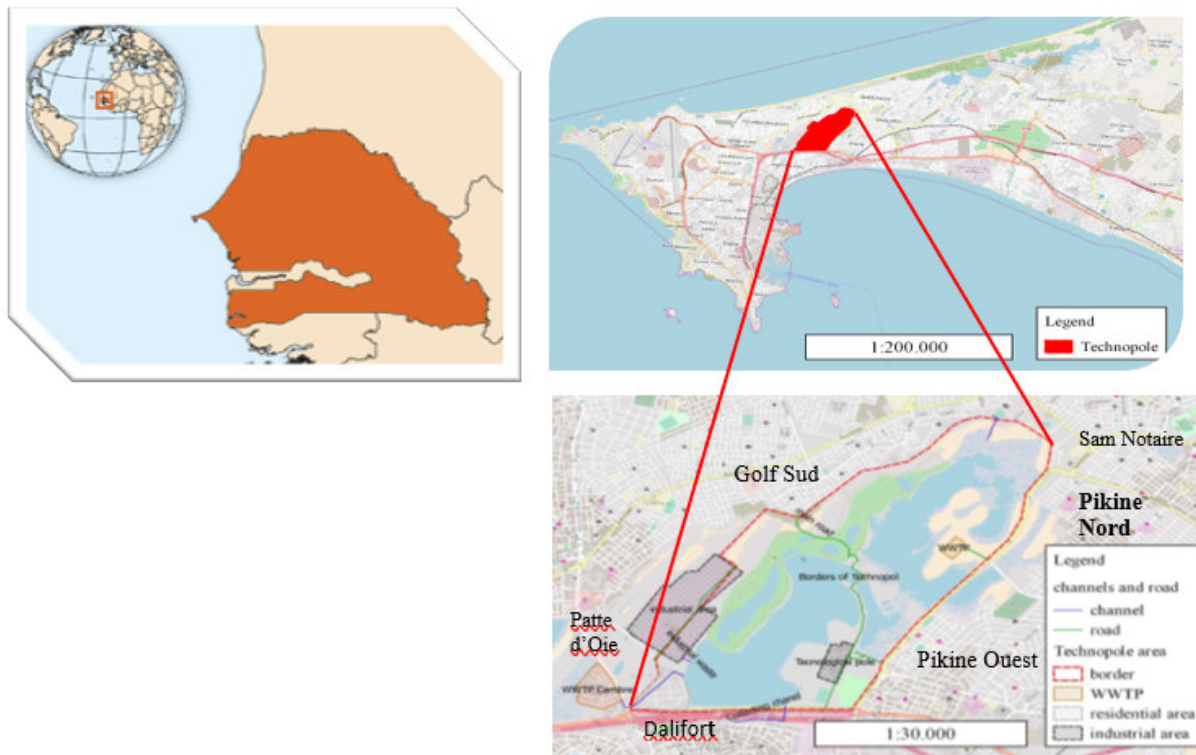


Figure 3. Localisation de la zone d'étude du Technopole à Dakar.

Présentation de la Step des Niayes de Pikine

Avec la collaboration des acteurs de l'assainissement de la zone du Technopole et de la station d'épuration, une étude des différentes composantes de la Step a été effectuée. Des données sur les valeurs des paramètres physico-chimiques et microbiologiques des eaux destinées à être traitées et des eaux usées traitées ont été fournies par les collaborateurs locaux travaillant pour l'Onas. Ces informations nous ont permis de mieux comprendre les causes des dysfonctionnements et la qualité des eaux usées mal traitées.

Delvic Sanitation Initiatives (Dsi) est une société privée sénégalaise dont la mission est de créer une entreprise rentable et durable proposant des solutions d'assainissement adaptées aux besoins du marché ouest-africain. C'est la partie qui gère la collecte et le transport des boues de vidange des fosses septiques, des latrines dans les quartiers proches (Pikine, Cambéréne, Parcelles Assainies) qui n'ont pas de système d'assainissement collectif (système d'égout). Les boues de vidange sont transportées par des camions de 8 m³, 10 m³ et 16 m³. Cette partie effectue le prétraitement (sédimentation) des boues de vidange, récupère la partie liquide et l'envoie à la Step pour traitement. Environ 500 m³ d'eaux usées est fourni chaque jour par la partie Delvic à la Step. Une des raisons pour lesquelles les eaux usées traitées par la Step sont de mauvaises qualités provient de Delvic. En effet, la quantité normale des eaux usées que Delvic doit fournir à la Step est de 60 m³

par jour. De plus, le prétraitement ne fonctionnant pas correctement, les eaux usées fournies par Delvic contiennent une quantité importante de boues.

Puisque beaucoup de quartiers dans cette partie de la ville ne sont pas bien desservies par un service d'égout permettant d'acheminer directement les eaux usées à la Step, ils dépendent entièrement des fosses septiques domestiques vidées par des entreprises privées.

Par conséquent, Delvic acceptant plus de boues que la quantité nominale, il n'est pas en mesure de les traiter complètement, de sorte que la qualité des eaux usées brutes sortante est très mauvaise; l'office national de l'assainissement (Onas) qui reçoit ces eaux usées brutes, est en litige avec la société privée Delvic sur le fait qu'elle ne respecte pas leur accord mutuel.

L'installation est composée des parties suivantes :

Une zone de déchargement afin de permettre aux camions de toutes dimensions (8m³, 10 m³ et 16 m³) de se vider ; très souvent, il y a trop de camions, ainsi ils forment une file d'attente à l'extérieur du portail d'entrée.

La zone de déchargement se termine par une grille capable de filtrer les matériaux volumineux ; ensuite, les déchets sont collectés dans deux réservoirs.

Un bassin de décantation où se déroule le plus important prétraitement, au cours duquel la partie solide de la boue est séparée de la partie liquide.

Les boues décantées vont vers plusieurs réservoirs peu profonds pour y être exposés ; une fois séchés, les boues sont envoyées à l'Omniprocessor (machine de la fondation Bill Gates qui transforme les boues séchées en énergie).

En raison de la surcharge en eaux usées brutes de Delvic, la partie liquide des boues à la sortie du décanteur était aussi trop chargé et l'Onas qui gère le traitement des eaux usées ne pouvait plus accepter que Delvic l'envoie ses eaux usées. Par conséquent un système de floculation a été installé pour retenir d'avantage les boues de la partie liquide des boues décantées. Le système est basé sur l'ajout du sulfate d'aluminium comme floculant pour améliorer la sédimentation et la qualité des eaux usées.

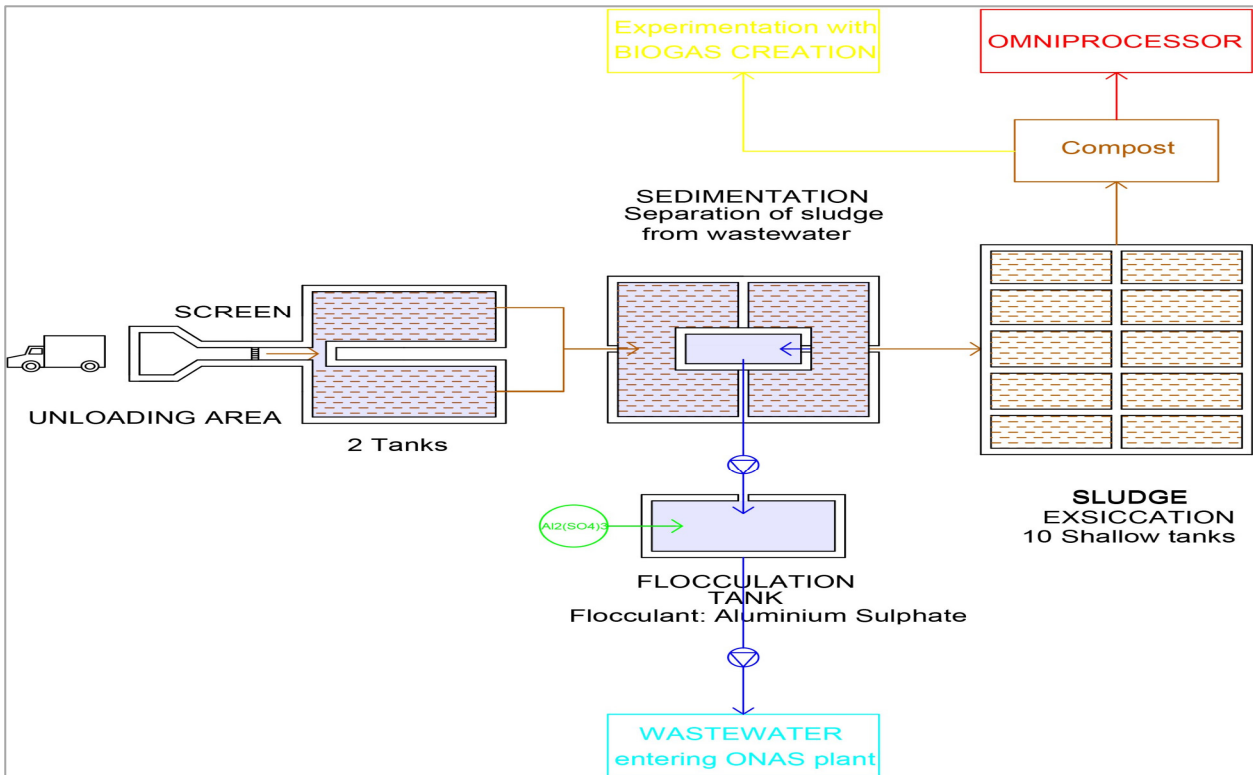


Figure 4. Schéma de toutes les composantes de la station de traitement des boues de vidange de la partie privée Delvic.

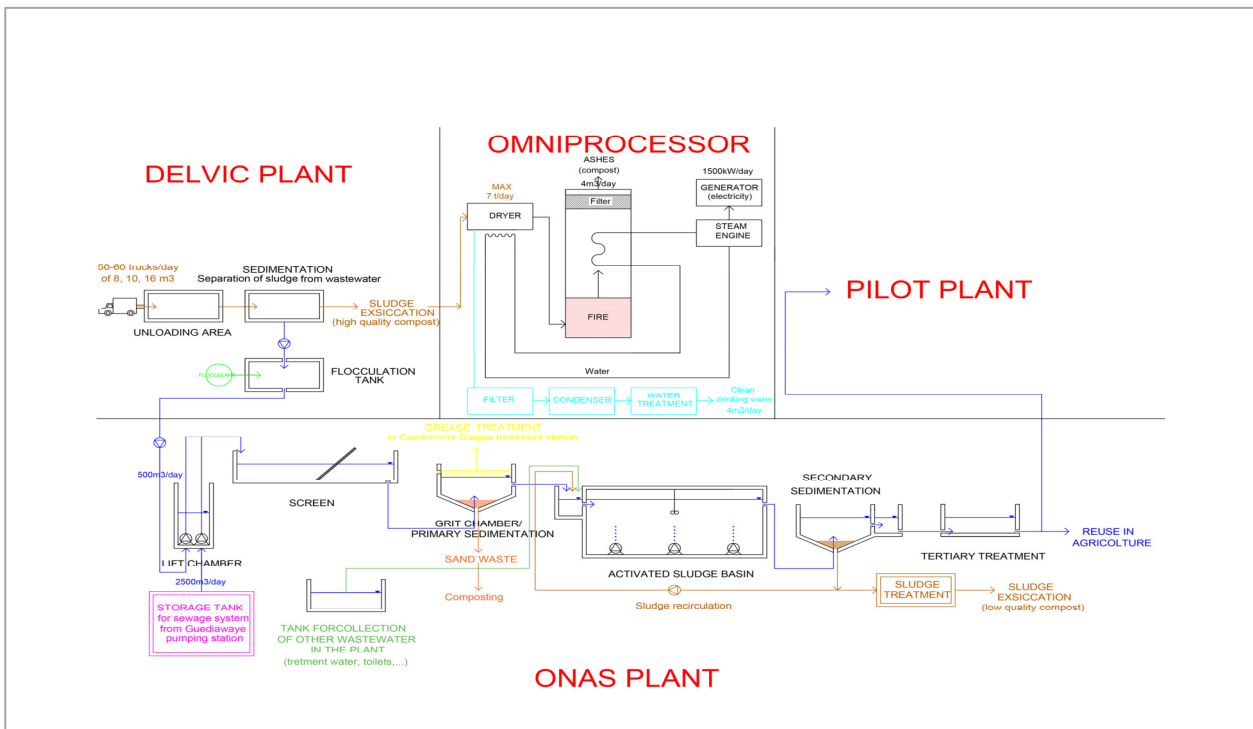


Figure 5. Schéma des différentes parties de la Step des Niayes de Pikine.

Date	pH	Cond (µS/cm)	Salinité (mg/L)	MEST (mg/L)	DBO ₅ (mg/L)	DCO (mg/L)	Col. Fécaux (UFC/100mL)
07/08/2018	7,48	4630	2400	7380	1400	2520	8*10 ⁵
13/08/2018	7,43	4310	2200	1480	650	3148	-
28/08/2018	7,44	4260	2200	1380	600	2840	-
Moyenne	7,45	4400	2266,66667	3413,33333	883,333333	2836	
Variance	0,0004667	26866,6667	8888,889	7868888,89	133888,889	65738,667	
Ecart type	0,02	163	94	28051	365,9	256,4	

Tableau 1. Résultats des tests faits sur les eaux usées prétraitées entrant dans la STEP de Niayes, données fournies par l'Onas avant l'installation du système de la floculation (pH, conductivité, salinité, MEST, DBO₅, DCO, TKN, PTol, Coliformes fécaux).

Date	pH	Cond (µS/cm)	Salinité (mg/L)	MEST (mg/L)	DBO ₅ (mg/L)	DCO (mg/L)	TKN (mg/L)	PTOT (mg/L)	Col. Fécaux (UFC/100mL)
04/09/2018	7,3	4070	2100	528	220	555	-	-	1,7*10 ⁵
11/09/2018	7,56	3730	1900	610	800	1468	-	-	-
18/09/2018	7,65	4860	2600	473,3	450	1920	-	-	-
25/09/2018	7,61	4310	2200	527	250	1250	-	-	-
09/10/2018	7,41	3850	2000	920	450	2164	361,8	25,6	-
16/10/2018	7,43	3630	1800	640	450	2184	-	-	1,4*10 ⁶
23/10/2018	7,39	3500	1700	1230	500	2492	-	-	-
30/10/2018	7,64	7,4	3680	200	450	748	-	-	-
06/11/2018	7,87	4490	2400	340	400	1142	663,3	12,1	-
13/11/2018	7,49	5150	2700	1100	600	2360	-	-	-
21/11/2018	7,41	4320	2200	700	850	1632	-	-	-
27/11/2018	7,51	4430	2300	236	600	838	-	-	-
Moyenne	7,5225	3969,8267	2292	1182,953	578	1817,4	512,55	18,85	790000
Variance	0,022	1585404,2	257070,66	405907,63	38607,33	470467,47	22725,56	45,56	3,78.10¹¹
Ecart type	0,148	1259	507	637	196,48	646	150,75	6,75	614817

Tableau 2. Résultats des tests faits sur les eaux usées prétraitées entrant dans la STEP de Niayes, données fournies par l'Onas après l'installation du système de la floculation (pH, conductivité, salinité, MEST, DBO₅, DCO, TKN, PTol, Coliformes fécaux).

Date	pH	Cond (µS/cm)	Salinité (mg/L)	MEST (mg/ L)	DBO ₅ (mg/ L)	DCO (mg/ L)
02/10/2018	7.35	2470	1100	7340	1850	15300

Tableau 3. Résultats des tests faits sur les eaux usées prétraitées entrant dans la Step de Niayes à un jour de traitement ou la floculation ne fonctionnait pas .

$\text{Var} (X) = \frac{1}{n} \sum_{i=1}^n (X_i - \bar{x})^2$ a été utilisé comme formule de calcul de la variance.

La station de pompage (SP) de Las Palmas de Guédiawaye fournit environ 2 500 m³ d'eaux usées mixtes par jour.

La station de pompage draine le bassin versant du Golf Sud (Guédiawaye) pour les refouler au niveau de la Step des Niayes. Elle dispose d'une bache circulaire de 7m de profondeur sur 3m de diamètre et une pompe d'une capacité de 160 m³/h (Onas, 2017). Le réseau de collecte des eaux usées est entièrement gravitaire de type collectif. Des regards de branchement réalisés au niveau des concessions branchées permettent une connexion des maisons avec la station de pompage.

Les caractéristiques de la station de pompage sont rappelées dans le tableau suivant :

Désignation	SP Las Palmas
Regard	1
Dessableur et Dégrilleur	1
Bâché et chambres des vannes	1
Salle de commande	1
Toilettes, clôture	1
Débit de refoulement (L/s)	44.44
Conduite de refoulement (mm)	PVC PN16 DN 315

Tableau 4. Caractéristique de la SP de Las Palmas (Onas, 2017).

Normalement, la quantité d'eau usée qui devait être fournie par la station de pompage à la Step est de 825 m³ (Onas), confirmant ainsi les quantités d'eaux usées qui dépassent de loin les normes d'acceptation de la Step. Cette surcharge est directement liée à la surpopulation et aux implantations informelles dans la région.

La capacité totale de traitement normale de la Step est de 12 500 équivalents/habitants avec un débit journalier de 935m³ par jour alors qu'elle reçoit et traite environ 3000m³ par jour à cause de la surpopulation de la ville de Dakar. Les quantités d'eaux usées reçues augmentent durant la période de chaleur et pendant l'hivernage.

Les tableaux 5, 6 et 7 suivants donnent les informations sur les paramètres physico-chimiques et microbiologiques du mélange entre les eaux usées sortant du prétraitement par la partie Delvic et les eaux usées venant de la station de pompage de Guédiawaye (eau brute) ; c'est la qualité globale des eaux usées qui entre dans la station d'épuration de l'Onas.

Date	pH	Cond (µS/cm)	Salinité (mg/L)	MEST (mg/L)	DBO ₅ (mg/L)	DCO (mg/L)	Col. Féc. (UFC/100mL)
07/08/2018	7,54	4150	2100	2340	1100	5430	6.3*106
13/08/2018	7,52	3110	1500	950	900	2300	-
28/08/2018	7,57	3990	2000	1390	800	2670	-
Moyenne	7,543	3750	1866,66	1560	933,33	3466,667	
Variance	0,00042	209066,66	68888,88	336466,667	15555,55	1950155,56	
Ecart type	0,02	457,23	262,46	580	124,7	1396,5	

Tableau 6. Résultats des tests sur les eaux usées brutes (caractéristiques des eaux entrantes) à l'intérieur de l'usine de Niayes, données fournies par l'Onas avant l'installation du système de la floculation.

Date	pH	Cond (µS/cm)	Salinité (mg/L)	MEST (mg/L)	DBO ₅ (mg/L)	DCO (mg/L)	TKN (mg/L)	PTOT (mg/L)	Col. Féc. (UFC/100mL)
04/09/2018	7,65	3170	1600	632	700	1604	-	-	6.5*106
11/09/2018	7,68	2510	1200	404	650	1154	-	-	-
18/09/2018	7,42	1643	600	1350	800	2248	-	-	-
25/09/2018	7,71	4050	2100	700	400	1598	-	-	-
09/10/2018	7,51	3490	1700	868	550	1928	431,3	23,5	-
16/10/2018	7,52	2500	1100	360	550	2244	-	-	106

8									
23/10/201	7,56	2480	1100	900	750	2112	-	-	-
8									
30/10/201	7,64	2090	900	476	350	1132	-	-	-
8									
06/11/201	8,03	3720	1900	653,3	650	1337	481,4	16	-
8									
13/11/201	7,55	3520	1800	720	700	1724	-	-	-
8									
21/11/201	7,52	3080	1500	473,3	900	1436	-	-	-
8									
27/11/201	7,52	2880	1400	524	1200	1481	-	-	-
8									
Moyenne	7,60	2927,75	1408,33	671,716	683,33	1666,5	456,35	19,75	
9									
Variance	0,02	462375,68	179097,2	68674,20	46805,5	141238,5	627,50	14,062	
2									
Ecart	0,14	680	423	262	216	375	25	3,74	
8									
type									

Tableau 7. Résultats sur l'eau brute (caractéristiques des eaux entrantes) à l'intérieur de l'usine de Niayes, après l'installation du système de floculation ; données fournies par l'Onas.

Date	pH	Cond (µS/cm)	Salinité (mg/L)	MEST (mg/L)	DBO ₅ (mg/L)	DCO (mg/L)
02/10/2018	7.33	2420	1100	27940	1800	21840

Tableau 8. Résultats des tests faits sur les eaux usées prétraitées entrant dans la STEP de Niayes, a un jour de traitement ou la floculation ne fonctionnait pas.

Enfin, les tableaux 9, 10 et 11 suivants donnent des informations sur la qualité des eaux usées traitées sortant de la Step de Niayes (eaux clarifiées). Les valeurs qui dépassent les normes de référence sénégalaises (normes de rejet des eaux usées NS 05-061 Juillet 2001) sont mises en gras.

Date	pH	Cond (µS/cm)	Salinité (mg/L)	MEST (mg/L)	DBO ₅ (mg/L)	DCO (mg/L)	Col. Féc (UFC/100mL)
07/08/2018	7,81	3310	1600	448	400	956	3.7*106
13/08/2018	7,75	3180	1600	540	320	1144	-
28/08/2018	7,81	2470	1100	500	320	1020	-
Moyenne	7,79	2986,66667	1433,33333	496	346,667	1040	
Variance	0,0008	136288,889	55555,556	1418,667	1422,22	6090,667	
Ecart type	0,02	369	235	37,6	37,71	78	
Limite SN	5.5 - 9.5	<3000		<50	<80	<200	<1000

Tableau 9. Résultats sur les eaux clarifiées sortant des usines de Niayes, données fournies par l'Onas avant l'installation du système de floculation (en gras les valeurs hors normes nationales de rejet des eaux usées).

Date	pH	Cond (µS/cm)	Salinité (mg/L)	MEST (mg/L)	DBO ₅ (mg/L)	DCO (mg/L)	TKN (mg/L)	PTOT (mg/L)	Col. Féc (UFC/100mL)
03/09/2018	7,89	2380	1100	212	175	414,5	-	-	-
04/09/2018	7,87	2400	1100	520	200	603	-	-	1.3*105
11/09/2018	7,86	2460	1100	276	180	646	-	-	-
18/09/2018	7,93	2470	1100	228	200	627	-	-	-
25/09/2018	7,91	2470	1100	324	160	680	-	-	-

09/10/2018	7,79	2470	1100	360	180	892	271	5.8	-
16/10/2018	7,85	2430	1100	132	200	768	-	-	1.6*106
23/10/2018	7,82	2460	1100	256	240	618	-	-	-
30/10/2018	7,59	3360	1700	236	180	536	-	-	-
06/11/2018	8,3	3580	1900	240	200	559	-	-	-
13/11/2018	7,9	3450	1700	264	200	330	-	-	-
21/11/2018	7,79	2520	1200	220	440	564	-	-	-
Moyenne	7,875	2704,167	1275	272,33	212,9167	603,125	271	5.8	1810000
Variance	0,023775	195324,306	83541,6667	8537,22	5051,909	19777,67			
Ecart type	0,14	441,9	289	92,4	71	140			
Limite SN	5.5 - 9.5	<3000		<50	<80	<200	<30	<10	<1000

Tableau 10. Résultats sur les eaux clarifiées sortant des usines de Niayes, données fournies par l'Onas après l'installation du système de la floculation (en rose, valeurs hors normes nationales de rejet des eaux usées).

Date	pH	Cond (µS/cm)	Salinité (mg/L)	MEST (mg/L)	DBO ₅ (mg/L)	DCO (mg/L)
02/10/2018	7.91	2440	1100	500	220	894

Tableau 11. Résultats sur les eaux clarifiées sortant des usines de Niayes, données fournies par l'Onas, un jour où l'installation du système de la floculation ne fonctionnait pas (en rose, valeurs hors normes nationales de rejet des eaux usées).

La date du 02 octobre correspond à une date où le système de floculation permettant de sédimenter d'avantage la boue de la partie privée Delvic ne fonctionnait pas, par conséquent, les données sont très élevées comme avant l'installation du système correspondant aux dates du 07, 13 et 28 août 2018.

Résultats et discussions du traitement

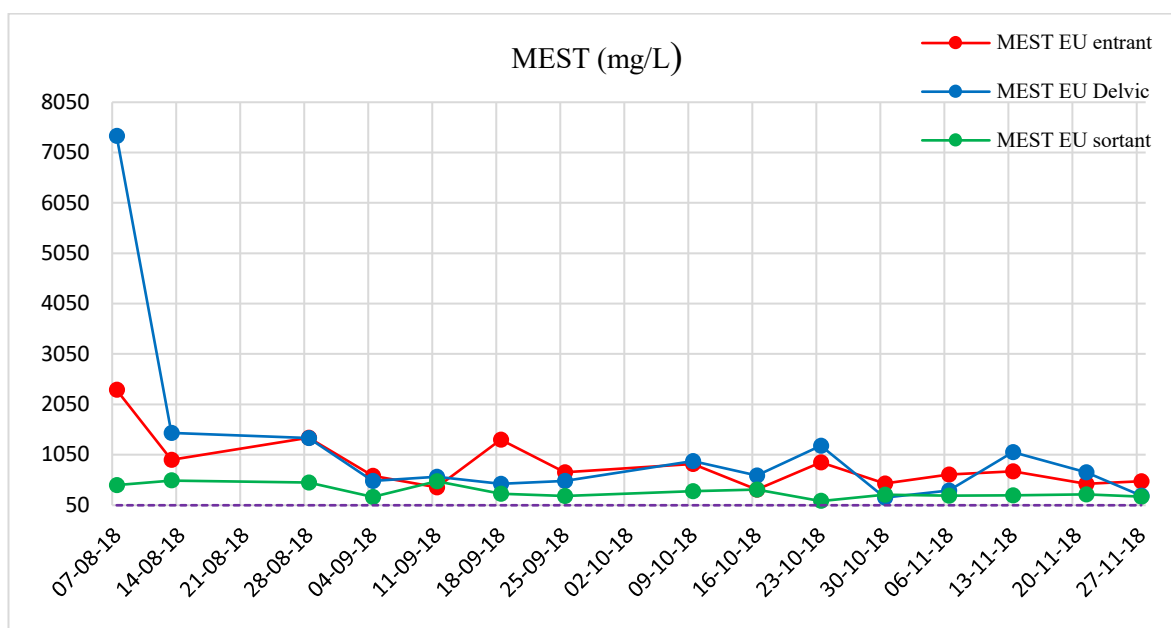
Les résultats des analyses ont montré dans les différents tableaux que les eaux usées sont très chargées en Mest, Dco et Dbo avant et après traitement et ne respectent pas les normes de rejet des eaux usées sénégalaises ni les normes de réutilisation dans l'irrigation de la Fao et l'Oms après traitement. Ainsi avant l'installation du système de floculation, les eaux usées prétraitées venant de la partie privée Delvic sont anormalement concentrées. Les eaux usées étaient prétraitées mais contenaient une quantité importante de boue. A partir du mois de septembre 2018 la floculation a été installé pour minimiser les problèmes. Mais malgré l'installation les eaux usées a la sortie du traitement ne respectaient pas les normes.

À partir des valeurs collectées dans les différents tableaux les valeurs moyennes sont calculées pour chaque paramètre (tableau 12) ; en ce qui concerne les valeurs de sortie de l'usine Onas (celles qui caractérisent les eaux réutilisées en agriculture et rejetées dans le lac du Technopole), il est facile de

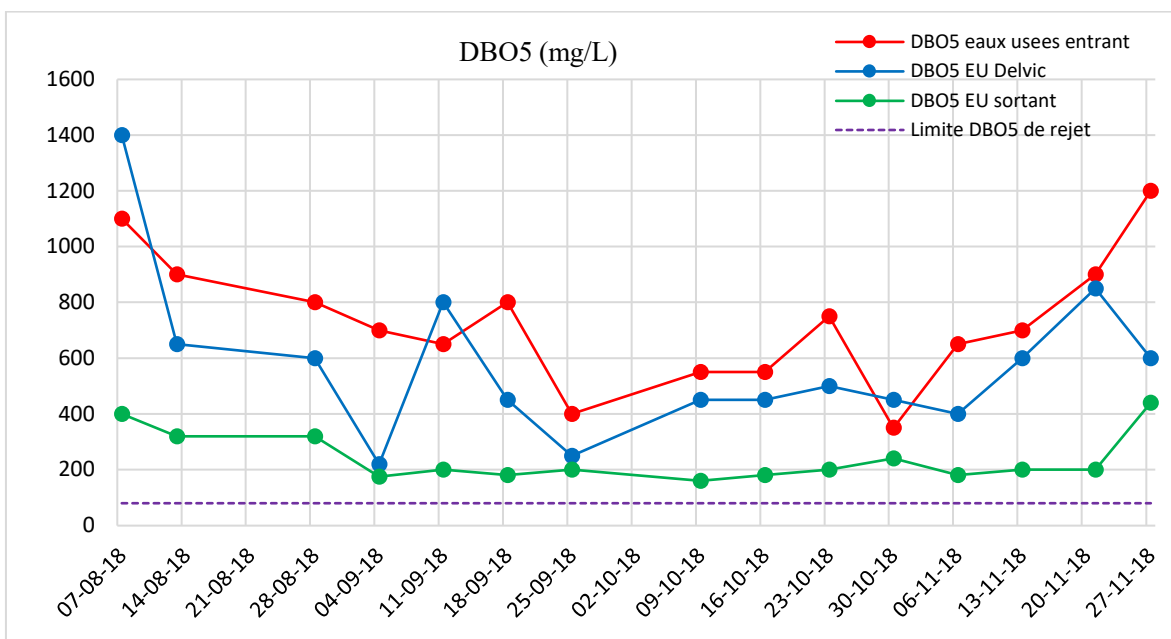
remarquer que les concentrations en MEST, DBO₅, DCO, NTK et coliformes fécaux dépassent largement les limites des normes de rejet des eaux usées sénégalaises.

Paramètres	pH	Cond (mS/cm)	Salinité (mg/L)	MEST (mg/L)	DBO ₅ (mg/L)	DCO (mg/L)	TKN (mg/L)	PTOT (mg/L)	Fécal Col. (UFC/100mL)
EU Delvic	7.50	3.88	2200	1568	657	2660	512.55	18.85	790000
EU entrant	7.58	3.05	1500	2543	800	3265	456.35	19.75	4600000
EU sortant	7.86	2.74	1300	328	238	703	271	5.8	1810000
Limites SN	5.5-9.5	<3	-	<50	<80	<200	<30	<10	<1000

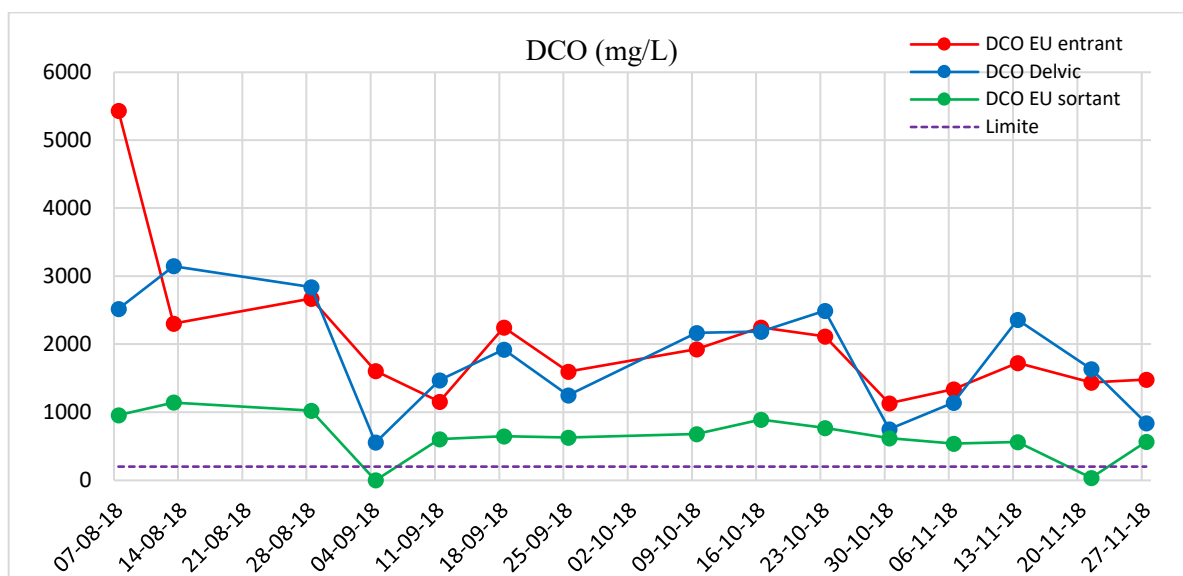
Tableau 12. Valeurs moyennes de tous les paramètres aux trois sites de surveillance de l'Onas.



Graphique 1. Résultats des MEST aux points de surveillance dans les différentes parties de la Step.



Graphique 2. Résultats de la DBO₅ aux sites de surveillance dans les différentes parties de la Step.



Graphique 3. Résultats de la DCO aux points de surveillance dans les différentes parties.

Quelques considérations peuvent être faites:

Les valeurs des concentrations en MEST, DBO₅, DCO et les coliformes fécaux des eaux usées clarifiées sortant de la Step ne respectent pas les normes de rejet des eaux usées sénégalaises;

Les données des eaux usées de la partie privée Delvic sont meilleures en qualité que lorsqu'elles sont mélangées aux usées de la station de pompage de Guédiawaye (Las Palmas). Ceci est dû au prétraitement effectué dans la partie Delvic des eaux usées avant leur envoi à la Step.

On constate aussi que les données en DBO₅, DCO et MEST sont plus élevées en aout et à la date du 02 octobre 2018 ; ce constat détaillé plus haut est dû à l'installation du système de floculation permettant de sédimenter d'avantage la boue des eaux brutes de Delvic. L'installation a été effectuée à partir du mois de septembre.

La station d'épuration d'Onas a de bons rendements d'élimination et fonctionne donc bien, mais elle est néanmoins manifestement surchargée et ne peut donc pas garantir de bonnes valeurs de sortie des eaux clarifiées pour respecter les normes de rejet et de réutilisation des eaux usées.

Paramètres	MEST (%)	DBO ₅ (%)	DCO (%)	NTK (%)	PTOT (%)	Col. Fécal (%)
ONAS efficience	87	70	78	41	71	61

Tableau 13. Efficacité d'élimination de la Step des valeurs moyennes des paramètres.

Les données du 02/10/2018 sont élevées en raison d'un problème interne à l'usine de prétraitement Delvic : le système de floculation a cessé de fonctionner et, par conséquent, les concentrations des MEST, de la DBO₅ et de la DCO étaient anormalement plus élevées.

Conclusion

Depuis une vingtaine d'années, dans la région de Dakar, les eaux usées urbaines par leurs volumes de plus en plus importants, se sont présentées comme une alternative assez intéressante pouvant combler le déficit en eau des exploitations. Malgré le potentiel que les eaux usées peuvent donner comme alternative, elles représentent un sérieux problème de santé, d'environnement et une menace économique au Sénégal. L'agriculture est à la fois un producteur et un utilisateur d'eaux usées. Par conséquent, le secteur peut à la fois provoquer et subir les conséquences de la pollution. Dans la zone humide du Technopole, les eaux usées traitées malgré leur abondance et l'insuffisance du traitement ne sont même pas suffisantes pour le maraichage.

Dans la plupart des zones de maraichage à Dakar, les eaux usées sont utilisées sans précautions de sécurité nécessaires, les polluants microbiologiques et chimiques peuvent s'accumuler dans les cultures, les produits de l'élevage, le sol ou les ressources en eau, et avoir de graves répercussions sur la santé des consommateurs d'aliments et travailleurs agricoles exposés. Toutefois, lorsqu'elles sont traitées de façon adéquate et utilisées sans risque, les eaux usées constituent une source précieuse d'eau et de nutriments, contribuant ainsi à la sécurité alimentaire et à l'amélioration des moyens de subsistance.

Ainsi, après avoir identifié la zone la plus polluée qui est la zone environnante de la Step causée par les quantités de boues de vidanges et d'eaux usées qui dépassent la capacité de traitement de la Step, nous avons pour la suite de nos travaux installer un système de zone humide construite à flux submergé horizontal à l'intérieur de la Step dont le but est d'améliorer la qualité des eaux usées traitées destinées au maraichage.

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Acronymes

Ands	Agence national de la statistique et de la démographie
Dsi	Delvic Sanitation Initiatives

DbO	Demanda biochimique en oxygène
Dco	Demanda chimique en oxygène
EU	Eaux Usées
Fao	Food and agriculture organization
ID	Impianto di depurazione
Mest	Matières en suspension totales
Omd	Objectifs du Millénaire pour le développement
Onas	Office national de l'assainissement du Sénégal
Rgphae	Recensement général de la population et de l'habitat, de l'agriculture et de l'élevage
Sst	Solidi sospesi totali
Step	Station d'épuration
SP	Station de pompage
Wwap	World Water Assessment Program

LEADERLESS, MUTUALISTIC, AND ORGANIC AGRICULTURAL CO-PRODUCTION AS A SOCIALLY-ECOLOGICALLY SUSTAINABLE RURAL-URBAN PRACTICE.

A local Italian experience, an international perspective to rethink the territory and the city

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Abstract

In an expanding world demanding more and more resources and causing interconnected crisis, the systemic nature of tragic social and ecological incidents is not (yet) widely acknowledged. The social and ecological limits of the current industry-based economic paradigm let us forerun the onset of possible emergencies to be possibly tackled through preventive design and positive transformation, where the rethinking of the territory, the city, and their supporting environments is necessarily involved. In this perspective, nurturing initiatives to ensure distributed food provision seems a good start in such a transformation, at least as a socio-economic sustainability tool and as a satisfier of basic human needs. We present an example of communal self-management for organic agricultural production, inspired to the model of Community-Supported Agriculture (CSA). This project was started in the urban sprawl of massively industrialised North-Eastern Italy by committed individuals and grassroot groups, already active in discourses on ecological sustainability, social equity, social and solidarity economy, transition and post-growth. From individual-to-collective self-determination and bottom-up initiative potentials through food plans and other tools to be participatorily defined with all the actors of a given area, a CSA can represent the trigger of a virtuous paradigmatic shift in more or less institutional policies for the maintenance, regeneration, and strengthening of territory and urban environments.

In un mondo in espansione, che richiede sempre più risorse e causa crisi interconnesse, la natura sistemica dei fallimenti ecologici e sociali non è (ancora) ampiamente riconosciuta. I limiti sociali ed ecologici dell'attuale paradigma delle economie a base industriale lasciano presagire l'insorgere di possibili emergenze, affrontabili attraverso una pianificazione preventiva e trasformazioni positive che includano un ripensamento delle città, dei territori e degli ambienti che li supportano. In questa prospettiva, curare iniziative che garantiscano l'approvvigionamento distribuito del cibo sembra costituire un buon punto di partenza, almeno come strumento di sostenibilità socio-economica e come garanzia del soddisfacimento di un bisogno umano primario. Viene qui presentato un esempio di autogestione comunitaria per la produzione di ortaggi biologici, ispirato al modello delle Comunità che Sostengono l'Agricoltura (CSA). Tale progetto è stato fondato nello *sprawl* industrializzato del Nord-Est italiano da individui e gruppi già impegnati nei campi della sostenibilità ecologica, dell'equità sociale, dell'economia sociale e solidale, della transizione e del post-crescita. Dal livello individuale a quello collettivo, con la sua potenzialità di iniziative di autodeterminazione dal basso tramite piani del cibo e altri strumenti definibili in maniera partecipata, una CSA può innescare virtuosi cambi di paradigma in pratiche e politiche più o meno istituzionali per la preservazione, la rigenerazione e il rafforzamento del territorio e degli ambienti urbani.

Keywords

Sustainable Planning and Practices, Community-Supported Agriculture, Urban Food Policy, Local Food Plans, Food Geographies, Political Ecology and Economy

Introduction: food in a tough world scenario

Reports say cities keep expanding, consuming fertile land and enlarging transport infrastructures to allow for their increasing affluence to be satisfied by external resources and goods. However, if tragic social and ecological incidents regrettably start emerging¹, their systemic nature is not (yet) widely acknowledged. As a matter of fact, the social and ecological limits of the current industrial economic paradigm on this planet let us glimpse an upcoming exhaustion of key resources to be possibly tackled through a positive transformation, e.g. preventive design, planning, and practices.

If the quest for an improved efficiency of the same paradigm seems not much more than a diversionary, we propose the demand should be targeted instead, and the rethinking of the territory, the city, and their supporting environments is necessarily involved. In this perspective, food seems to possibly play an important role in such a transformation, for its ability to shape the territory both for its production and for its delivery, while representing one of the basic human needs.

Within such discourses, in this paper we present an example of communal self-management for organic agricultural production, inspired to model of Community-Supported Agriculture (CSA). Since 2018, this experience has been studied from different points of view, and some publications have followed: in Auriemma *et al.* (2020), the cooperative enterprise is presented and addressed with a focus on its implications in pursuing social equity and food autonomy; in Cristiano *et al.* (2020a), through action research the attention is mostly oriented to frame it and discuss it into the international debates toward possibly sustainable and desirable societies and economies in a challenging century and in likely post-growth scenarios; in Cristiano (forthcoming), this CSA example is investigated as a case study through a transdisciplinary tool such as systems thinking and an emerging comprehensive geobiophysically-based environmental accounting tool such as the Emergy Assessment method.

The encounter between academic and activist-producer perspectives has generated and fostered so far a fruitful exchange of knowledge and approaches; on the one hand, the everyday practice has inspired possible concrete paths to be matched with old and new theoretical arguments; on the other hand, the role of the university side has been contributing to the construction of models, to support experimental and optimisation scenarios, and to progressively assess the performances. It clearly is beyond the purposes of this paper to conduct or report a full literature review of the context and to replicate the research materials and methods, all offered anyway in the three above cited publications.

¹ This work was submitted in late 2019. During its revision, the COVID-19 pandemic has severely affected the whole planet, and the discourses about ensuring the provision of food and other livelihood have abruptly become more clear and compelling, as we discussed e.g. in Cristiano (2020) and Cristiano & Gonella (2020).

Instead, the main aims of the present work are (a) to originally formalise the logic diagram of a given CSA project and (b) to start to systemically detect its potentials (and limits) for socially and ecologically sustainable transformation in urban and rural context and related design and planning tools, with territorial and geographical foci, oriented toward practical replication and implementation.

The CSA Veneto project among practice, education, and socio-ecological transformation

This project was started in the urban sprawl of massively industrialised North-Eastern Italian region *Veneto* by committed individuals and grassroots groups, already active in discourses on ecological sustainability, social equity, transition, and post-growth. The *CSA Veneto* project is integrated in a Social and Solidarity Economy district (*Oltreconfìn*) consociating several organic farms in the urban-rural sprawl between Venice and Treviso, and itself framed in a wider network also including the aforementioned groups as well as other local ones (Figure 1): the producers from the district operate in the sectors of cereals, greens, eggs, cheese, herbs, and seeds; among the networking organisations, some national ones are present such as the roundtable for solidarity economy, the two main national associations for degrowth, the national network of ecovillages, and other groups from the agro-ecological movement; among the local ones, we can find ethical purchasing groups, ethical micro-finance agencies, fair trade shops, and a cultural association helping keeping Old Town Venice alive.

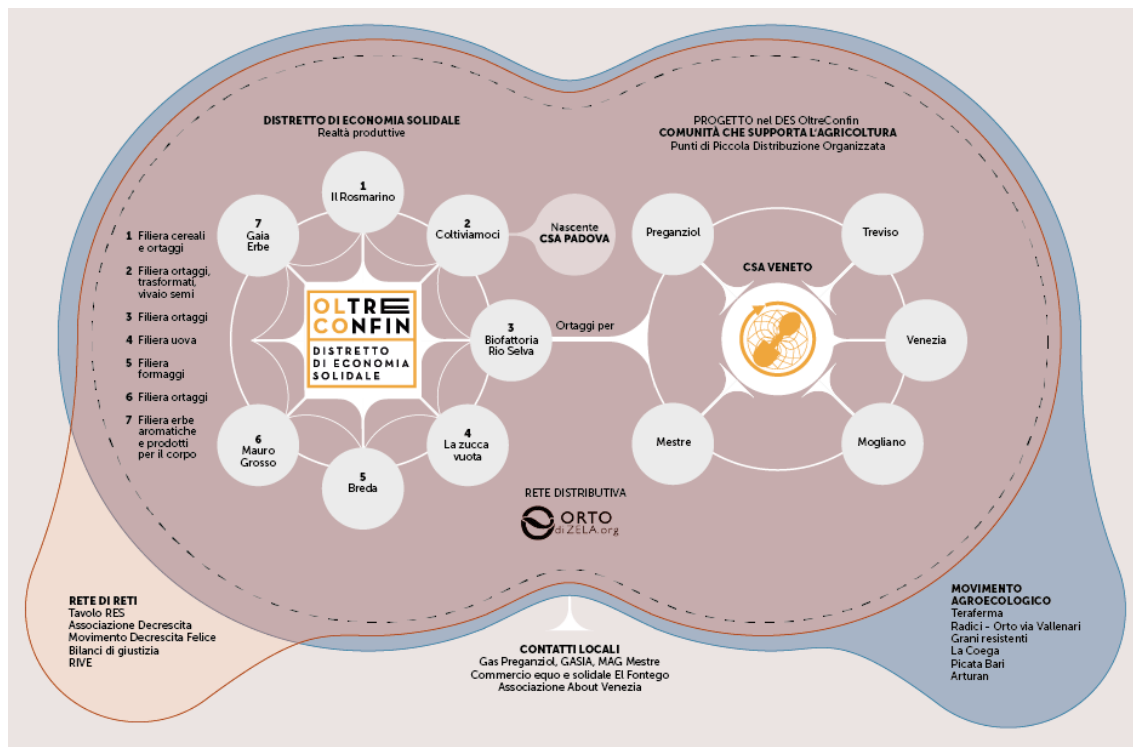


Figure 1. The CSA project framed in a wider social solidal network of local producers, associations, and movements

The members, the activities, and the food distribution are all deployed in a local yet quite differentiated rural-urban spectrum.

The project started in early 2018 based in the historic organic farm *Biofattoria Rio Selva* (Figure 2) in Preganziol, next to Treviso. The food provision planning system overlaps with the planning of the cropping semester, formulated by an agro-technical working group and approved by a plenary assembly (Figure 3): the variety and quantity of the vegetables that the community actually needs are discussed and defined, so as to correctly plan production according to the real requirements of the final consumers. The most appropriate seeds to plant are evaluated, based on the type of local soil that can be used in a given year. This is important within a wider effort to minimise to use of fertilisers, even those theoretically allowed in organic farming, thus going towards a more radical, natural agriculture. The costs to run the project are born by the very producers-consumers (~50 shares) based on their expenditure possibilities.



Figure 2. A view of the farm hosting the project



Figure 3. Winter Assembly of the CSA Veneto, January 2019

Savings from the prevention of food waste and of packaging are clear, and the production expenses and methods are totally transparent; this way, and since food is not sold, there is no need for a third party (i.e. one of the existing organisations to be called and paid to obtain a certification) to make release approvals about the food being organic. Besides being *de facto* self-certified by the producer-consumer community, organic food is here de-commodified in a mutualist system — an explicit alternative to the mainstream, currently dominant, agri-food model (Cristiano *et al.*, 2020a).

Among the founding principles of the co-production project at issue are:

mutuality, since members can put the amount of money and time they can offer, regardless of the share to which they are eventually entitled;

planned crop production;

produce acceptance;

transparency and fair budgeting;

relationship and self-management building, encouraged through active involvement in distribution and other tasks, proximity, and short duration of collection time slots;

democratic management, through open meetings, no structured board, and no leaders;

learning across groups;

appropriate group dimension (i.e. if the group grows too much, gemmation will be preferred);

progressive cooperation and development.

Some pillars can be also found in the overall vision guiding the project: local food; food autonomy or *sovereignty*, with the latter version proposed by the international peasant movement Via Campesina (Rosset, 2003; La Via Campesina, 2019); Social Solidarity Economy (Mance, 2007, Fonteneau *et al.*, 2010, 2011; UN Inter-Agency Task Force on Social and Solidarity Economy, 2018); agroecology (cf. Francis *et al.*, 2003; Altieri, 2009, 2018); permaculture (cf. Mollison and Holmgren, 1978; Mollison, 1988); and resilience. A logic scheme of the concepts and functioning of the CSA Veneto project are illustrated in Figure 4.

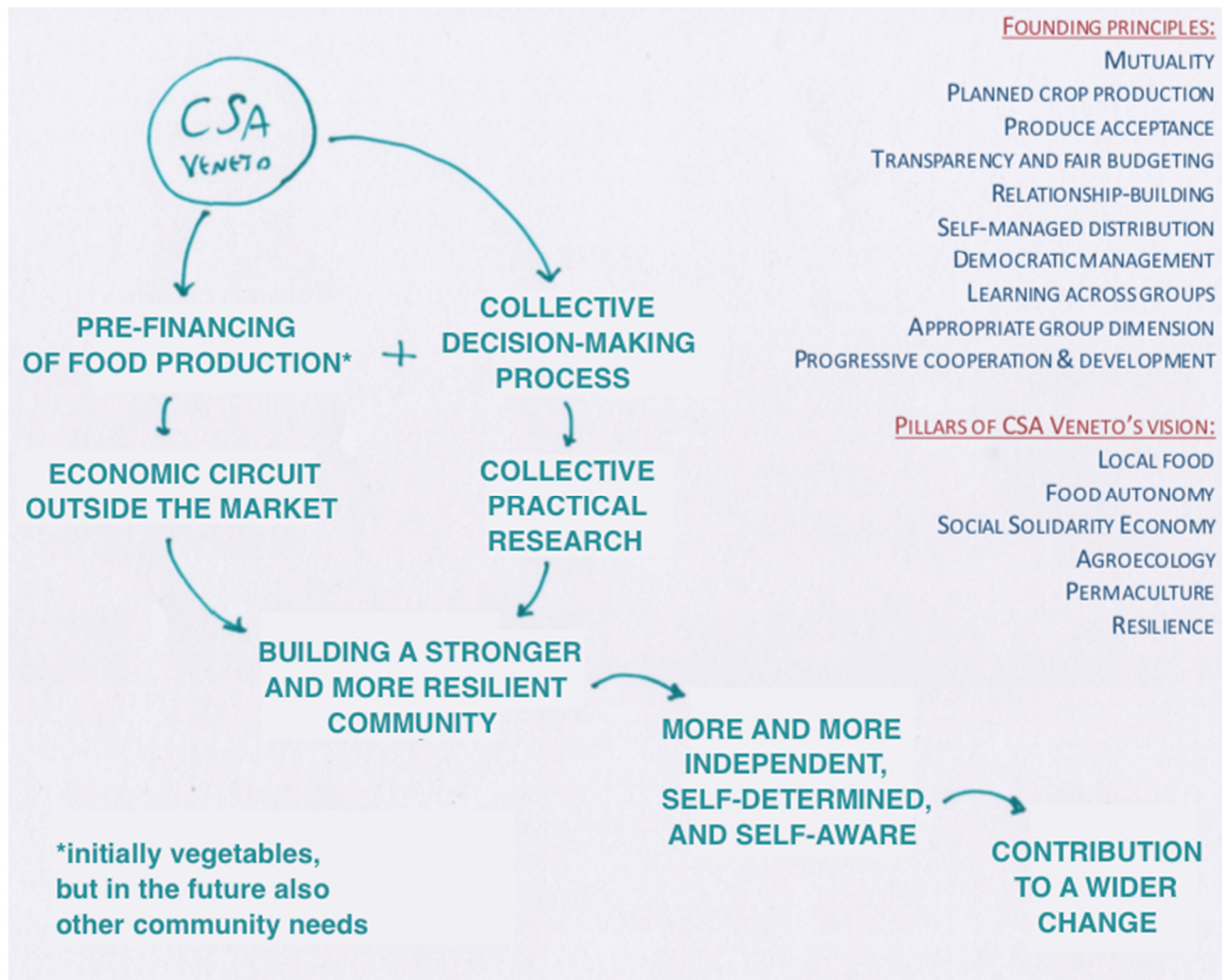


Figure 4. CSA Veneto's logic diagram and key concepts

This experience is meant as part of a conscious action within a wider idea of experimenting a socio-economic transformation of agro-ecological reorganisation, ecosystems regeneration, and urban food ecology, and involves genuine and intentional processes of self-organised inhabitants-and-producers: not a set-piece, nor a niche marketing operation, but rather the genuine outcome of real processes pursuing the self-determination of aware and self-organised inhabitants-producers (*ibid.*). The whole experience can be framed in what Chodorkoff (2019) widely defines as education for groundbreaking transformation, especially when

you learn how to act with others in a democratic fashion, when you begin to reshape your understanding and relationships between yourself and others and the environment in which you live”, and – indeed – “when you organise a cooperative [...] (Chodorkoff, 2019)

All of this seems to have something to deal with a quote from Murray Bookchin, as reported by the same Chodorkoff (*ibid.*), maintaining that “every revolutionary project is an educational project”. When education and ideas are involved, we might say one is targeting what systems thinking

defines as mental models, placing them at the bottom tip of its metaphorical iceberg (Meadows, 2008), i.e. where the leverage potential for sustainable systemic change is higher (Meadows, 1999). In such a perspective, context-based tools and policies are being explored. In this direction, CSA Veneto has recently organised events to start a dialogue with local public administrations for concrete action plans and facilitation tools. A CSA already represents an evolution from the passive individual choices of a single consumer to an active collective engagement in bottom-up initiatives. Through urban food plans, policies (Calori *et al.*, 2017), and other tools to be defined in participatory ways with all the actors of a given area, a CSA can represent the trigger of a virtuous paradigmatic shift in more or less institutional policies for the maintenance, regeneration, and strengthening of territory and urban environments.

At a local social, environmental, and economic level, the production model proposed by CSA Veneto exhibits benefits such as: local, healthy, sustainable organic food fairly accessible to an increased number of households; community-building and increased resilience; soil protection; awareness raising and material and immaterial re-thinking of the relations between and across the city and the countryside.

At a larger level, the CSA Veneto model implicitly poses epochal societal challenges such as the ideal shape of a city in a given context, the relation between a city and its surrounding countryside and support areas, strategically sustainable urban metabolisms and truly circular patterns (Cristiano *et al.*, 2020b), the needed transport infrastructures as well as the preservation of land, water bodies, and local resilience and quality of life in general.

All challenges that seem hardly addressable by current business as usual scenarios, i.e., just “greening” some specific processes in a *de facto* still unsustainable and unjust social and economic paradigm unavoidably producing unquestioned ever expanding cities globally, which – in a frightening paradox – increasingly consume the fertile soil theoretically required to feed their increasing populations. In such a complex scenario, a CSA seems to offer some lessons to learn.

However, some limits can be detected, partially suggested here but deserving future developments. We propose that acting in a problematic paradigm, yet envisioning its overcoming, might set some policy and behavioural barriers. Besides the risk of ending up not really getting to question the paradigm from the inside, among such barriers we might find: unclear bureaucratic framing and following lack of legitimation²; company- and profit-oriented economic incentives and financial subsidies from public administrations at all levels; scarce protection from pollution, nearby use of pesticides, land consumption, and inadequate light transport infrastructures; land rental or

² The outbreak of the COVID-19 pandemic, which has followed the conclusion of this work, might suggest some hints e.g. in terms of the possibility for the farming activities, the voluntary work, and the deliveries to be authorised in curfew and/or lockdown periods.

purchasing prices in a competitive market economy; working yet poor people not having time to dedicate to (or even to get to know) even mutualist cooperative initiatives like this, and so on. Given the mostly experimental and voluntary nature of an aware project like a CSA, some internal limits might also play a role, e.g.: group dynamics and decline in active participation, with overloads on few people deciding for everyone (and consequent power issues); declining available time and/or motivation; participants getting fed up with not being able to grocery shop based on their daily desires; changing parallel activities (e.g. abrupt lack good salaries for personal jobs in times of economic crises) to contribute to the project in a solidarity perspective; inadequate time spent on internal relations and external outreach; possible exhaustion of aware and interested people in the society, leaving the approach to marginality. As premised, future punctual works may adequately address these issues.

Conclusion

The main features of an innovative co-production system for food production is illustrated in this paper. In addition to radical organic farming, self-education exercises include being horizontal, leaderless, and mutualistic. This Community-Supported Agriculture project addresses the challenges of socio-ecological transformation by – literally and metaphorically – seeding within the current industrial economic paradigm to be overcome. Proposed and practiced as a local experience, the project acknowledges and aims at locally (and necessarily partially) addressing global issues; refusing closed localisms, it has an international perspective of dialogue and networking. It can be seen as a practice to rethink the territory and the city, by reconnecting the urban contexts to the rural environments that ultimately and unavoidably support them. Such reconnection is physical and immaterial, with exchange of products, notions, and resources within a short supply chain.

Another immaterial goal is represented by the very concept of community, reinforcing the resilience of a territory by enhancing collective relations and mutual aid: collaboration rather than competition, pursuing higher degrees of autonomy and independence in a perspective of long-lasting, genuine sustainability. Starting on food, the same approach can be enlarged to other key sectors of human societies, and provide valuable information to support the appropriate rethinking, planning, and design of the whole urban-rural world, including local choices within cities, to be possibly implemented through spontaneous initiative and – if need be – integration into participatory and bottom-up built urban food policies and plans.

The role of systemic interconnections both in ecology and in human societies is crucial, and the collective bottom-up approaches driving this project, together with their goal of self-determination,

allow participatory processes to be put into practice and experimented. An innovative project like this can represent one of the triggers of a virtuous paradigmatic shift directly acting on the founding principles driving the rethinking, maintenance, regeneration, and strengthening of both rural territories and cities. Systemically speaking, a fair leverage potential for change is detected, together with crucial issues to be possibly recognised and addressed both internally and in future studies.

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PUBLIC HOSPITAL SETTING IN RURAL ANGOLA: MEDICINE QUALITY AND MEDICATION ADHERENCE

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Abstract

The *A.P.P.A.*[®] Project focuses on Galenic Laboratories (GLs) established in medical structures in Developing Countries. The first laboratory in Angola was set up in 2011.

In this context, the objectives of the study carried out in 2016 were: to update the handbook of the GL in view of locally endemic pathologies and the widespread infiltration of counterfeit medicines; to curb the use of counterfeit medicines within the health structure through the implementation of a monitoring programme and to identify an effective method for monitoring and increasing the medication adherence by patients with non-communicable diseases. All objectives have been achieved.

Il progetto *A.P.P.A.*[®] ha come scopo la realizzazione di laboratori galenici (GLs) in strutture mediche di Paesi in via di sviluppo. Il primo laboratorio in Angola è stato istituito nel 2011. In questo contesto, gli obiettivi dello studio condotto nel 2016 erano: aggiornare il formulario del GL in considerazione delle patologie endemiche e della presenza diffusa di medicinali contraffatti; ridurre l'uso di medicinali contraffatti all'interno della struttura sanitaria attraverso l'implementazione di un programma di monitoraggio, identificare un metodo efficace per monitorare ed incrementare l'aderenza alla terapia da parte dei pazienti con malattie non trasmissibili. Tutti gli obiettivi sono stati raggiunti.

Keywords

Galenic medicines, developing Countries, counterfeit medicines, non-communicable-diseases, *A.P.P.A.*[®] Project

Introduction

Aid Progress Pharmacist Agreement (*A.P.P.A.*[®]) is a non-profit association (*A.P.P.A.*[®] website, 2019) whose main activity is the *A.P.P.A.*[®] Project (Baratta, 2014). The Project began in 2004 and is the result of the cooperation between the University of Turin (Department of Drug Science and Technology) and Italian Community Pharmacists. The Project focuses on Galenic Laboratories (GLs) established in medical structures located in Developing Countries (DCs).

The project involves undergraduate students of the Degree Course in Pharmacy as part of their experimental thesis. Community Pharmacists and University Researchers are usually involved in supervision missions of on-site activities. The Project complies both with European and the guest country's legislation while safeguarding the quality of medicinal products. The Project is structured in different steps following which an effective and functional lab can be set up: only if a real need for the GL is demonstrated, can the subsequent steps be carried out. The pharmaceutical forms proposed are liquid preparations, capsules, ointments, pessaries, suppositories and multi-dose parenteral solutions. For each laboratory, a specific handbook has been designed: each of these complies with the different local needs taking into account the medicinal products that, based on our studies on site, are more often counterfeit (WHO website, 1999; Di Giorgio, 2010; Baratta, 2012). After ten years, several Projects have been established: two in Cameroon, Madagascar and Angola; one in Chad and one in Haiti (*A.P.P.A.*[®] website, 2019).

The first *A.P.P.A.*[®] laboratory in Angola was set up in 2011 at the Nossa *Senhora da Paz* Hospital (NSPH) (*A.P.P.A.*[®] website, 2019). The NSPH is in Cubal, a city located in a rural zone in the south of the country; this large region covers an area of 4.794 km². The territory is made up of small towns with a total population of about 500.000 inhabitants. The NSPH offers many services among which are: Accident and Emergency, Paediatrics department, Malnutrition department, Adult medicine, AIDS department, Vaccination department, Paedology clinic, Paediatrics clinic and General Medicine. It has also one of the most important centres in Angola for the treatment of tuberculosis (NSPH website, 2019).

In this context, medicines are supplied by various sources. Firstly, the Ministry of Health provides some medicines free of charge, especially for the treatment of malaria, AIDS and tuberculosis. Other medicines are produced directly in the *A.P.P.A.*[®] GL or purchased on the local market. These purchases regard, in particular, medicines in which the active ingredient is impossible to ship in pure form for compounding in the GL. However, the use of medicines of industrial origin, purchased independently of the hospital or acquired through the Ministry of Health, gives rise to a

significant problem: as shown in previous studies, a large part of the products available on the local market in DCs and even in Angola are counterfeit (Baratta, 2012).

In addition to the problem of counterfeit medicines described above, it is necessary to consider the growth of Non-Communicable-Diseases (NCDs): cardio-vascular and respiratory diseases, tumours and diabetes, which have reached epidemic proportions in low-income countries owing to factors such as ageing populations, urbanisation and the spread of unhealthy lifestyles. DCs are facing a double blow from disease as they are under attack from both communicable and non-communicable diseases entailing a growing demand for new services and high costs for medical treatment: costs, in large part, borne directly by the patient. This situation calls for a multi-sector healthcare programme aimed at the prevention and control of the principal risk factors - smoking, unhealthy diet, sedentary lifestyle and alcohol abuse - and addressing the underlying social drivers. In the near future, in line with the global strategies of the WHO, the fight against NCDs will be extended to many countries, contributing to achieving target 3.4 of the Sustainable Development Goals of the United Nations (WHO website, 2018; UN website, 2015).

This is a fundamental goal considering that, according to the WHO in 2015, the African region had the highest rate of mortality from NCDs. Angola, in particular, ranks ninth in the world and third in the region, with 823 deaths per 100,000 inhabitants, just after Cote d'Ivoire and Sierra Leone (WHO, 2016).

Given this background, the aims of the study performed in 2016 at the *Nossa Senhora da Paz Hospital* in Cubal in collaboration with *A.P.P.A.*[®] non-profit association, University of Turin (Department of Drug Science and Technology) and local healthcare staff were:

To update the handbook of the GL in order to meet the requirements of the hospital in view of the spread of endemic pathologies in the area (the updating of the handbook takes place periodically in order to ensure that it matches the real current needs) and, furthermore, to keep up with changes in the availability of industrial products on the local market as well as to prevent the infiltration of counterfeit products.

To curb the use of counterfeit medicines at the health structure through the implementation of a monitoring programme for industrial products purchased locally and used in the various departments of the hospital with the goal of detecting immediately any counterfeit products;

To identify an effective methodology for monitoring and increasing the medication adherence amongst patients affected by NCDs and treated in out-patients' clinics in a rural setting in a DC such as NSPH.

Methods

The implementation of an *A.P.P.A.*[®] project normally takes place through missions involving qualified pharmacists and undergraduate students from the Degree Course in Pharmacy (Baratta,2014). To satisfy the objectives of the project in this current study, a physician was also involved. The involvement of a physician was justified as:

It facilitated the rapport with local healthcare personnel, eased the way for the updating of the handbook of the GL and led to the rapid identification of potentially counterfeit medicines.

The local healthcare personnel required training for the monitoring of adherence to therapy project. The physician mission was funded as part of a cooperation project of the University of Turin called UNItO for international COOperation (UNI.COO).

Updating the galenic formulations handbook

In order to increase the synergies between the diagnostic and treatment activities and the production of the GL, a number of meetings were held with the participation of the *A.P.P.A.*[®] volunteers (qualified pharmacists and undergraduate students of the University of Turin) as well as the stakeholders in medicine management within the NSPH: the general director of the hospital, the health director, heads of departments and the out-patients' clinics, nursing staff and the GL staff.

During these meetings, the details of the project were outlined and all staff were asked to co-operate with the project team in order to achieve the goals of the project.

Regarding the updating of the handbook of the GL, based on the actual requirements of the hospital, the following procedure was applied:

an assessment was made of the frequency of prescription for all the galenic formulations in the existing handbook of the GL;

the reasons for a reduction in the number of prescriptions for particular medicines were investigated;

proposed new medicines to be inserted into the handbook of formulations were put forward based on the clinical requirements;

each proposed new medicine was evaluated based on cost-effectiveness and feasibility in terms of laboratory capabilities;

the selected preparations were introduced into the handbook of the GL;

a year later, a follow up mission was carried out to check the progress of the project.

Monitoring of Counterfeit Medicines

The investigation of the presence of counterfeit medicines within the hospital commenced with a random sampling of the industrial medicines available in the NSPH. The objective was to ensure the performance of tests in compliance with those specified by European standards for pharmaceutical quality control (EDQM,2017). In addition, tests were also performed on any product whose efficacy was suspect, based on reports by the local health personnel, as patients had not responded to the therapy to the degree expected.

Monitoring of Medication Adherence

In order to monitor in the out-patients' clinic the levels of medication adherence amongst patients affected by NCDs in a rural setting of a PVS, an observational study was conducted involving all adult patients who were examined at the out-patients' clinic at the NSPH in the months of March and April 2016. The study was designed as follows:

Inclusion criteria: all patients with a declared age over 14 years were included in this study provided that it was possible to make a diagnosis and prescribe a therapy.

Exclusion criteria: patients suffering from tuberculosis or HIV were excluded from this study as the NSPH utilises a different diagnostic-therapeutic procedure for these patients.

Diagnosis, enrolment and consent: The diagnosis was made through medical records, examination, radiological tests (traditional x-ray and echotomography), laboratory and microbiological tests. In the specific cases of arterial hypertension, dyslipidemias and type 2 diabetes mellitus (DMT2), the diagnostic criteria specified by WHO guidelines were adopted (WHO, 2003; WHO, 2006; WHO, 2009). The diagnosis of communicable diseases was confirmed through radiological tests of the thorax for pneumonia and microbiological test for other infections. At the moment of the diagnosis, the patient was informed of the study and asked to participate. The patient then signed a consent form.

Prescription: insofar as possible, medicines prepared in the GL at the NSPH were prescribed to patients. The reason for this was to avoid prescribing industrial medications that may be falsified.

Subdivision of patients into comparative groups: the participating patients were divided into two groups: group 1 comprised those patients diagnosed with one or more chronic non-communicable diseases such as arterial hypertension, DMT2 or dyslipidemias; group 2 was made up of those patients diagnosed with other pathologies: mainly communicable diseases (CDs). The patients

diagnosed with more than one type of pathology were inserted in the former group when at least one of these was a non-communicable disease.

Follow-up: each patient was given a follow-up appointment at a date distant enough from the date of diagnosis to enable a clear evaluation of the effectiveness of the therapy. In order to assess the adherence to therapy, it was decided to utilise an objective assessment scale - pill-count- as well as a subjective scale-the Morisky Medication Adherence Scales with 8 items (MMAS-8)-. Upon enrolment in the study, each patient was asked to retain the blister pack so that the pill-count could be performed during the follow-up examination. A ratio equal to or greater than 85% between observed pill-count and expected pill-count was taken as the cut-off point indicating a high adherence to therapy (Krueger, 2003). During the follow-up examination, each patient was surveyed using the MMAS-8. The scale was in Portuguese, the official language of Angola, and also in Umbundu, often the only language spoken by the patients. Given the high rate of illiteracy among the population, the questions were read aloud to the patients by a member of the nursing staff. A value of 8 on the MMAS-8 scale corresponded to a high adherence to therapy; values between 6 and 8 indicated a fair adherence to therapy while any value below 6 was interpreted as poor adherence to therapy. Finally, it was also recorded whether the patient had been prescribed industrial, galenic or both types of medication in order to assess whether the type of medication had any influence on the outcome (Morisky, 2008; Morisky, 1986).

Statistical methods: A chi-squared test and a multi-variate logistic regression was employed for the study of dichotomous variables. The level of significance of the test was set at 95% ($\alpha=0,05$). The calculations were performed using STATA[®] software package.

Results

Updating the galenic formulations handbook

The meetings to review the handbook of the GL created a useful dialogue between all the stakeholders involved in the production, prescription and dispensation of medicines at the NSPH. This permitted the *A.P.P.A.*[®] volunteers to assess rapidly and efficiently the current needs of the hospital and, hence, to review and purchase the necessary supplies of raw materials as well as, in agreement with the laboratory staff, to draw up a monthly production schedule for galenic medicines. The following preparations have been added: paediatric formulations for the treatment of tuberculosis, promethazine cream, promethazine capsules, metronidazole oral suspension and carbocisteine syrup.

Monitoring of Counterfeiting

In order to monitor the extent of medicines which were suspected of being counterfeit, a range of drugs was tested based on the two following criteria: (a) they had been specifically reported as being ineffective in the treatment of patients by the local medical staff or (b) they were part of a random sample of medicines stocked in the hospital. The results obtained, summarised in table 1, highlight the dramatic nature of the problem of counterfeit medicines in Angola.

Table 1 – Quality control results				
A.P.I.¹ and DOSAGE	DOSAGE FORM	ORIGIN	RESULT	EUR. PH. UNSATISFIED TESTS
Albendazole 400 mg	Tablets	UAE	Unsuitable	2.9.1. Disintegration of tablets and capsules 2.9.7. Friability of uncoated tablets 2.9.8. Resistance to crushing of tablets
Artemeter 20 mg Lumefantrine 120 mg	Tablets	USA	Suitable	/
Artemeter 20 mg Lumefantrine 120 mg	Tablets	India	Suitable	/
Ciprofloxacin 500 mg	Tablets	India	Unsuitable	2.9.8. Resistance to crushing of tablets
Ciprofloxacin 500 mg	Tablets	United Arab Emiratesi	Unsuitable	2.9.6. Uniformity of content of single-dose preparations 2.9.8. Resistance to crushing of tablets
Cotrimoxazole 480 mg (sulfamethoxazole 400 mg + trimethoprim 80 mg)	Tablets	India	Unsuitable	2.9.6. Uniformity of content of single-dose preparations 2.9.8. Resistance to crushing of tablets
Cotrimoxazole 480 mg (sulfamethoxazole 400 mg + trimethoprim 80 mg)	Tablets	India	Unsuitable	2.9.8. Resistance to crushing of tablets
Doxycycline 100 mg	Capsules	Mauritius	Suitable	/
Doxycycline 100 mg	Tablets	Brazil	Unsuitable	2.9.7. Friability of uncoated tablets
Ethambutol 400 mg Isoniazide 150 mg	Tablets	India	Unsuitable	2.9.8. Resistance to crushing of tablets
Ethambutol 400 mg Isoniazid 150 mg	Tablets	India	Unsuitable	2.9.8. Resistance to crushing of tablets
Ethionamide 250 mg	Tablets	India	Suitable	/
Isoniazid 100 mg	Tablets	India	Unsuitable	2.9.7. Friability of uncoated tablets
Isoniazid 100 mg	Tablets	India	Unsuitable	2.9.7. Friability of uncoated

¹ A.P.I.: Active Pharmaceutical Ingredient

				tablets 2.9.8. Resistance to crushing of tablets
Isoniazid 300 mg	Tablets	India	Suitable	/
Lamivudine 150 mg Zidovudine 300 mg	Tablets	India	Unsuitable	2.9.8. Resistance to crushing of tablets
Efavirenz 600 mg	Tablets	India	Unsuitable	2.9.8. Resistance to crushing of tablets
Lamivudine 30 mg Nevirapine 50 mg Zidovudine 60 mg	Tablets	India	Unsuitable	2.9.6. Uniformity of content of single-dose preparations 2.9.7. Friability of uncoated tablets 2.9.8. Resistance to crushing of tablets
Lopinavir 100 mg Ritonavir 25 mg	Tablets	Switzerland	Unsuitable	2.9.1. Disintegration of tablets and capsules 2.9.7. Friability of uncoated tablets 2.9.8. Resistance to crushing of tablets
Dapsone 100 mg	Tablets	Portugal	Unsuitable	2.9.7. Friability of uncoated tablets
Ofloxacin 400 mg	Tablets	India	Unsuitable	2.9.8. Resistance to crushing of tablets
Paracetamol 500 mg	Tablets	India	Unsuitable	2.9.7. Friability of uncoated tablets
Pyrazinamide 400 mg	Tablets	India	Unsuitable	2.9.7. Friability of uncoated tablets
Prothionamide 250 mg	Tablets	India	Suitable	/
Rifampicin 150 mg Isoniazid 75 mg Pyrazinamide 400 mg Ethambutol 275 mg	Tablets	India	Unsuitable	2.9.6. Uniformity of content of single-dose preparations 2.9.8. Resistance to crushing of tablets
Rifampicin 150 mg Isoniazid 75 mg Pyrazinamide 400 mg Ethambutol 275 mg	Tablets	India	Unsuitable	2.9.6. Uniformity of content of single-dose preparations 2.9.8. Resistance to crushing of tablets

Monitoring of Medication Adherence

To monitor the adherence to therapy, a total of 82 outpatients were enrolled in the study. The two most representative age groups were patients between the ages of 40 and 49 (28%) and patients between the ages of 20 and 29 (22%). 23% of the studied subjects were over 50 years of age. In terms of gender, females accounted for 60% of the total number of subjects. 26% of the subjects were affected by NCDs. The most common NCDs, often in co-morbidity, were arterial hypertension, type 2 diabetes mellitus and dyslipidemias (mainly mixed dyslipidemias and hypercholesterolemia). The communicable diseases most commonly found during the study period

were in descending order: malaria, pneumonia, tuberculosis, urinary tract infections and intestinal parasites.

Out of the 82 patients enrolled in the study, 27 (33%) returned to the hospital for a follow-up examination. 30% of these returning subjects had NCDs.

As regards the tests utilised for the evaluation of adherence to therapy, the results for the patients who returned for the follow-up examination are as follows: 78% brought back the empty packaging necessary to conduct the pill-count. 76% of these patients were in the high adherence category after the pill count test. The results of the MMAS-8 test are that 33% of patients belong in the high adherence category, 37% in the intermediate category and 30% in the poor adherence category.

The results obtained from the MMAS-8 test were, therefore, compared with those of the pill-count test; from this comparison, good values for sensitivity (80%) and specificity (81%) emerged even for the MMAS-8 test. Furthermore, the MMAS-8 test showed a good negative predictive value (93%). In other words, if a high or intermediate adherence to therapy ($MMSA \geq 6$) results from the MMAS-8 test, this indicates with a good degree of certainty that one can rule out the possibility that a patient is not following the prescribed course of medication.

Finally, it can be affirmed that there is no link between that prescription of Galenic medication at the time of diagnosis and the successive return of the patient for the follow-up examination in that no patient received a prescription solely for galenic medication. For this reason, it is not possible to evaluate whether the use of galenic preparations had any influence in terms of treatment effectiveness and, hence, return for follow-up examination.

Discussion

Updating the galenic formulations handbook

The most pressing clinical requirement identified in the meetings to review the handbook of the GL was the complete lack of medicines for paediatric tuberculosis therapy. The Angolan Ministry of Health provides the NSPH with medicines suitable for the treatment of TB in adults, but nothing that can be used for the treatment of paediatric cases. In the past, the only way to provide therapy for such cases was to break the tablets used for adults. However, this practice has obvious risks; the tablets were split without using scales and, hence, the dosage could not be accurate or precise. Moreover, an excipient or, worse yet, an active ingredient, such as ethambutol, contained in the tablet may not be suitable for paediatric use. To overcome the above issues and to satisfy the demand for paediatric medicines for tuberculosis, the GL started production of capsules containing

the active ingredients at suitable dosage levels for paediatric therapy as specified by the WHO (WHO, 2017).

Monitoring of Counterfeiting

Compared to a study carried out in 2011 (Baratta, 2012), in the same area and employing the same study criteria, the situation has worsened drastically. In the 2011 study, 54% of the sampled medicines turned out to be counterfeit; by 2016, the figure had risen to 77%. In accordance with WHO assessments, India was the first exporting Country, with 19 samples (about 79% of which were counterfeits). This prominent role of India in the production of counterfeits could be a result of several causes, among which is the permissive legislation and inefficient judiciary system, absence of qualified supervising staff, and widespread corruption (Swaminath, 2008).

Monitoring of Medication Adherence

The low return rate of patients for the follow-up examination (27 patients) can, in part, be explained by the probable improvement in their clinical condition for those patients treated for communicable diseases. As far as patients affected by NCDs are concerned, the low return of patients may be a consequence of their difficulty in understanding the concept of a non-communicable disease. In particular, the course of a chronic disease. As often happens, even in high-income countries, patients have difficulty in understanding that some pathologies can be asymptomatic for long periods of time and that they are not cured by the therapy, but simply under control.

In order to explain the pill-count test results, it can be affirmed that given the low purchasing power of the local population and the high cost of medicines *in loco*, the patients enrolled in the study did effectively take the prescribed medicine.

The MMAS-8 test encountered two obstacles: firstly, the effectiveness of the interview format. Despite being asked to respond to the questions honestly, some patients may have given inaccurate answers which skew the results of the test in favour of a higher adherence to therapy; secondly, although the test had been translated into both Portuguese and Umbundu, some patients displayed difficulty in the comprehension of the questions as they lacked the necessary socio-cultural background for a task of this complexity. Taking all of the above into account, the pill-count test was deemed to be the benchmark for reliability against which to evaluate the results of the MMAS-8 test.

Conclusions

The excellent collaboration between the staff responsible for prescribing medication, the staff of the GL and the team of volunteers from *A.P.P.A.*[®] led to a series of decisions, shared by all stakeholders, of great importance for the treatment of patients availing of the NSPH.

In the first place, it enabled the updating of the handbook of the GL and ensured the production of high-quality galenic medicines in line with the effective local demand. Furthermore, thanks to the constant surveillance of industrial products, it is possible to quickly detect counterfeit industrial products. Another advantage of the GL is the capability to produce tailor-made medicine to fit the specific needs of the patient e.g. based on the age of the patient. In particular, a new line of medicines for paediatric patients suffering from tuberculosis has been introduced; products that, in the context of the NSPH, would not normally be possible to obtain.

Concerning the monitoring of medication adherence, despite the low number of subjects in the sample population enrolled, it is still possible to draw some interesting conclusions from the observational study conducted at the NSPH. Firstly, given the widespread presence of NCDs, even in areas such as Cubal and its environs, and taking into account the results obtained, it is clear that a fundamental priority is the development of a health education programme for the local population, which, in view of the low educational levels, lacks an understanding of chronic diseases and is unable to conceive an asymptomatic disease. Hence, in this setting, the forthcoming missions to the NSPH will focus on providing patients affected by NCDs with a formal counselling programme available through the out-patients' clinics of the general medicine department or the pharmacy where the medicine is dispensed to the public. It will be interesting to evaluate the effectiveness of this method on a population availing of this service for the first time and it will be a useful pilot scheme for larger-scale programmes at a regional level in the future.

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Acronyms

A.P.P.A.®: Aid Progress Pharmacist Agreement

CDs: communicable diseases

DCs: Developing Countries

DMT2: type 2 diabetes mellitus

GLs: Galenic Laboratories

MMAS-8: Morisky Medication Adherence Scales with 8 items

NCDs: Non-Communicable-Diseases

NSPH: Nossa *Senhora da Paz* Hospital

WHO: World Health Organization

**STUDENTS AND PROFESSORS FOSTERING
INTERNATIONAL UNIVERSITY COOPERATION.
ANALYSIS OF EDUCATIONAL NEEDS OF MYANMAR HEALTH PROFESSIONALS**

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Abstract

The collaboration between the University of Parma, the University of Medicine 1 of Yangon and the General Practitioners' Society of Myanmar, aimed at improving healthcare services in rural areas of Myanmar, has led to the programming of an advanced training course for Myanmar health professionals. In order to organise the course, it was necessary to conduct an in-depth context analysis, realized through the collaboration of students and professors of both contexts.

The synergic collaboration between students and professors proved to be particularly effective, allowing to conduct a comprehensive and original study, and successfully planning the course. A first key factor of the collaboration lied in the interdisciplinary profiles of students and professors involved, which proves to be an extremely important driver in the development and conduction of a cooperation project. A second key factor lied in the constructive exchange between students and professors both vertical exchange, as it concerns the transmission from the professors to the students of knowledge and professional skills, and horizontal exchange, as the meeting between students and professors answered to the transversal objective of the research of producing new competences from an educational, didactic and experiencing point of view.

La collaborazione tra l'Università di Parma, l'Università di Medicina 1 di Yangon e la General Practitioners Society del Myanmar, finalizzata al miglioramento dei servizi sanitari nelle aree rurali del Myanmar, ha portato alla programmazione di un corso di alta formazione per gli operatori sanitari del Myanmar. Per organizzare il corso è stato necessario condurre un'approfondita analisi di contesto, realizzata attraverso la collaborazione di studenti e docenti di entrambi i paesi.

La collaborazione sinergica tra studenti e docenti si è rivelata particolarmente efficace, consentendo di condurre uno studio completo e originale e di programmare con successo il corso. Un primo fattore chiave della collaborazione risiede nei profili interdisciplinari di studenti e docenti coinvolti, che si rivela un driver estremamente importante per lo sviluppo e la conduzione di un progetto di cooperazione. Un secondo fattore chiave risiede nello scambio costruttivo tra studenti e professori, sia scambio verticale, in quanto riguarda la trasmissione dai docenti agli studenti di conoscenze e competenze professionali, sia scambio orizzontale, in quanto l'incontro tra studenti e docenti rispondeva all'obiettivo trasversale della ricerca di produrre nuove competenze dal punto di vista educativo, didattico e sperimentale.

Keywords

Global Health, International Cooperation, Development, Education, Universities

Introduction

International objectives as developed by the United Nations about economic, social and environmental concerns led to the implementation of new international partnerships with the aim to introduce innovative plans for sustainable development (Undp 2019). In this framework,

cooperation between low-middle income and high-income countries is becoming more popular and of interest also with the purpose of strengthening social equity and environmental sustainability.

Usually, international cooperation is introduced by collaborations through National Ministries or international Non-Governmental Organizations (NGO) which start new projects with the support of economic funds invested for specific actions (Undp 2019-2). To this regard, an important role could be played by the University. Indeed, Universities are considered as strategic institutions in the processes of social inclusion and in the enhancement of public awareness (Stefanini 2013), with cooperation through international Universities having a key role in global markets as graduates are most likely to deal with people from different cultural background (Chan 2004, Ferronato 2018).

Through good cooperation it is possible to do good research, train future professionals and create bonds and connections which are likely to increase the value of the territory, social enrichment and business possibilities. Countries' transition from "south of the world country" to leading country usually happened at fast-pace and, who has been able to build, also through international cooperation, reliable and lasting relations with these realities, has been repaid with positive effects on the local territory.

This is the reason why, over recent years, Italian universities have incremented their activities in the sector of international development cooperation, offering their contribution to stability and democratization processes, also through concrete actions and synergies with other major players, as the Ministry of Foreign Affairs and International Cooperation (MAECI). Furthermore, at the Italian level a new national cooperation context is added which, beginning with the law No. 125/2014 "Disciplina generale sulla cooperazione internazionale per lo sviluppo", opens to a framework whereby cooperation becomes an integral and qualifying part of the country's foreign policy.

The cooperation through scholars and the activities structured by University agreements, such as students exchange and sensitivity campaigns, are of utmost importance (Koehn et al. 2011).

Students' participation to cooperation activities contributes in fostering education for global citizenship, which is a pivotal element in shaping citizens capable of positively experiencing globalization (Colombo 2017), facilitates youth participation in determining the policies of our country and of the European Union, promotes among younger generations a new leading role based on conscious and sustainable lifestyles in the vision of being oriented towards the pursuit of internationally shared development goals (Colombo 2017). The world of work increasingly looks for graduates combining technical expertise with transversal skills, such as teamworking, cultural understandings, able of operating in complex contexts and of managing changes.

At the same time, students may also become cooperation's stakeholders (D'Apice 2018). Their active involvement, that can take advantage of the professors' experience, expertise and scientific

knowledge, can spawn concrete research and education initiatives. In addition, students, with their young age and with the awareness of being the potential protagonists of the brighter future that cooperation would like to create, bring new ideas and energy giving new life to Universities development cooperation centres (D'Apice 2018).

Thus, a situation is thereby determined, similar to what in the pedagogical area is defined “Flipped Classroom” with students developing cognitive competences in their extra-university life (o’ Flaherty 2014) and meeting with professors in a collaborative way, whereby professors can act as tutor alongside students (Roach 2014, Gilboy 2015). It is scientifically documented that this didactical approach favours cooperation and innovation (Strayer 2012) and the students can become key actors of cooperation projects.

The case study discussed in this paper aims at analysing the results of a collaboration experience between students and professors in an inter-university cooperation project that, in one of its stages, foresaw a research on the Myanmar health educational needs in the making of an advanced training course for Myanmar health professionals. The goals of the study and the preliminary results of the research have been illustrated during the CUCS Conference, session “Students protagonists” held in Trento (Italy) on the 20th of September 2019.

Case study: Myanmar

The collaboration between the University of Parma (UNIPR) and the University of Medicine 1 of Yangon (UM1) started already in 2016 with the purpose of activating bilateral exchanges of professors and students, joint research and cooperation projects within the health field. One of the cooperation projects started by the interuniversity collaboration with the goal of achieving significant improvement of the quality of healthcare services in rural areas of Myanmar. The project encompasses, among its first actions, the organization by the University of Parma of a training course in family medicine and integrated primary care. Myanmar health professionals will participate in the course. Considering the social and cultural differences between the two nations involved, the preparation of the training programme presumes the reciprocal knowledge of the socio-sanitary contexts, and in particular it presumes that the Italian organizers of the training course have a broad understanding of the training needs of Myanmar health professionals. In order to collect the necessary information to analyze the training needs, it was decided to resort to the exchange program already active between the two universities asking for collaboration to the Italian students going to Myanmar, Myanmar students coming to Italy, and professors of both countries.

Methodology

The research followed an inductive reasoning, developed through the approach of the Grounded Theory that uses a systematic set of procedures to develop an inductively derived theory about a phenomenon (Strauss 1990). It was subdivided in four phases.

During the 1^o phase, a detailed review of existing literature was jointly conducted by 2 professors and 1 student. The bibliographic research was conducted on the NCBI PubMed, Proquest, and Google Scholar research portals, using as key words: educational need AND health professions; educational need AND primary care; educational need AND family medicine; Myanmar health needs; Myanmar health system. The bibliographic research was coupled with primary and official documents of the Myanmar Ministry of Health and Sports. Moreover, during the 1st phase, students and professors jointly planned the data collection.

During the 2nd phase, following a detailed field-observation conducted by students in Myanmar, two professors proceeded with the defining of a qualitative study design, thereby considering the main health and social elements shaping the Myanmar context as observed by students. In this phase, some interview topics have been selected by tracing a number of questions with the aim of enabling the potential candidate to freely express himself or herself on the subject matter in a detailed way without being guided by the interviewer when answering.

The interview scheme has gauged some areas of investigation:

- Strengths and pitfalls of the Myanmar health system;
- Strengths and pitfalls of the education and training of Myanmar health professionals;
- Myanmar population health needs;
- Educational needs of the Myanmar health professionals;
- Relation between Myanmar health professionals and local population

During the 3rd phase, students conducted, in collaboration with UNIPR professors, interviews to a convenience sample of Myanmar health professionals (physicians, nurses, health assistants), to members of the General Practitioners' Society of Myanmar (GPs) as key informants and to other professionals involved in the project as key informants.

The research has involved 4 Italian adjunct professors of different background – one medical doctor, one sociologist, one nurse, one expert of international relations -, and 15 students of both Italy and Myanmar of different background – students of medicine, students of social policy, students of international relations.

With the purpose of enriching the research, the interviewees were selected also on the basis of the different roles they play, and hence the different competences, within the Myanmar health and

social context. The interviews followed a semi-structured scheme, so as to give the interviewees some already-defined questions to be answered, by leaving them at the same time the choice to go off the track of the interviews, expanding and deepening the themes they preferred to.

Totally, 11 interviews have been conducted following different modalities – three in presence meetings, three through Skype calls, five through emails – depending on the degree of availability of each interviewed person. Thus, students had the chance to personally and concretely experience the use of a qualitative research methodology, bumping into its resources and limitations.

During the 4th phase, the registered interviews have been de-registered verbatim and translated into Italian. Professors and students of different background jointly analyzed the interviews and the grids of observation following a double-blind approach.

Results

The ten Italian students and the five Myanmar students having taken part in the exchanges, have gathered a number of information and enabled to collect preliminary important results. Within the research phase, the collaboration between students and professors was highly advantageous. Indeed, the knowledge derived from the professors' professionalism and experience were extremely useful to identify the thematic areas to be investigated and to define the research questions, while the students' curiosity allowed to explore the educational need theme in all its aspects, also the non-sanitary ones.

The analysis of the results was the crucial phase of the research activity for the professors as it provided technical methods to scientifically unfold the content of the different topics allowing students, after the type coding of interviews, to summarize and synthesize the results according to the subject-matter areas by comparing them with the literature previously analyzed. The research proves to be scientific, as it follows the methodology set by the professors, and innovative, as it concerns several aspects of the health need of Myanmar.

An added value brought by students lied in their different background – medicine, sociology, international relations, and law, which allowed to deepen the subject with several approaches and understandings. For example, it emerged that a training programme in common between the two countries has to consider the different understandings of health, healthcare, sickness and disease, and further, it has to consider the different cultural approach of the patient to the healthcare system. Hence, it has been possible building up a preparatory training programme, that will be attended by Italian and Myanmar healthcare professionals and professors, aimed at the joint planning of the Master that will then be activated in 2020-21. At the same time, the contribution of sociologists,

anthropologists and experts of international relations made it possible to identify some best practices of the Myanmar healthcare system organization as related, for example, to the perception of the quality of the healthcare system that could eventually be transferred and re-adapted to the Italian context as to thereby ameliorate the perceived quality. To this aim, in collaboration with the Emilia-Romagna Region (RER), it has been programmed to activate some Italy-Myanmar study laboratory that will see the participation of professionals of both contexts.

Discussion

International development cooperation so far proved to be non-effective. Indeed, the so called “undeveloped countries” still largely are undeveloped or less developed. In the reshaping of international cooperation aims and strategies, answering to the United Nations sustainable development goals, in the process of favouring social inclusion and enhancing public awareness, the University can play a key role (Stefanini, 2013).

International development cooperation enriches the institutional mission of the University – education and research – giving the University a unique chance to improve training and education, boosting research and implementing the so-called university third mission, thereby including university internationalization (Colombo, 2017). In particular, cooperating with third countries enables the university to enhance its research programs and internationalization activities, while training and education are addressed as students learn from cooperation (Koehn et al. 2011).

The University gathers in itself a peculiar element, that of interdisciplinarity, namely the combining of methods and insights of two or more academic disciplines into the pursuit of a common task, which proves to be an extremely important driver in the development and conduction of a cooperation project.

The establishment of dynamics of cooperation between professors and students has allowed to conduct a comprehensive study and to develop an innovative educational and training path tailored on the needs of Myanmar students. Both students and professors have devoted their time and knowledge in different modalities: on one hand, students went on the field in Myanmar to collect information and hence bringing to the research and to the construction of the educational and training path a point of view innovative and more correspondent to what the expectations of a student could be; indeed, being students in first place undergoing a training path, it is more likely for them to empathize with and individuate the educational needs of a potential Myanmar student.

On the other hand, professors, not having the possibility to easily move to Myanmar, contributed to the research providing valuable knowledge stemming from their experience and professionalism.

The synergy thereby created between students and professors and the exchange of knowledge and competences, has placed the subjects on plans professionally comparable, hence giving the chance to scientifically reflect on the experience. For example, it was detected how in informal settings the meeting between students and professors created the opportunity for professors to probe the translatability of their training and educational tools normally used in didactic contexts. In this way, professors had the chance to verify and better understand the degree of effectiveness in transferring their knowledge to students. On the other hand, for students it was useful to engage in a research experience, but also and above all to contribute with the point of view of students themselves, in the construction of an educational and training path which is addressed to students, even if of different nationalities. For this reason, it has been decided to integrate the course offered in Parma with a period of traineeship. This way, students will have the chance to concretely put into practice the knowledge offered by professors during frontal lessons.

Ultimately, it can be said that there has been an exchange between students and professors: on one hand a vertical exchange, as it concerns the transmission from the professors to the students of knowledge and professional skills; on the other hand a horizontal exchange, as the meeting between students and professors answered to the transversal objective of the research of producing new competences from an education, didactic and experiencing point of view.

Conclusion

From the analysis of the case study, it clearly emerges that the involvement of students in university cooperation projects represents an added value, both to the personal and professional development of students and professors, and to the purposes of the project (Frisch et al 2015).

In the context of cooperation, the relationship between professors and students is enriched and oriented towards a more open-minded dialogue, whereby students and professors can learn one from one another, exchanging knowledge and competences (D'Apice, 2018). University students provide innovative inputs to development cooperation, through the development of fresh and pioneering ideas, the aspiration to get involved and to develop professional and personal competences, hence playing a key role which is of particular importance in such a moment of transition and reconsideration of cooperation. Furthermore, being bearers of an intellectual and cultural dynamism, which is typical of their age, and experiencing an ever more globalized world, students can provide an essential contribution to the understanding of global citizenship and international development cooperation, hence coming to play a new leading role based on conscious and sustainable lifestyles (Colombo, 2017).

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**STUDENTS AND PROFESSORS CO-PROTAGONISTS OF INTERNATIONAL
COOPERATION:
AN EXPERIENCE FROM CUCS CONFERENCE**

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Abstract

This paper presents the key issues and the main outputs emerged during the parallel session “Students Protagonists” of the sixth edition of the University Coordination for Development Cooperation (CUCS, Italian acronym) Conference. The session shed lights on the results achieved by universities development cooperation highlighting how new synergic collaborations between professors and students can and should be established to promote a new vision of global citizenship and common goods. In particular, the challenge of the session focused on reporting how students’ participation to university cooperation projects can provide an added value, producing real benefits both for students and for the university too.

Il seguente lavoro presenta le principali tematiche e le relative considerazioni emerse dallo svolgimento della sessione parallela “Studenti Protagonisti” della sesta edizione del convegno della rete CUCS (Coordinamento Universitario per la Cooperazione allo Sviluppo). Nello specifico, durante la sessione sono stati presentati e discussi i risultati ottenuti da progetti di matrice universitaria in contesti di cooperazione allo sviluppo, evidenziando come la collaborazione sinergica tra studenti e professori possa promuovere una nuova prospettiva di cittadinanza globale e beni comuni. La sessione si è in particolare concentrata sul discutere come, in progetti universitari di cooperazione allo sviluppo, la partecipazione degli studenti rappresenti un valore aggiunto fondamentale, capace di produrre benefici concreti non solo per gli stessi studenti, ma anche per il mondo accademico nel suo complesso.

Keywords

International development cooperation, academia, education, communication

Introduction

The Italian law recognizes Development Cooperation (DC), human rights and peace as an integral part and qualifying aspect of the Italian foreign policy (l. 125/2014).

In 2006, the General Direction for Development Cooperation of the Ministry of Foreign Affairs and International Cooperation (MAECI, Italian acronym) started to promote three main regional academic networks between universities – namely the North, Centre, and South networks – whereby young generation were to play a leading role. As a follow up, within a unique and systematic framework, the University Coordination for Development Cooperation (CUCS, Italian

acronym) was created in 2007, setting a system through which Italian universities can promote development cooperation activities as well as improving their coordination. In addition, the CUCS organization was conceived to strengthen networks of collaboration, thus improving the process of internationalization, also designing specific study tracks addressed to young people and students (Sali 2018). Since the first conference held in Pavia in 2009, every two years CUCS organizes a national conference as one mean to sustain these goals. Throughout its meetings, CUCS became an opportunity for partner universities, in a joint effort with several development cooperation actors, to gather themselves, boost dialogue, share knowledge and improve synergies. More precisely, CUCS conferences have always sought to promote the debate around strategies, policies, and actions starting from a particularly relevant topic, according to the emerging needs of the period. The last CUCS Conference edition, held in Trento (Italy) in September 2019, focused on “Citizenship and Common Goods”, aiming to raise awareness of the ever-increasing importance of such issues within a development cooperation context, both from a local and global perspective.

Aim of the paper

This paper focuses on the key issues and the main outputs emerged during the parallel session entitled “Students Protagonists” of the CUCS 2019 Conference. On one hand, the experiences reported in the session constitute a good example of the interesting results achieved by universities in development cooperation and, on the other hand, they outline shared difficulties. While proving itself perfectly consistent with the conference goals, the session has especially shed lights on those international cooperation experiences where university students represent vital actors, concerning global citizenship and common goods.

The Session “Students Protagonists”

The title of the session, i.e. “Students Protagonists”, aimed at exploring themes concerning the collaboration between professors and students in co-designing, implementing, and analysing results of universities development cooperation activities. Specifically, the main objective of the session was highlighting how the synergic collaboration between professors and students may boost the development of a new vision of global citizenship and the promotion of common goods. Since university by tradition is a community of students and professors, the session confirmed that students are not just “users” but leading actors. In fact, as bearers of a more dynamic and future-oriented idea of citizenship, students can be considered amongst the most powerful expression of

the evolution of the society. In particular, international students, which matriculations in the Italian universities continuously increased in the last ten years (from 12.863 to 15.878 in the period 2010-2019¹) can act as mediating bridge between their hosting society and their country of origin, thus promoting the development of collaboration aimed at reciprocally exchange skills and best practices.

Specifically, reciprocity and plurality have been the key words of the session since cooperation does not mean solidarity. Such leading assumption also reveal the way we think and implement the process of teaching and learning as well as our ideas on academia.

As listed in Table 1, the session “Students Protagonists” received 14 contributions, which were reviewed by the Scientific Committee and subsequently subdivided into oral and poster presentations. The contributions to the session, both in the form of oral and poster presentations, offered a wide view of the key role played by the interplay between students and professors in cooperation activities. Namely, they focused on the following aspects: cooperation as a distinctive feature of the Italian culture, university as a community of professors and students, dialogue between students and professors, and their more well-balanced relationship within the context of cooperation activities.

Oral presentations		
<i>Title</i>	<i>Main Authors</i>	<i>Affiliation</i>
Advanced training course for Myanmar General Practitioners: Context analysis conducted by students	D’Apice, Mosca, Sarli	University of Parma
Cardio-vascular risk factors in Cameroon: Students protagonists	Kougang, Tedah, et al.	University of Parma
Global Health as theatre performance: a masterclass on public awareness with university students	Di Benedetto, Cavagna	Medici con l’Africa CUAMM
Vet for Africa	Gentile	University of Bologna
Dévelo association: an example of students’ involvement in international cooperation between universities	Zoppolato, De Marinis	Dévelo Association
Workshop CHIASMA 2019: a participatory process for S.Martino	Dal Ri	Acropoli

¹ Further data are made available by the Ministry for Instruction, University and Research (MIUR) at <http://ustat.miur.it/>

Poster presentations		
<i>Title</i>	<i>Authors</i>	<i>Affiliation</i>
The “Scalabrini Model” in Uganda	Perucca	University of Pavia
Reflections on a teaching experience of an Italian Professor in the context of Rwandan Civil Engineering Education	Valentino	University of Parma
Thesis Experience: a bridge for new partnership	Pradella, Ragazzi	University of Trento
WamiPura: recovery of ancestral techniques for dyeing wool and natural fibers in North-East Argentina	Pedrazzani, Scali	University of Florence
Pappa di Parma	Corradini	University of Parma
Third mission, education, sustainable development for a supportive citizenship	Vischi	University of Sacro Cuore Milan
Promoting Awareness among professionals: a definition of Citizen Engineer	Castelli, Serrao et al.	University of Florence

Table 1. Oral and poster contributions presented within the session “Students Protagonists” during the CUCS 2019 Conference held in Trento (19-21 September 2019). All submitted abstracts can be found in the Book of Abstract CUCS Trento 2019 Conference².

Results

Starting from its enriching variety of oral and poster presentations, the session “Students Protagonists” resulted in the submission of 5 full papers to the Conference proceedings to this JUNCO issue, thereby outlining the high interest of such topic in the context of development cooperation projects. Indeed, the discussion held after the oral presentations revealed several significant aspects of the university cooperation, coherently with the mission and founding values of the academic world: improving training and education, boosting research, and implementing the so-called university third mission, thereby including university internationalization. In particular, cooperating with third countries enables universities to enhance their research programs and internationalization activities, while training and education are empowered as students learn from cooperation.

The challenge of the session “Students Protagonists” was documenting how students’ participation to university cooperation projects can benefit the entire university and not the students only. Indeed,

² <https://event.unitn.it/cucs2019/BookofAbstracts.pdf>

the exchange of values, norms, cultural habits and best practices that characterize cooperation activities can be all considered as factors that enrich students, professors, and the university as a whole.

In the context of cooperation projects, students become spokespersons of their needs, hence somehow matching the requirements of the so-called “flipped classroom”, a new teaching method that sees the user at the centre of the activity (Bergmann 2012). In other words, the student assumes a central role, while the teaching activity starts from the context and from the student’s needs. This practice shares with international development cooperation a set of specific attitudes. Indeed, these attitudes are related with the willingness to accept the plurality of views on the same issue as well as the openness to interact, in a positive way, with different moral and cultural contexts. Therefore, a good class is considered the perfect environment within which everyone can hone the capability to pose the right questions, make statements, and find solutions, while being aware of the probability of making mistakes. These concepts emerged clearly during the Q&A (Questions and Answers) time of the session.

From an overall analysis of the discussion within the panel, it emerges that, in the context of cooperation, the relationship between professors and students becomes more equal and promote such a more productive dialogue. Furthermore, students become protagonists by playing a role that provides mutual advantages both for them and for the professors. Indeed, students often tend to pose themselves more naturally than professors, from a prejudice- and stereotype-free mind state, thus being capable of acting faster within a project with an open-minded and culture-welcoming approach. The session’s discussion also indicated that, to promote a more active participation of students in cooperation activities, universities need to effectively and adequately communicate with them. Indeed, it is desirable that the participation of students (i.e. academics with age less than 35) in the CUCS Conference should be the highest possible, such in this last edition of Trento, where more than 140 young students, out of a total of nearly 350 participants, attended different conference panels, showing their interest towards development cooperation projects. This academic young core participation was particularly significant within the session “Students Protagonists”, contributing to an enriching discussion. However, from the session’s debate it also emerged how students’ involvement requires appropriate communication strategies. For instance, high schools should be also involved.

Examples from the Session: Oral Presentations

Albeit with some variations, the contributions to the session offered a wide view of the key role played by the interplay between students and professors in cooperation activities. Precisely, the need of reciprocity and synergic effort were especially stressed recalling that university cooperation does not mean solidarity nor charity, but exchange of knowledge and best practices.

The importance of engaging students in university cooperation projects and the fact that their contribution can lead to positive results beyond expectations was initially highlighted by the University of Parma. Specifically, the presentation “Advanced training course for Myanmar General Practitioners: context analysis conducted by students” outlined the pivotal role played by students in conducting a context analysis, in collaboration with professors, finalized at detecting the educational needs of Myanmar health professionals. As students are bearers of students’ needs, their involvement has allowed to detect more easily the educational needs of their Myanmar peers, which have then been analysed in collaboration with their professors. Further, being bearers of an intellectual and cultural dynamism, which is typical of the young age, as well as protagonists of an ever more globalized world, students have provided an essential contribution to the understanding of global citizenship as a common good.

The second contribution offered by the University of Parma, “Cardio-vascular risk factors in Cameroon: Students protagonists”, highlighted that students are key actors not just in the implementation of cooperation actions, but also in the promotion and initiation phases. In particular, Cameroon students of the Faculty of Medicine and Surgery have launched a cooperation research project in collaboration with the professors of the Faculty of Medicine and Surgery of the University of Parma and of the University of Dschang (Cameroon). Within this project, several scientific data were jointly collected by Cameroon and Italian students of the University of Parma during field missions led by Cameroon students at health facilities of the Dschang Region, and later analysed in collaboration with their professors. A potential important interest of the research consists in the possibility of identifying risk factors different from the ones already known for the Italian population that could concern both Italian citizens and the numerous citizens coming from Sub-Saharan countries having residence in Italy. This project, conceived from the initiative of young students, represents an example of the potential of students as international cooperation project designers. This important element has been also highlighted by the presentation made by the Association Acropoli, “Workshop CHIASMA 2019: a participatory process for S.Martino”. CHIASMA is an intense “design and make” workshop, organized by the students-led Association Acropoli on an annual basis. It represents an opportunity for students and young architects to

develop a project through all its phases, from conception, to design, to realization and management. More precisely, the CHIASMA project, being implemented in a local, not international cooperation landscape, such as the district of S. Martino in the city of Trento (Italy), helped to understand which might be the essential concepts and methods for designing a project in which students are able to play a key role. In fact, by implementing a participatory process with the S. Martino local community, CHIASMA showed several common points and approaches with the other international cooperation projects presented during the “Students Protagonists” session. This resulted in highlighting how the concepts of citizenship and common goods can efficiently be implemented both on a global and local level when students have a protagonist role.

The importance of effective and tailored communication in involving students in cooperation initiatives was raised by the non-governmental organization Medici con l’Africa Cuamm. The presentation “Global health as theatre performance: a masterclass on public awareness with university students” pointed out that when communication is aimed at raising awareness on specific scientific issues, with the aim of making people aware of contents and stimulating them to act differently, traditional communication formats are not effective, as they mainly attract people who are already “sensitive” to the topics. Hence, innovative formats of communication, using creativity and culture, are necessary. Specifically, to raise young students’ awareness on global health topics, Medici con l’Africa Cuamm organized a cross-cultural activity in the form of a “global health theatre masterclass”, which proved to be extremely effective as it directly involved students in the construction of the performance, making them closer to the themes and making them act as ambassadors of the project.

The presentation “Dévelo Association: an example of students involvement in international cooperation between universities” made by the Dévelo LCI Association, a student-led association at the State University of Milan, focused on the active role played by students in development cooperation. Following Dévelo LCI reasoning, universities should be able to foster new and smart paradigms in the context of the global crisis. This ability stems from the willingness of each component of the university to discuss, interact and push a community vision and a general asset of values promoting a new sustainable development paradigm. In this perspective, international cooperation allows students to have a first-hand experience of the “delicate theme of human sustainable development”, whereby Dévelo’s role is exactly to support this kind of experience while acting in favour of the academic internationalization. Dévelo’s activities are organized in two directions: development cooperation and global citizenship education. On both sides the organization works according to three main values or concepts: agroecology, as a way of understanding the role of human being on safeguarding the ecological equilibrium, also through

agricultural activities; appropriate technology, meaning the focus on innovations that are sustainable from a socio-ecologic standpoint and the use of participatory methodologies.

The “Vet for Africa” association showed the results of the long-term cooperation activities that the students of veterinary medicine of the University of Bologna carry out in the Hanga Monastery (South Tanzania) starting from 2003. More precisely, during their on-field period, Italian students supported the activities of cattle and chicken farms thanks to the competences and skills acquired during their studies. In addition, thanks to their involvement in the local habits of the village, students were able to promote initiatives, such as courses of hygiene and nutrition, with the aim of improving facilities of the primary school and building the library of the village. The activities of “Vet for Africa” helped students to become skilled professionals and responsible citizens.

Examples from the Session: Poster Presentations

The role of the academic world in the citizenship and common goods perspective was also described by several poster presentations included in the “Students Protagonists” session, highlighting the existence of common themes that emerge when the academic world is involved in a development cooperation project. More precisely, the concept of considering students as bridges between different cultures was described by the presentation “Thesis experience: a bridge for new partnership” (University of Trento). This presentation highlighted the role played by students in acting as bridges between cultures. Indeed, students conducting research for their thesis on the field in the context of cooperation projects, can stimulate the creation of new collaborations between the sending university and the hosting institution.

Students collaboration for common goods was presented by the “Pappa di Parma” poster (L. Speciale, University of Parma). The project “Pappa di Parma”, whose aim is to combat infant malnutrition in the region surrounding the Mvimwa Monastery (Eastern Tanzania), by formulating a hyper-energetic supplementary food with exclusive local ingredients and equipment, foresaw the active involvement of students of the University of Parma, who spent several months on the field to conduct and monitor the development of the project. During their stay in Tanzania, students prepared the meals with ingredients bought at the local market and with rudimentary equipment in order to better understand the potential problems and difficulties that local mothers would have encountered in preparing at home the same baby meals. Students hence had the opportunity to dialogue with local mothers, exploring local food habits as to better tailor the project, and discussing with them the importance of good nutrition education, with the support of their

professors. Further, students, always with the support of their professors, conducted lessons at local primary schools with the aim of teaching children basic concepts of nutrition and food hygiene.

The full role played by students was also presented in the poster “WarmiPura: recovery of ancestral techniques for dyeing wool and natural fibbers in North-West Argentina” of the University of Florence (Natural Resources Management for Tropical Rural Development). Indeed, by creating an integrated team of students coming from different sectors (agriculture, cooperation, marketing, communications, etc.), the rural community of the WarmiPura group was able to boost to organize itself and used its own know-how to be resilient and increase its autonomy. Moreover, the best practices exchanged with the University of Florence members, being aware of the current “global changes” can share new visions and strategies with the local Argentinian community in order to preserve and recover the ancestral techniques for dyeing wool and natural fibbers.

The poster “The ‘Scalabrini model’ in Uganda” presented by the University of Pavia showed the long-term collaboration that religious institutions have with development cooperation and how the university can come into play by interacting with the local community and placing the community itself in the workforce, guaranteeing education, medical treatment and professional training thanks to the business and fundraising activities.

As regards the role played by students, which can provide mutual advantages both for them and for professors, the poster entitled “Reflections on a teaching experience of an Italian professor in the context of Rwandan Civil Engineering Education” (University of Parma), beyond writing a report of teaching/learning activities carried out, aims at explaining the lesson learnt from this experience, by both teacher and students. In fact, the poster reports on the one hand an example of successful experience of a European professor and, on the other hand, the perception by the students, as expressed through an evaluation questionnaire. The students’ opinion will be very useful in planning future activities of the same kind in the field of cooperation.

Discussion and Conclusions

The session “Students Protagonists” showed how an international cooperation project should always support a synergic interplay between students and professors, thus designing a project according to a reciprocal and well-balanced dialogue between the different (academic and non-academic) actors involved. This interplay should be cultivated starting from frontal lectures, where students can have an open dialogue with their professors and develop ideas for an efficient international cooperation project design. Then, students and professors should continue to work as co-protagonists by some field experience, that can be undertaken in any context where there is the

possibility to exchange of knowledge and best practices synergistically. This approach was discussed within the “Students Protagonists” session by focusing on the citizenship and common goods topics, highlighting the essential aspects that one should consider when implementing an international cooperation project in which the academic world is involved.

More precisely, three main key-messages (KM) can be highlighted by the “Students Protagonists” session: (KM i) cooperation activities as distinctive feature of the Italian culture, (KM ii) the need to recover and develop on new basis the relationship between students and professors and (KM iii) the existing synergy between students’ course of studies and development cooperation is more than a matter of academic internationalisation.

Specifically, the KM (i) stresses the valuable traditional experience of universities in international cooperation by promoting projects between and within universities. In this sense, the CUCS network should be considered as a fundamental communication channel to increase and develop innovative and integrated development cooperation projects, thus reinforcing its role as a nation-wide reference network for development cooperation.

In terms of the KM (ii), in order to recover and develop on a new ground the relation between students and professors, the university should retrieve its original identity of being a community of students and professors. The place where this relationship should be pursued is within the context of cooperation projects, where the relation between students and professors is more horizontal. This is basically due to the fact that both students and professors play in an unknown context when they are in a “foreign” environment. However, the unknown context can raise the complementary abilities and attitudes of students and professors. Indeed, while students are free from prejudices and constructs as adapt faster to cultural and social evolution, professors have the valuable experience to manage a development cooperation project, guiding the innovative proposals made by the students. In this way, the relationship between students and professors is – or can become – synergic.

KM (iii) indicates that to involve an always increasing number of students it is extremely important to learn how to correctly and effectively communicate with them.

The three main key-messages of the session “Students Protagonists” just described can be considered as desirable learning outcomes and can be pursued in a joint vision: by looking to the valuable and long-term Italian tradition in development cooperation projects (KM i), the synergic interplay between students and professors can be recovered and developed (KM ii), giving importance to the pivotal role played by students (KM iii) as they are capable of advancing innovative added values and best practices to address a development cooperation project.

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OPPORTUNITIES AND BARRIERS IN DEVELOPING A PROJECT AIMING TO FIGHT INFANT MALNUTRITION IN TANZANIA

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Abstract

The project "pappa di Parma" aims to implement hyper-energy meals to fight child malnutrition. A key aspect is the use of locally available food raw materials. The research has been conducted in its starting phase at the University of Parma and it was implemented locally in Tanzania (Rukwa Region) where local and accessible food ingredients and technologies were searched for. Mothers and children were interviewed about the acceptability of the meals and about whole family's eating habits. The educational tools created were useful to raise awareness among the population about the issue of child malnutrition through the project "pappa di Parma".

Keywords

Infant malnutrition, food security, sustainability, nutrition education

The "pappa di Parma" project in Tanzania

In this paper, after a brief introduction of the socio-economic context of Tanzania, it will be presented the "Pappa di Parma" project, from when it was born to its implementation in Tanzania, whose purpose is to combat child malnutrition through the domestic preparation of high-energy food made with locally available raw materials. Moreover, it will be examined the tools created to provide information at the local level and finally it will be presented the data obtained through mothers' interviews about the food family habits.

The project "Pappa di Parma" has been developed in Tanzania with the contribution of three students of the University of Parma contextually to the Erasmus Overworld Programme.

The socio-economic context and the objectives of the project

Tanzania is one of the most peaceful, stable and prosperous countries in Africa. Despite growth averaging 6.5% per annum for over a decade, the Gross domestic Product GDP has struggled to stay ahead of high population growth (3% per year), leaving as many as 12 million Tanzanians below the poverty line. The country is ranked 151 out of 188 in the United Nations Human

Development Index, which classifies it as a country of 'Low Human Development'. Nevertheless, Tanzania has a well-defined ambition to become a Middle-Income Country by 2025 (Action against hunger & Iris, 2017).

The agricultural sector is currently the prevailing economic one representing 26.5% of total GDP. It is estimated that 87% of the poorest people live in rural areas and that the annual migration rate from countryside to cities is quite high, around 5.36% (United Republic of Tanzania, 2018). In urban areas, employment and school education levels are higher than in rural areas and this increases the gap in the Tanzanian population (Hassine, 2015).

In the United Republic of Tanzania malnutrition is still severely present, in particular, in the Rukwa region, where the level of stunted and underweight children was respectively 50.4 and 13.5%, (Nordang S, 2015), but the situation is even more dramatical in the southern areas of the nation where the percentage of malnourished children is above 50%. Malnutrition, in this case, means an insufficient intake of one or more macronutrients and / or micronutrients. The World Health Organization and Unicef have developed therapeutic food products called Ready-to-use therapeutic foods (RUTF). RUTF are high-energetic meals, distributed from multinational companies in sanitary emergency conditions only for a short period of time. The first and most commonly used RUTF contains sugar, dried skimmed milk, oil, peanut butter, vitamin and mineral supplements. They must also respond to three important characteristics: i) the taste and texture must be appropriate for children; ii) as "ready to use" product cooking must not be necessary; iii) the packaging should be suitable for feeding infant and safe assuring a long shelf-life. However, RUTF do not consider the eating habits of the local population, it is industrially produced by and, because of that, too much expensive for local people, therefore it can't represent a long-term solution. The project "pappa di Parma" was born in the first months of 2008 at University of Parma with the collaboration of the Pediatric School, the Human Nutrition Unit, Food Technology Unit and the academic spin off Madegus (Vanelli, 2014). The underlying principles are the same as RUTF. Hence, the aim is to formulate hyper-energetic supplementary food for malnourished children from 6 to 60 months, but with the sole and exclusive use of local ingredients and equipment. This feature could make the "pappa di Parma" production affordable for people living in villages and acceptable. Based on previous experiences in Sierra Leone (2009-2013) and Zambia (2011-2012), "pappa di Parma" was developed for Tanzania in 2018. The project is the result of a collaboration with Golfini Rossi Onlus, an Italian charity association, the University of Parma (Italy), Mvimwa Abbey (Rukwa Region, Tanzania) and the St. Joseph University (Dar es Salaam, Tanzania). The Abbey represents the core of the aggregation for all the small villages of the district with a population of 20,000 inhabitants, where water is collected from spontaneous pools, there is no electricity, agriculture is

minimal and the houses are rudimentary. The monks offer support to the local population in different ways: the Monastery runs professional schools for electricians, carpenters, blacksmiths, seamstresses, mechanics. Moreover, it supports and manages the St. Placidus Primary School with over 250 children, the St. Maurus Chemical Secondary School in Sumbawanga with over 1000 students and a college for future teachers. Finally, close to the monastery there's a dispensary equipped for simple surgical interventions, for analysis and examinations, there are rooms for recovery and delivery rooms.

Pappa di Parma development for Tanzania

Implementing baby meals with local ingredients

The preliminary phase of the project was the development of a database for local Tanzanian ingredient drafted through bibliographic data (Tanzania Food composition tables (2008); National nutrient database for standard reference (2015); West African food composition table (2012)).

The preparatory phase at the laboratories of Food and Drug of the University of Parma consisted in cooking six different recipes using ingredients inserted into the database. The recipes respected Fao nutrition criteria for malnourished children aged from 5 to 60 months who live in Tanzania (Fao, 2008). Simultaneously, the characteristics of the baby meals must be technologically, microbiological and sensory adequate.

The intervention phase in Tanzania, at the Benedictine monastery of Mwimva consisted in finding out ingredients in 5 city markets: Soko Kuu, Madela, Soko la Bangwe, Soko la Chanji and Soko la Majengo all located in Sumbawanga. There were numerous difficulties in the search for raw materials, including the distance between the Abbey and the local market of Sumbawanga (about 50 miles). Furthermore, the local inhabitants speak only Swahili and therefore the constant presence of an interpreter was necessary. Additionally, we turned to small shops to find missing food and tools. After ascertaining the extreme simplicity of the kitchen tools used by local population, we adapted the production method developed at the Department of Food and Drug's laboratory of University of Parma to the kitchen of the Monastery (Figure 1).

Pappa di Parma formulas were developed using:

- Frying pan, pot and ladle,
- Pestle and mortar to chop the ingredients,
- Filters, to crush and reduce cooked whole beans into paste,
- Containers for storing products,
- Digital food scale.



Figure 1. Abbey kitchen

In the monastery kitchen there is only one gas stove, while in the villages there are wood stoves. This instrumentation highlighted some problematics in the correct management of cooking. In addition, the lack of a refrigeration system limits the conservation of some raw materials and pappas themselves. For this reason, the pappas have been prepared daily. We went to Sumbawanga's market weekly, consequently the most perishable products last about 4 days for the high temperatures. All these difficulties extended the time for pappas production and compromised their standardization. Immediately after preparation, pappas were administered to the children of the villages in order to verify its acceptability. The presence of the monk-interpreter of the Monastery and of the Doctor of the dispensary (Figure 2), who ensured assistance in case of an allergic reaction, allowed the administration of "pappa di Parma".



Figure 2. Abbey dispensary, photo taken during the administration of Pappa

The survey was conducted over an overall period of three months and involved 287 children aged between 6 months and 5 years. Firstly, the three student of Parma University made a brief introduction to families about the project and short lesson of simple nutrition's concepts and the explanation of the ingredients used in the formulation and their importance. Then the children taste the meal with doctor and nurse monitoring and the last step of this investigation protocol was the administration of habit questionnaire to mothers.

Educational tools

Poster depicting baby food and the "pappa di Parma"

We created four posters depicting the final appearance of the relative four pappas and the required ingredients (Figure 3). The posters have an educational role being self-explicative images. This overtakes the linguistic barrier and population illiteracy. Since the equipment available in the houses of the villages is very rudimentary, it was imperative to find a unit of measure for the dosages of each raw material. In conclusion, the number of spoons, identified as better unit of measure, was placed near the picture of the ingredients.



Figure 3. Poster of pappa di Parma formulas

Moreover, also a poster about the nutritional benefits deriving from “pappa di Parma” consumption has been developed both in the official language of the United Republic of Tanzania, Swahili, and in English (Figure 4). The poster shows that a child eating the “pappa di Parma” can grow up healthy while a malnourished child cannot grow neither in weight nor in height, Lion has an iconographic meaning: it represents strength and energy. The measures of weight and height taken as references are those indicated by the Who as the adequate growth measures (Who, Unicef, 2009).

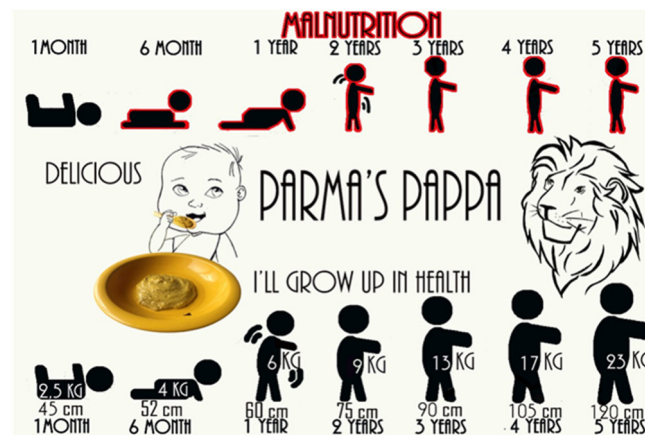


Figure 4. Posters of “pappa di Parma”

In order to make the project “pappa di Parma” understandable by local people, it was essential to know the socio-cultural context of the local population. Women, in particular, represent the true essence of the place in which they live, they embody the conjunction between the past and the future, they are at the same time mothers and daughters of a land that, albeit voiceless, shout out for help in the present. Every day the three students went to the dispensary to meet them, where most women receive help during childbirth and return for the monthly visits of the baby. Therefore, the interview has been randomized, because it wasn't possible to know which and neither how many mothers would have come to the dispensary. During these visits, children were weighed and monitored for growth. In the most extreme cases of malnutrition, the doctor would advise the family to go to Sumbawanga's hospital. Unfortunately, few families are able to bear the costs of travel and accommodation and to leave the rest of the family without someone to assist them. For this reason, it is very important to do a preventative job that avoids desperate situations that would have little chance of resolution. After the tasting of the baby meals, students tried to understand their food's habits through a simple and schematic questionnaire. Listening to their stories, students soon realized the inadequacy of some of their requests because they were too specific and set on European parameters, so they scaled down their approach. In fact, in Europe people are used to a very varied diet, on the contrary, the population of the villages always eats the same dishes, only in the more fortunate periods they manage to eat more expensive or difficult to find dishes (meat, fish, and fruit). For example, if a

family kills a cow, it could eat its meat for the entire following week and then not eat more meat for two months. For this reason, it was not possible to distinguish between the types of meat and it was very difficult to understand the real frequency of consumption of these foods. First, students asked mothers some personal information: age, the village of origin, how many children they had, how many months after birth they decided to start weaning and which food children eat in place of breast milk. Then, the attention shifted to the habits of the rest of the family: if they used to have breakfast and how, if they respected the main meals and which food they usually consumed, how often did they eat meat, fish, eggs, vegetables and fruit. Finally, students asked how much water they used to drink per day. Since they do not have the availability to use a food scale, a cup or spoons were used as a unit of measure. 185 interviews have been collected. The average age of mothers interviewed is around 25 years, most of them already had 3 children, who were usually weaned six months after birth with white corn flour porridges and, in rare cases, cow milk. The quantity varies from a minimum of 5 spoons to a maximum of 2 cups. For breakfast most adult people eat the same porridge and, more rarely, they prepare fried donuts which are traditionally called Mandazi. For lunch and dinner, adults and children eat Ugali, which is a sort of polenta prepared with white corn flour and water. Beans would never miss in the main meals, more rarely accompanied by seasonal vegetables. Only 11% of the women interviewed add potatoes or rice. Unfortunately, only 10% of families eat fruit every day or at least every two days. 79% of families consume meat maximum 4 times in a month. Fish and eggs are cooked more than three times a week by about 11% of the women surveyed. On average, adults drink 0.8 L of water a day: in the villages, it is easier to meet a kiosk that sells carbonated drinks rather than water, moreover the few water reserves are heavily contaminated and often insufficient for the entire population. The value of the interviews was strategic, as they were an opportunity to speak to the women of the villages also about health and nutrition. The goal was to give concrete and achievable suggestions in order to improve the eating habits rooted in their daily lives from centuries.

In conclusion, in order to be effective, the educational proposal must take place in a dialogue of mutual knowledge that has the strength and patience to enrich both sides.

The barriers that hinder the development of this project in Tanzania are not only of cultural nature, in relation to the food habits of the population, but also of a practical nature. The procurement of raw materials is a critical point of the process in particular due to the great distance that has to be done on foot, between the villages and the city where the market is located.

Nevertheless, this project started countless opportunities for improving conditions of Tanzanian population living in Rukwa Region, with the awareness that "What we are doing is just a drop in the ocean. However, the ocean would be less because of that missing drop" (Madre Teresa di Calcutta).

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Acronyms

Gdp	Gross Domestic Product
Rutf	Ready to Use Therapeutic Food
Who	World Health Organization
Fao	Food and Agriculture Organization

**COLLABORATION BETWEEN STUDENTS AND TEACHERS IN A STUDY ON
CARDIOVASCULAR DISEASES IN CAMEROON: COMPARISON BETWEEN RURAL AND
URBAN AREAS**

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Abstract

Le patologie cardiovascolari presentano un'incidenza in netto aumento nei paesi subsahariani. Queste patologie croniche rappresentano un carico aggiuntivo per i sistemi sanitari di questi paesi, che versano già in gravi difficoltà per quel che riguarda la gestione delle altre problematiche sanitarie. Il progetto "Medical Experience To Cameroon", nato in contesto universitario a Parma, ha consentito di reperire ed analizzare dati sulle patologie cardiovascolari e i loro fattori di rischio in Camerun. In particolare, abbiamo effettuato una raccolta di dati da una popolazione di 183 persone residenti in contesto urbano (Douala) e da una popolazione di 507 persone residenti in contesto rurale (Dschang e villaggi limitrofi) per un totale di 690 persone, i cui dati sono stati confrontati. L'obiettivo è di analizzare la prevalenza di queste patologie in due contesti diversi dal punto di vista dell'organizzazione, della cultura e delle abitudini di vita. Inoltre, abbiamo cercato di capire quale fosse il livello di informazione di queste popolazioni sulla prevenzione di queste patologie. Per quanto riguarda quest'ultimo aspetto la popolazione urbana si è dimostrata meglio informata; abbiamo rilevato in questa un maggior tasso di obesità. In entrambi i contesti i soggetti femminili sembrano essere più prone alla sedentarietà e di conseguenza all'obesità. L'ipercolesterolemia risulta essere la patologia meno conosciuta.

Cardiovascular diseases show a marked increase in incidence in sub-Saharan countries. These chronic diseases represent an additional problem for the health systems of these countries, which are already in great difficulty in managing other health problems. The project 'Medical Experience To Cameroon' born in the university context of Parma has allowed to retrieve and analyse data on cardiovascular diseases and their risk factors in Cameroon. In particular, we have collected data in a population of 183 people living in an urban context (Douala) and a population of 507 people living in a rural area (Dschang and neighboring villages) for a total of 690 people; the data have been compared. The objective is to analyse the prevalence of these diseases in these two contexts that show differences from the point of view of organization, culture and habits of life. In addition, we tried to understand how well these populations were informed about the prevention of these diseases. On this last aspect, the urban population has shown to be better informed; we have found in this one a greater rate of obesity. In both contexts, females appear to be more prone to sedentary and, consequently, obesity. Hypercholesterolemia is the least known pathology.

Key words

Cardiovascular diseases, Risk factors, International cooperation, Student and teachers, West and Littoral Cameroon.

Introduzione

Le malattie cardiovascolari rimangono tuttora un tema di grande interesse nella medicina, essendo una delle principali cause di mortalità, non solo nei paesi sviluppati ma anche nei paesi in via di sviluppo. Nella realtà occidentale, l'epidemiologia di queste patologie è molto aggiornata grazie alla sensibilizzazione della popolazione e all'organizzazione del sistema sanitario. In altre realtà, come alcuni paesi africani ad esempio, purtroppo si fa ancora fatica ad avere un'idea chiara e obiettiva della prevalenza e dell'incidenza di queste patologie. Purtroppo, l'assenza o l'inadeguatezza di un percorso di diagnosi precoce e di cure di queste patologie croniche determina gravi conseguenze. Infatti, secondo l'Organizzazione Mondiale della Salute (Oms) 80% dei decessi legati a queste patologie avviene nei paesi a basso/medio reddito¹. Inoltre si stima a 23.6 milioni il numero di decessi legati a queste patologie nel 2030. Il sistema sanitario in molti paesi dell'Africa subsahariana è organizzato per la gestione di patologie acute e non per quelle di natura cronica². I pazienti affetti da queste patologie presentano di solito almeno un fattore di rischio, cioè quelle condizioni o abitudini che aumentano la possibilità di avere una malattia (cardiovascolare, in questo caso). Questi possono essere distinti in fattori modificabili e non modificabili. Un aspetto positivo è che la maggior parte dei fattori di rischio è di natura modificabile e per essi la prevenzione passa semplicemente per una modifica dello stile di vita.

Fattori di rischio

Sedentarietà e Inattività fisica

Secondo l'Oms il 60% della popolazione mondiale non è abbastanza attiva fisicamente. L'attività fisica è benefica a tutte le età poiché migliora il peso, la pressione arteriosa, il livello ematico di glucidi e di lipidi, i fattori proinfiammatori e protrombotici. La World Heart Foundation (Whf) ricorda l'effetto benefico dell'attività fisica anche nelle persone che presentano già fattori di rischio o delle patologie cardiovascolari. L'urbanizzazione di molte regioni africane si associa a una modifica dello stile di vita caratterizzata da un maggior consumo di cibi ipercalorici e una riduzione dell'attività fisica³. Sicuramente questo è uno dei dati che favoriscono l'aumento dell'incidenza delle patologie non trasmissibili, tra le quali al primo posto figurano quelle cardiovascolari.

¹ World Heart Federation (<https://www.world-heart-federation.org/>). Ultima consultazione 20/12/2020.

² BeLue (2009). An overview of cardiovascular risk factor burden in sub-Saharan African countries: a socio-cultural perspective, "Global Health", 5:10.

³ BeLue, *op. cit.*

Fumo

Sin dal 1940 è stato dimostrato un legame fra l'abitudine del fumo e lo sviluppo di patologie cardiovascolari e tumori polmonari. Infatti, il fumo favorisce la formazione di trombi e placche aterosclerotiche, oltre allo spasmo coronarico. La nicotina aumenta la pressione arteriosa e la frequenza cardiaca. Secondo la World Heart Federation le donne fumatrici presentano un rischio cardiovascolare maggiore dei maschi fumatori.

Familiarità

La presenza di un parente di primo grado colpito da un evento cardiovascolare prima di 55 anni se maschio e prima dei 65 anni se femmina, aumenta il rischio di mcv. La World Heart Federation (Whf) ricorda l'esistenza di una componente genetica nell'ipertensione e per ciò che concerne i livelli di lipidi ematici. Infatti, esistono diverse forme di ipercolesterolemia familiare ereditarie.

Dieta

Una dieta ricca di grassi saturi aumenta il rischio di mcv. Piccole modifiche della dieta determinano importanti effetti a lungo termine. Infatti, la Whf afferma che riducendo il contenuto di grassi saturi e aumentando quello frutta e verdure, si determina una riduzione del 73% del rischio di nuovi eventi cardiovascolari. Il sale rappresenta un altro elemento importante nel rischio cardiovascolare, in quanto strettamente legato all'ipertensione. Il livello ematico di colesterolo è legato alla dieta e un aumento di colesterolo Ldl aumenta il rischio di eventi cardiovascolari.

Ipertensione

Definita generalmente come una pressione sistolica maggiore di 140 e diastolica maggiore di 90 millimetri di mercurio, rappresenta il fattore più importante tra quelli alla base di patologia coronarica e ictus. Secondo la società camerunese del cuore⁴, un camerunese su tre è iperteso o è affetto da patologia cardiovascolare. Si identificano due forme di ipertensione, essenziale e secondaria. La prima è la più frequente ed è legata a particolari caratteristiche genetiche e allo stile di vita, la seconda, meno frequente, è legata ad una causa identificabile.

⁴ Società Camerunese del Cuore (Fondation Camerounaise du Coeur). <https://camehf.skyrock.com/> (ultima consultazione; 20/12/2020).

Obesità

Rappresenta una condizione definita sulla base di un valore chiamato Indice di Massa Corporea, determinato dal rapporto fra il peso e l'altezza al quadrato. Se maggiore di 25 il paziente viene definito sovrappeso mentre sopra 30 è obeso. Successivamente vengono distinti altri gradi di obesità. Questa condizione si associa ad un aumento proporzionale del rischio di diabete 2 ed ipertensione.

Diabete

La stretta correlazione fra diabete e mcv è ormai evidente, infatti un diabetico è da due a quattro volte più a rischio di sviluppare una patologia cardiovascolare. Un diabete non compensato determina a lungo un danno ai vasi, condizione che, associata ad alti livelli ematici di lipidi e ad un'elevata pressione arteriosa, favoriscono l'aterosclerosi. La Whf ricorda che un buon controllo glicemico riduce del 57% il rischio di infarto e di ictus. Il fattore di rischio non modificabile più importante rimane l'etnia: gli asiatici, africani, gli arabi e gli ispanici presentano un rischio maggiore di sviluppare mcv.

Il progetto

Questo studio nasce nel contesto di un progetto chiamato "Medical Experience To Cameroon" avviato a Parma nel 2016 dall'iniziativa di studenti camerunesi e italiani della Facoltà di Medicina e Chirurgia dell'Università di Parma. Si tratta di un progetto di volontariato e scambio accademico ideato da studenti, che è stato successivamente accolto e supportato dai professori e dall'Università. Il gruppo si è dato l'obiettivo di raccogliere dati sulle patologie cardiovascolari in Camerun partendo dallo studio dalla regione Ovest, i cui dati sarebbero stati in seguito confrontati con quelli della popolazione di Douala. Questo è stato fino a oggi realizzato tramite soggiorni periodici di un gruppo formato da studenti non solo di medicina, ma anche di scienze infermieristiche, che durante il periodo di permanenza in Camerun (un mese ogni anno) hanno studiato le popolazioni locali durante giornate di sensibilizzazione e diagnosi di queste patologie. A due anni dall'inizio delle attività, è stato firmato un accordo fra l'Università di Parma e altre due Università Camerunesi, quella di Dschang e quella di Bagangté. Questi accordi hanno consentito di creare un gruppo di lavoro sui dati raccolti.

Ci saranno diverse possibilità per gli studenti che parteciperanno al progetto negli anni a venire; vantaggi dal punto di vista accademico sono: che il tirocinio effettuato potrà essere riconosciuto come parte del percorso accademico, che sarà possibile raccogliere dati per la propria tesi di laurea, cosa già effettuata da diversi studenti. Sicuramente per quanto riguarda l'aspetto umano i

partecipanti hanno tanto da guadagnare, essendo un'esperienza di lavoro in squadra ed avendo la possibilità di collaborare con studenti, professori e professionisti di un'altra realtà. Inoltre, esiste un'ampia parte del progetto dedicata ai bambini, e nello specifico agli orfani, che nell'ambito del progetto ricevono assistenza di diversa natura. Gli studenti protagonisti non sono solo quelli dell'Università di Parma che vanno in Camerun ma anche una grande squadra di studenti delle università locali. I professori rappresentano degli attori indispensabili, poiché indirizzano gli studenti nella programmazione e nell'organizzazione del progetto, formano gli studenti e altri volontari e spesso sono anche medici che si prestano alle attività di raccolta dei dati. Per esempio, oltre alla parte clinica in cui aiutano nella visita e il colloquio con il paziente, valutano i tracciati elettrocardiografici che ricevono dall'equipe sul campo. Sempre grazie a loro il progetto ha ricevuto in dono un dispositivo che permette di valutare l'indice caviglia-braccio (Abi) determinante nella diagnosi precoce delle arteriopatie obliteranti. I dati rilevati con questo dispositivo potranno essere illustrati un altro studio. Una rete di collaborazione fra docenti in Italia e in Camerun già ha permesso a una studentessa di realizzare il suo lavoro di tesi di laurea in Infermieristica su dati raccolti in Camerun. Come dato più recente questa rete ha concesso al progetto di presentare il suo lavoro durante il Cucs (Coordinamento Universitario per la Cooperazione allo Sviluppo) a settembre 2019.

Questo percorso dimostra l'importanza di un rapporto professore-studente. Questo progetto tuttora in corso, a quattro anni dall'inizio, è stato creato da studenti e proposto ai professori, i quali hanno accompagnato gli studenti stessi nelle diverse procedure di stesura di protocollo, analisi dei dati raccolti ma anche nelle attività sul campo. Questo va sicuramente al di fuori dello schema classico della lezione magistrale che relega lo studente nella posizione di ricevente.

Lo studio

Obiettivo

Lo studio si pone come obiettivo di valutare la prevalenza dei fattori di rischio delle patologie cardiovascolari nel contesto urbano e rurale in Camerun. Ogni zona presenta delle peculiarità rispetto all'altra. Questo dovrebbe permettere di arricchire le conoscenze riguardo l'epidemiologia di queste patologie e di poter fare a lungo termine un confronto fra l'area urbana e rurale del Camerun in termini di distribuzione dei fattori di rischio e controllo dei pazienti patologici. Ancora più importante: grazie a questi dati sarà possibile impostare gli interventi di prevenzione necessari tenendo conto delle peculiarità di ciascuna zona.

Il contesto

I lavori si sono svolti nella regione dell'Ovest, nello specifico nell'area chiamata Menoua (figura 1 e tabella 1). È stata scelta per un primo studio in zona rurale, per la vicinanza alle Università dove studiano gli studenti e i professori camerunesi che partecipano allo studio e la conseguente maggiore facilità di accesso da un punto di vista logistico. Questa zona è caratterizzata da una popolazione prevalentemente adulta/anziana che per lo più pratica l'agricoltura come attività lavorativa. La dieta è quindi basata quindi su prodotti di questa attività. Si tratta principalmente di verdure, radici, frutta. Una piccola parte della popolazione è rappresentata da giovani, in gran parte studenti. Sono soprattutto giovani che vengono dalle città per studiare nell'Università locale. Le lingue usate sono il francese e il dialetto locale chiamato 'Yemba'.

villaggio	provincia	Struttura sanitaria
Dschang	Ovest	Hopital des soeurs de Batsing'la ,Hopital Saint Vincent de Paul
Bamendou	Penka-michel	“Centre de santé de Bamendou 1 et 2”
Balefock	Penka-michel	“Centre de santé de la chefferie Balefock”
Nkong-zem	Nkong-ni	“Infirmierie de la commune de Nkong-zem”
Batsing'la	Nkong-ni	“Centre de sante notre Dame de Batsing'la”

Tabella 1. Dschang e villaggi limitrofi.

La zona urbana è rappresentata da Douala (figura 2), capoluogo della regione chiamata 'Littoral'. È la capitale economica del paese e di poco più popolata della capitale politica Yaounde. Conta circa 4 milioni di abitanti (2019); città portuaria, è la sede di diverse aziende locali e straniere. Questo comporta di conseguenza la presenza di molte e diverse possibilità lavorative per cui accoglie molti cittadini che si trasferiscono da altre città o paesi. La popolazione, come la maggior parte del paese ha un'età media bassa essendo costituita soprattutto da giovani. La città è suddivisa in diversi comuni (tabella 2).

Comuni	Sede	Centro di salute
Douala I	Bonanjo	“Hopital du génie militaire de Douala”
Douala II	New-bell	
Douala III	Logbaba	“Hopital de la cité des palmiers”
Douala IV	Bonassama	

Douala V	Kotto	“Hopital de Bépanda”
Douala VI	Manoka	

Tabella 2. Comuni di Douala.

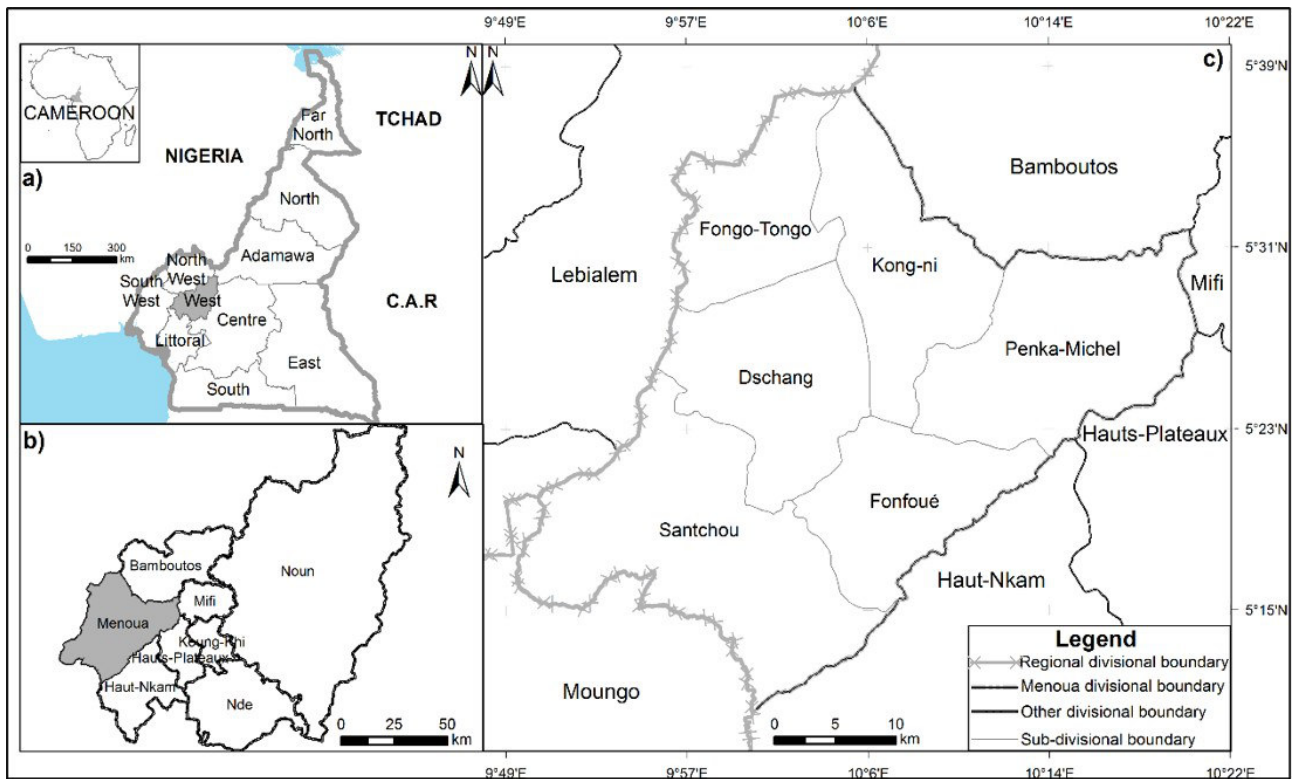


Figura 1. Mappa di Dschang e villaggi limitrofi.

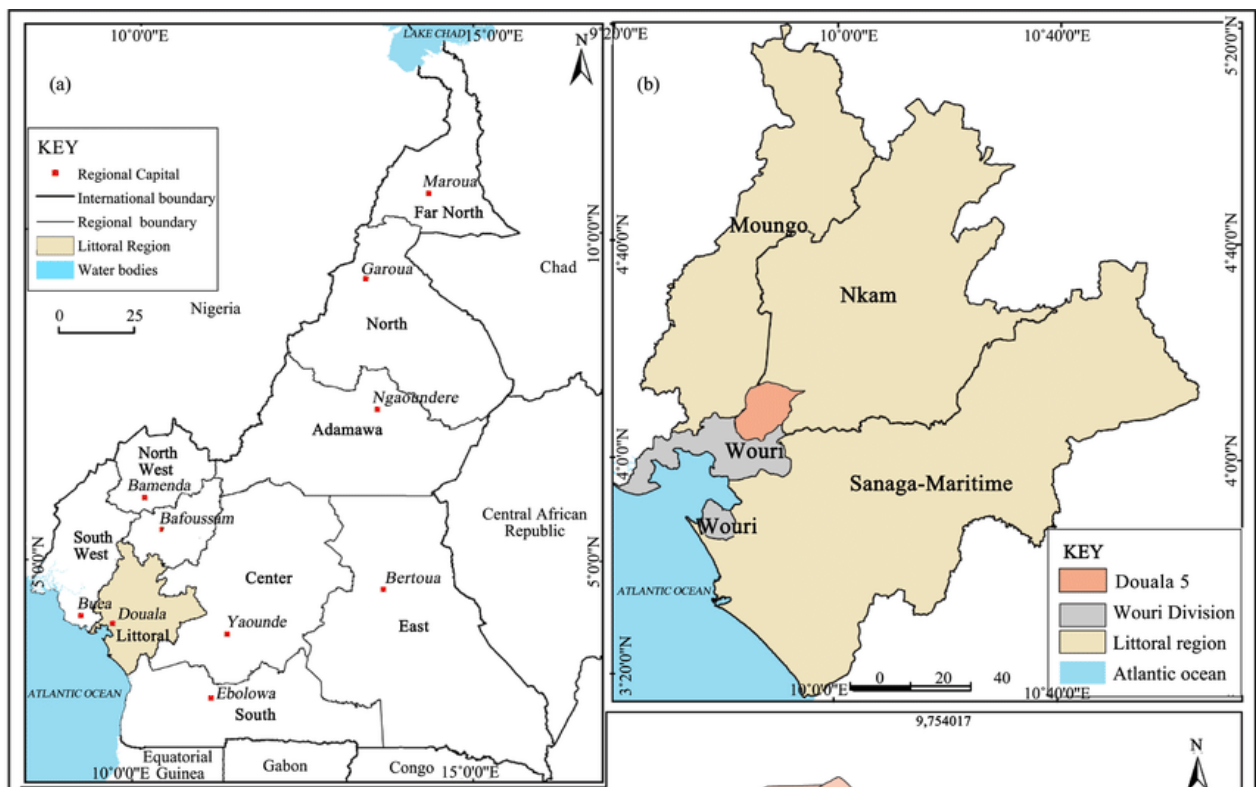


Figura 2. Mappa di Douala.

Raccolta e analisi

I dati sono stati raccolti durante due settimane nel contesto di giornate di sensibilizzazione sul tema delle patologie cardiovascolari. Prima dell'inizio delle attività, con l'aiuto delle autorità tradizionali, l'uso delle radio locali e le locandine, le popolazioni sono state avvisate circa il programma e riguardo indicazioni importanti come l'osservanza del digiuno per effettuare le analisi che sarebbero state svolte. Le attività si sono svolte quasi sempre nell'ospedale presente nella zona.

L'equipe è stata organizzata in piccoli gruppi formati da studenti e docenti o professionisti responsabili della raccolta di un dato specifico. Viene così creato un percorso che il paziente deve seguire una volta dato il consenso.

I dati sono stati raccolti usando un modulo unico, consegnato ad ogni persona in cui sono segnati: L'anamnesi familiare, patologica remota e recente, raccolta tramite domande semplici e chiare mirate sui fattori di rischio cardiovascolari (familiarità, attività fisica, fattori di stress, consumo alcol, dieta...). Questa viene raccolta di volta in volta da uno studente formato.

La pressione arteriosa sistolica misurata almeno due volte da uno studente formato o da un medico.

L'indice di massa corporea, calcolato sulla base del peso e dell'altezza.

La glicemia capillare misurata a digiuno con un glucometro.

I pazienti sono stati infine visitati da medici e sottoposti a un ulteriore colloquio. Durante questo colloquio, tramite domande semplici, viene valutata la conoscenza del paziente sul tema dei fattori di rischio delle patologie cardiovascolari e sulla prevenzione di quest'ultime. Considerando che in zona rurale buona parte degli anziani parlano poco il francese, per ottimizzare i risultati nel team di lavoro c'erano studenti, docenti e professionisti capaci di esprimersi anche nel dialetto locale.

Bisogna segnalare che le attività di sensibilizzazione essendo aperte al pubblico; sono stati registrati i dati di tutti i partecipanti però solo quelli che rispettano i criteri seguenti sono significativi per l'obiettivo di questo lavoro. Le persone i cui dati sono stati considerati sono adulti con età maggiore o uguale a 20 anni residente nella zona da almeno due anni. Sono state escluse persone che vivono in zona da meno di due anni o che vivono anche in città.

Per ragioni pratiche i dati raccolti a Dschang sono stati analizzati insieme a quelli dei villaggi circostanti, essendo Dschang comunque un contesto che mantiene molto dello stile di vita rurale.

Di seguito questo gruppo di dati verrà citato solo come 'Dschang' rappresentando così la zona rurale, mentre i dati raccolti a Douala rappresentano la zona urbana.

Risultati e Discussione

Le persone registrate sono state 183 nella città di Douala e 507 a Dschang, per un totale di 690 persone di cui 461 di sesso femminile (66.81%) e 229 di sesso maschile (33.18%). Si denota quindi una prevalenza della popolazione femminile che rappresenta il doppio di quella maschile nel gruppo di studio. Questa tendenza si mantiene nei singoli gruppi, a Douala hanno partecipato allo studio 183 persone di cui 114 femmine e 69 maschi, a Dschang erano 349 femmine e 158 maschi (tabella 3).

	Maschi	Femmine	totale
Douala	69	114	183
Dschang	158	349	507
totale	229 (33,18%)	461 (66,81%)	690 (100%)

Tabella 3. Distribuzione della popolazione in base alla residenza e al sesso.

L'età dei partecipanti si distribuisce su una fascia abbastanza larga: da 3 anni a 92 anni con un'età media di circa 45 anni. Il 10.86 % aveva un'età inferiore o uguale ai 20 anni, il 15.21 % un'età compresa fra 21 e 30 anni, il 13.47 % un'età compresa fra 31 e 40 anni, infine il resto dei partecipanti quindi il 60.43 % aveva un'età maggiore dei 40 anni. Quest'ultima fascia di età comprendeva 266 femmine con un'età media di 57 anni e 151 maschi di età media di circa 59 anni, mentre la restante parte con età inferiore o uguale a 40 anni conta 77 maschi di cui un'età media di 27 anni, e 196 femmine con età media di 26 anni (tabella 4).

Anni	Douala	Dschang
>40	49%	36%
<40	51%	64%

Tabella 4. Distribuzione della popolazione in base all'età.

Nello specifico a Douala l'età era compresa fra 10 e 77 anni con una media di circa 42 anni. Il 49% aveva un'età minore o uguale a 40 anni e il 51% un'età maggiore. Dschang presenta una fascia più larga dai 3 ai 92 anni, età media 46 anni circa, con il 36% al di sotto dei 40 anni e il 64% al di sopra.

Prevenzione patologie cardiovascolari

Durante il colloquio, ogni partecipante doveva rispondere a domande sui fattori di rischio e sui metodi di prevenzione. Le domande erano fatte in francese o in dialetto. Alcuni esempi di domande: “sa che cos’è l’ipertensione/obesità/diabete?”; “sa come prevenire queste patologie?”; “quali metodi di prevenzione conosce?”. Il partecipante poteva rispondere a seconda delle domande con ‘si’, ‘no’ o con delle risposte aperte. Il professionista segnava quindi le risposte sul modulo. Complessivamente dai dati risulta che 175 partecipanti (25.36%) non conosce nessuna delle patologie cardiovascolari citate, 149 (21%) non conosce il diabete e 538 (78%) l’ipercolesterolemia. Si evidenzia anche il 16% che non conosce nessuna delle patologie considerate. Il tasso di conoscenza varia poco tra i due gruppi, a Douala il 26% non conosce nessuna di queste patologie mentre a Dschang è il 25%. L’ipercolesterolemia rappresenta di sicuro quella meno conosciuta, sono 72.60% a Douala e 88.75% a Dschang. Il diabete è abbastanza conosciuto nei due gruppi. Per quanto riguarda la prevenzione, 37.59% dei partecipanti conosce almeno un metodo di prevenzione del diabete, mentre 44.10% è informato sulla prevenzione delle patologie cardiovascolari. Nello specifico a Douala il 39.20% sono informati sulla prevenzione delle patologie cardiovascolari contro 36.96% a Dschang, sul diabete 47.70% a Douala e 42.89% nell’altro gruppo. Purtroppo, una parte non trascurabile dei partecipanti non conosce metodi di prevenzione di nessuna delle patologie studiate.

Familiarità

241 partecipanti cioè 35% del totale ha affermato di avere almeno un parente affetto da diabete, 268 quindi 38.78% per quanto riguarda le malattie cardiovascolari. Nello specifico per il diabete il 37.29% della popolazione di Douala presentava familiarità contro 34% a Dschang, per le altre patologie il 50.28% a Douala e il 34.71% a Dschang (tabella 5).

	Diabete	Malattie cardiovascolari
Douala	37,29%	50,28%
Dschang	34%	38,78%

Tabella 5. Quota della popolazione di studio con familiarità positiva.

Iperglicemia

Purtroppo, causa difficoltà nella fornitura del materiale utile per le misure, la glicemia non è stata esplorata in modo adeguato in tutti i partecipanti. Infatti, a Dschang sono state effettuate 337

misure di cui 36 erano valori patologici, mentre a Douala solo 27 misure di cui 2 con valori patologici. Questi ultimi dati purtroppo risultano di conseguenza poco attendibili considerando che esprimono l'andamento di solo una parte della popolazione studiata.

Obesità

L'obesità è stata esplorata tramite due parametri: l'indice di massa corporea (Imc) e il rapporto fra giro vita e giro fianchi detto Whr (waist to hip ratio). Il primo come detto in precedenza è calcolato il rapporto fra il peso e l'altezza al quadrato. I valori di riferimento danno come normale un Imc inferiore a 25 kg/m², come sovrappeso se compreso fra 25 e 30, obeso se maggiore a 30. Complessivamente il 34.30% dei partecipanti aveva un indice nella norma, 34.45% un indice elevato corrispondente a un sovrappeso e 31.25% un indice che indicava obesità. Nello specifico Douala aveva un tasso di normalità del 31.54% contro 35.24% a Dschang. Era in sovrappeso il 34.52% della popolazione di Douala contro il 34.42% a Dschang. Infine, l'obesità era presente in zona urbana con un tasso del 34% mentre in zona rurale era del 30%. Il rapporto Imc patologico/Imc normale era di circa 2.17 a Douala e quindi maggiore in zona urbana.

I valori di Whr sono correlati al sesso. Le misure sono state eseguite con un metro da sarto, con il paziente in piedi e rilassato. Il giro vita viene misurato all'altezza dell'ombelico senza compressione, mentre il giro fianchi viene misurato nel punto di massima sporgenza. Questo indice studia la distribuzione del grasso corporeo, Un valore anomalo corrisponde a un maggior accumulo nella zona addominale, che corrisponde ad un rischio cardiovascolare maggiore. Complessivamente i tassi di valori sopra la norma erano 71.72% delle femmine con un Whr > 0.8 cm, mentre 23.74% dei maschi con un Whr > 0.9. Nelle singole popolazioni, la zona urbana presenta un 30.16% di maschi e 72.73% di femmine con valori anomali mentre la zona rurale ha valori più bassi con il 21.15% dei maschi e 71.43% delle femmine. Si evidenziano i valori alterati prevalentemente in zona urbana e soprattutto nelle femmine (tabella 6).

Imc	Percentile	stato
<25	34,30%	normale
25-30	34,45%	sovrappeso
>30	31,25%	obesi

Tabella 6. Popolazione e Imc.

Sedentarietà

L'analisi dell'anamnesi personale, ha rilevato che il 54% dei partecipanti non praticano o praticano un'attività fisica insufficiente rispetto agli standard dell'Oms. Di questi il 29% sono maschi e il 71% sono femmine. Correlando questi dati con quelli sull'obesità, si nota che il 70% di questa popolazione sedentaria presenta un Imc sopra 25 kg/m², di cui il 50,20% sovrappeso e il 49,80% obesi. Si evidenzia inoltre un indice Whr anomalo nel 66,20% di questa popolazione sedentaria di cui 82% femmine e 18% maschi.

Conclusioni

I dati precedenti rilevano sicuramente alcune differenze nella conoscenza e nella distribuzione delle patologie cardiovascolari, in particolare dei loro fattori di rischio in un contesto rurale e in un contesto urbano. In particolare, i nostri dati sembrano confermare che in area urbana c'è una maggiore consapevolezza di queste patologie, dei loro fattori di rischio e soprattutto dei loro metodi di prevenzione. L'ipercolesterolemia sembra essere quella meno conosciuta in entrambi i gruppi. Tra le due popolazioni, quella urbana presenta un tasso di obesità maggiore rispetto a quella rurale, questo viene confermato dai valori alterati di Whr più frequenti a Douala. Un altro dato che si rileva è la maggior prevalenza di obesità nelle femmine in tutte e due le popolazioni. Questo risultato potrebbe in parte essere determinato dall'alto numero di femmine nel totale dei partecipanti.

Nonostante non sia stata esplorata in modo approfondito, la dieta urbana risulta essere più ricca di sale e grassi rispetto a quella rurale che si compone soprattutto di cereali, verdure e poca carne.

Alcuni limiti di questo lavoro sono sicuramente il numero maggiore della popolazione rurale, il periodo ridotto dello studio, il numero ridotto di dati scientifici precedenti con cui fare confronti. Questo lavoro va quindi considerato come un punto di partenza per altri studi più approfonditi e più ampi. È sicuramente stato un ottimo contesto di collaborazione fra gli studenti e i loro docenti da diverse origini dalla pianificazione alla realizzazione, a dimostrazione dell'interesse scientifico comune nel fornire dati sempre più aggiornati e precisi. Questo è alquanto più importante quando si lavora in un contesto come il Camerun in cui dati epidemiologici recenti possono permettere di strutturare o modificare programmi di prevenzione e trattamento sempre più efficaci. Grazie al continuo appoggio delle Università e dei docenti, gli studenti potranno sicuramente essere sempre protagonisti nella ricerca e nella formazione.

Ringraziamenti

Vorremmo ringraziare l'Università di Parma, l'Università di Dschang, tutta la squadra Medical Experience, le associazioni Student Office, Pipad, Clirap, il Dott. Sobze. Ringraziamo tutti gli ospedali che hanno aiutato a realizzare questo studio. Ringraziamo in particolare il Re del villaggio Batsing'la, Giresse Feujio, Nelly Kwamo, Francesco Rasmi, Andrea Gnassi, Maddalena Gnappi, Francesco Frigo e tutti quelli che hanno aiutato a realizzare questo progetto.

Lista degli acronimi

Abi	Ankle Brachial Index
Cucs	Coordinamento Universitario per la Cooperazione allo Sviluppo
Imc	Indice di Massa Corporea
Ldl	Low density Lipoproteins
Mcv	Malattie cardiovascolari
Oms	Organizzazione Mondiale della Sanità
Whf	World Heart Federation
Whr	Waist to Hip Ratio

GIOVANI CON DISABILITÀ E ACCESSO AD UN LAVORO DIGNITOSO IN MOZAMBICO: RISULTATI DI UN PERCORSO DI RICERCA EMANCIPATORIA

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Abstract

Questo paper presenta i risultati di una ricerca emancipatoria condotta in Mozambico e finalizzata ad identificare le barriere e i facilitatori che impediscono (favoriscono) l’accesso al mercato del lavoro per i giovani mozambicani con disabilità. Diversi attori (organismi governativi, cooperazione, ONG, OPD) hanno partecipato alla ricerca. I risultati evidenziano un quadro complesso dove la partecipazione al mercato del lavoro è ostacolata da barriere tecniche e culturali. Imprese più grandi e strutturate sono mediamente più inclini ad includere lavoratori disabili, e imprenditori con una esperienza diretta con la disabilità tendono ad avere attitudini più inclusive.

Keywords

Mozambico, Inclusione, Disabilità, Lavoro, Ricerca emancipatoria

Introduzione

Questo articolo presenta i risultati della ricerca emancipatoria coordinata dai ricercatori del laboratorio ARCO¹ e condotta in Mozambico nell’ambito del progetto “PIN – Percorsi partecipativi per l’inclusione economica dei giovani con disabilità in Mozambico”, finanziato dall’Agenzia Italiana per la Cooperazione allo Sviluppo (AICS) e implementato dall’Associazione Italia Amici di Raoul Follereau (AIFO) in partenariato con Terres Des Hommes-Italia e l’Istituto Sindacale per la Cooperazione allo Sviluppo (ISCOS). AIFO è una delle ONG che fanno parte della Rete Italiana Disabilità e Sviluppo (RIDS), una innovativa partnership tra ONG e organizzazioni di persone con disabilità. La ricerca si focalizza sull’accesso al mercato del lavoro e alla formazione professionale per i giovani mozambicani con disabilità. Nella realizzazione dell’attività di ricerca, il Forum delle Associazioni Mozambicane di Persone con Disabilità (FAMOD) ha svolto un ruolo centrale dato che, grazie all’attivazione della propria rete associativa, ha mobilitato i giovani con disabilità che hanno poi condotto la ricerca stessa. Anche l’Istituto de Formação Profissional e Estudos Laborais Alberto Cassimo (IFPELAC) e l’Istituto Nazionale di Statistica (INE) hanno contribuito in modo determinante mettendo a disposizione il proprio staff e le proprie infrastrutture fornendo supporto e assistenza tecnica.

¹ <https://www.arcolab.org/en/>

Parliamo di Ricerca Emancipatoria sulla Disabilità (RED) nel momento in cui le Persone con Disabilità (PcD) e le Organizzazioni di Persone con Disabilità (OPD) divengono protagonisti di un processo di ricerca assumendone il pieno controllo in ogni sua fase (definizione della domanda di ricerca, raccolta dati, analisi, disseminazione). La scelta della RED come modalità di ricerca-azione prende le mosse dalla Convenzione ONU sui diritti delle persone con disabilità (CRPD), adottata dalle Nazioni Unite nel 2006 e ratificata dal Mozambico nel 2012, che promuove la partecipazione diretta delle PcD alla produzione di conoscenza sul fenomeno disabilità stesso. La Convenzione pone l'obbligo, da parte dei paesi firmatari, di monitorarne l'applicazione e sottolinea come le persone con disabilità e le loro organizzazioni debbano essere coinvolte attivamente in tutte le fasi del monitoraggio, ivi inclusa la attivazione di meccanismi indipendenti. La stessa AICS, adotta e pratica sistematicamente un approccio alla disabilità basato sulla partecipazione e sui diritti umani all'interno delle iniziative che finanzia e/o implementa.

Il presente paper si struttura come segue. Dopo questa introduzione, il capitolo 2 fornirà un focus di carattere socio-economico sul Mozambico. Il capitolo 3 è incentrato su una presentazione metodologica della ricerca emancipatoria come strumento di empowerment. I capitoli 4 e 5 descrivono il percorso condotto in Mozambico e raccolgono e analizzano i principali risultati qualitativi e quantitativi. Seguiranno conclusioni.

Il Mozambico: un contesto in cerca di sviluppo

La ricerca oggetto del presente articolo è stata condotta in un contesto (quello mozambicano) caratterizzato da una diffusa povertà, da un basso livello di sviluppo umano (181° stato su 188 nel rank globale del HDI²) e da una complessiva fragilità del sistema-paese³. Tutto ciò colpisce i cittadini e le cittadine mozambicane con disabilità in modo più che proporzionale rendendo nei fatti difficile una piena ed effettiva partecipazione alla società (Eide and Kamaleri, 2009). Un cambiamento profondo di questa situazione non può che passare da un massiccio coinvolgimento dei giovani che nel paese costituiscono la grande maggioranza della popolazione (il 50% dei mozambicani ha meno di 17 anni)⁴. Secondo i dati dell'International Labour Organization (ILO), il 39% dei giovani (15-24 anni) risultano disoccupati⁵ e ciò testimonia quanto sia difficile per i giovani mozambicani entrare (e/o rimanere) nel mondo del lavoro, ancor più se disabili. Sul fronte educazione, il livello di istruzione delle PcD è molto basso, specialmente nelle aree rurali e si stima che l'80% dei bambini con disabilità non vada a scuola (SADPwD, 2007). A questo quadro, già

² Dati UNDP, 2016.

³ Nel fragile state index, il Mozambico si situa nella categoria "High warning".

⁴ Dati WB, 2017.

⁵ Dati ILO, 2016

critico, si aggiungono problemi strutturali inerenti la qualità del sistema educativo (Van Der Berg et al., 2017).

Complessivamente, nonostante il Mozambico abbia ratificato la CRPD nel 2012, la discriminazione è ancora comune in materia di occupazione, istruzione, formazione professionale etc. Oltre a questo, le PcD sono spesso ostacolate anche da stereotipi sulle proprie capacità oltre che dalla attitudine discriminatoria e segregante dei fornitori di servizi e dei datori di lavoro (Eide and Kamaleri, 2009).

Allo stesso tempo la società civile mozambicana si dimostra vitale e ricca di risorse. Il movimento delle PcD si è infatti strutturato in modo articolato con una organizzazione-ombrello (FAMOD) che si pone come spazio di coordinamento e concertazione delle azioni delle singole OPD. La presenza di questa struttura ha fornito un supporto decisivo alla ricerca emancipatoria consentendo il coinvolgimento di 3 gruppi di giovani con disabilità a Pemba, Beira e Maputo.

La ricerca emancipatoria: fondamenti teorici

Promuovere uno sviluppo inclusivo significa adottare un approccio che sostenga e salvaguardi i diritti umani, che rispetti e valorizzi l'essere umano promuovendone la piena partecipazione alla società. Una delle componenti centrali dell'inclusione è quindi la partecipazione concreta dei soggetti marginalizzati (o a rischio di marginalizzazione) ai processi decisionali. La RED mira a contribuire al raggiungimento di questo risultato essendo basata sui principi di autopromozione, autodeterminazione ed empowerment. Le PcD divengono infatti ricercatori, cioè produttori di conoscenza sulle proprie vulnerabilità, sulle barriere e sui facilitatori che impediscono\favoriscono una piena ed effettiva partecipazione alla società. Il coinvolgimento in un processo di RED non è solo un percorso individuale ma anche una esperienza collettiva e politica in cui si prende coscienza della propria appartenenza a un gruppo che condivide bisogni, aspirazioni e rivendicazioni. Lo sviluppo della ricerca emancipatoria, in quanto approccio alla ricerca, trova fondamento da una parte nella diffusione delle tecniche e dei metodi di ricerca partecipativa di Chambers (1982) e dall'altro in tutto quel filone di riflessioni e di pratiche che scaturisce dal lavoro di Paulo Freire e Augusto Boal. Il risultato è una forte critica alle dinamiche proprie della ricerca sociale che, partendo da un approccio proprio delle "scienze dure", vedevano una netta separazione tra il ricercatore (dotato dei saperi e del potere necessario a interpretare il fenomeno in questione) e l'oggetto della ricerca (entità per lo più passiva dalla quale ricavare informazioni). La partecipazione si connota quindi sia come pratica di ricerca (tramite l'elaborazione di appositi metodi volti a favorire la creazione di spazi di ascolto, espressione e interazione) che come diritto in sé nonché strumento per la piena realizzazione di altri diritti (Ferguson, 1999). Il lavoro di Paulo

Freire e Augusto Boal è stato per molti versi precursore dello sviluppo dei metodi partecipativi. I primi tentativi di ricerca-azione messi in campo nei quartieri poveri di San Paolo sono stati fonte di grande ispirazione per Chambers. Freire (1996) sottolinea come i poveri, i marginalizzati, gli ultimi abbiano spiccate attitudini analitiche e come siano capaci di metterle in campo nel momento in cui vengono a crearsi le circostanze appropriate. I principi cardine posti da Freire saranno quindi alla base dello sviluppo dei percorsi di ricerca emancipatoria (Kumar, 2002) dove i poveri e i marginalizzati hanno le capacità per analizzare il loro mondo e i loro problemi e i processi emancipatori sono necessari per sviluppare e mettere in pratica queste capacità analitiche. E' necessario lavorare sullo sviluppo di una auto-consapevolezza critica e quanto più si è posti ai margini della società, quanto più si ha il potenziale di essere catalizzatori di un cambiamento. Considerando questo tipo di background, è abbastanza chiaro come ben presto si sia sviluppata l'idea di applicare tali principi e tali pratiche al campo dei cosiddetti Disability Studies. A partire dal lavoro di Oliver (1992), si comincia a parlare di ricerca emancipatoria sulla disabilità come di un percorso di ricerca in cui le PcD e le loro organizzazioni smettono di essere "oggetto" di ricerca e divengono soggetto attivo nella produzione di conoscenza su sé stessi, sul mondo che li circonda e sulle dinamiche sociali economiche e culturali che li marginalizzano. Nel contempo, il ricercatore professionista ricopre un ruolo di supporto tecnico e facilitazione.

La convenzione ONU sui diritti delle PcD (art. 31-33) ha aperto un ulteriore ambito di sviluppo della RED e da ormai diversi anni (Deepak 2012, ARCO & RIDS 2016, Biggeri & Ciani 2019), il mondo della cooperazione allo sviluppo italiano ha dato seguito a quanto descritto sopra adottando sistematicamente la RED come strumento di conoscenza dei contesti e come azione volta al rafforzamento delle capacità delle PcD e delle OPD e all'empowerment a livello individuale. Tale metodologia si è dimostrata essere uno strumento utile in termini di empowerment delle PcD, di protagonismo nel processo di produzione di conoscenze sulla disabilità, di individuazione delle barriere che impediscono la partecipazione su base egualitaria e conseguentemente di identificazione dei reali bisogni.

ARCO, AIFO e RIDS (ARCO, RIDS 2016. *Emancipatory Disability Research – West Bank, Palestine*, Rimini: EducAid) hanno fatto della RED uno strumento decisivo per rafforzare la competenza, la partecipazione attiva e la responsabilizzazione delle PcD e delle organizzazioni che rappresentano nei paesi. Competenza, partecipazione attiva e responsabilizzazione sono elementi essenziali della sostenibilità della CRPD e componenti imprescindibili del principio "Niente su di noi, senza di noi".

Il percorso di ricerca emancipatoria in Mozambico

Coerentemente con quanto previsto dalla metodologia di ricerca emancipatoria, il protocollo di ricerca con la definizione delle attività da svolgere è stato elaborato attraverso il coinvolgimento attivo degli attori identificati. Nello specifico la prima fase si è svolta a giugno 2018, quando i ricercatori di ARCO hanno definito insieme a giovani adulti disabili, rappresentanti dell'IFPELAC e rappresentanti delle principali OPD mozambicane, la prima bozza di protocollo di ricerca. Il percorso di co-creazione del protocollo ha portato alla definizione delle seguenti domande di ricerca:

- La formazione professionale è accessibile per le PcD fisica e sensoriale?
- La formazione professionale per le PcD ha un impatto sul loro accesso all'impiego?
- Quali sono i fattori che impediscono o favoriscono l'inclusione delle PcD nell'impiego e nell'auto-impiego?

Per rispondere a queste domande di ricerca, il gruppo di lavoro ha identificato diversi stakeholder da coinvolgere, in quanto fonti di informazioni, e gli strumenti di ricerca ritenuti più idonei. A marzo 2019 i ricercatori di ARCO hanno effettuato una seconda missione in Mozambico durante la quale hanno effettuato attività di formazione e facilitazione di laboratori con i 3 gruppi di ricerca situati nelle aree di Maputo (21 ricercatori di cui 9 uomini e 12 donne), Beira (20 ricercatori di cui 11 uomini e 9 donne) e Pemba (23 ricercatori di cui 15 uomini e 8 donne). Nello specifico, i ricercatori di ARCO hanno svolto le seguenti attività:

- formazioni ed esercitazioni pratiche sul tema della disabilità coerenti con la CRPD e con l'approccio bio-psico-sociale alla disabilità;
- formazione teorica ed esercitazioni pratiche sul tema della ricerca in generale e sull'utilizzo dei principali strumenti di ricerca (interviste, questionari, Focus Group - FG);
- esercitazioni pratiche all'uso di Excel e altri strumenti di analisi dati.

Le attività formative hanno consentito anche di finalizzare il protocollo di ricerca stabilendo un piano di azione e migliorando gli strumenti di ricerca. Coerentemente con quanto previsto dalla metodologia della ricerca emancipatoria, infatti, era importante che i gruppi di giovani ricercatori si appropriassero profondamente degli strumenti di ricerca, modificandoli secondo le loro intuizioni, interessi e, non ultimo, alla luce della loro approfondita conoscenza del contesto in cui sarebbero stati applicati. Questa operazione ha permesso di arrivare ad una formulazione finale degli strumenti di ricerca molto migliorata rispetto alla versione iniziale.

Un ulteriore obiettivo che si voleva raggiungere attraverso i percorsi con i giovani era quello di creare una prima occasione di incontro per i gruppi di giovani ricercatori e lo staff di supporto della RED (focal point e tutor messi a disposizione da FAMOD). Le attività di gruppo, le esercitazioni in coppia e la condivisione di un percorso intensivo, hanno permesso ai giovani di iniziare a conoscersi e a prendere progressivamente confidenza gli uni con gli altri. Questo ultimo obiettivo non è da considerarsi secondario rispetto agli altri, in quanto la capacità di peer-support, di solidarietà e di incoraggiamento reciproco all'interno dei gruppi di ricerca sono una chiave fondamentale per la realizzazione di un percorso di ricerca emancipatoria efficace.

Riassumendo (Tab.1), dal punto di vista degli strumenti di ricerca, la raccolta dati per la ricerca è stata effettuata attraverso l'utilizzo di 4 strumenti come riassunto nella tabella seguente.

Stakeholder	Strumenti di ricerca	N. di intervistati	Contenuti principali
Imprese private (imprenditori formali e informali)	Questionario strutturato	100 imprenditori (formali/informali) per ogni area	Informazioni generali sull'imprenditore e sull'impresa; Domanda di lavoro presente o potenziale dell'impresa; Propensione all'assunzione di PcD
Centri di formazione professionale (formatori e direttori del centro)	Interviste semi-strutturate	1 direttore per ogni area; Numero formatori variabile a seconda del personale presente nei centri di formazione professionale	Esperienza e Background dell'intervistato; Accessibilità dei corsi e utilizzo di TIC; Esperienza di formazione di PcD; Suggerimenti e proposte per migliorare l'inclusione di PcD nei percorsi di formazione
Giovani con disabilità che hanno frequentato corsi di formazione professionale e giovani che non vi hanno avuto accesso	Focus Group	3 FG con al massimo 15 giovani in ogni area	Conoscenza dell'esistenza dei centri di formazione professionale Esperienze nell'ambito della formazione professionale
Responsabili risorse umane nel settore pubblico/impresе pubbliche	Focus Group	Max. 2 FG con al max. 10 partecipanti	Analisi e presentazione del proprio ente; Attuale assunzione di PcD e propensione a future assunzioni di PcD

Tab. 1. Strumenti di ricerca. Fonte: nostre elaborazioni

La raccolta dati ha avuto luogo tra aprile e giugno 2019. I giovani ricercatori hanno effettuato operativamente la raccolta dati con il supporto logistico dei tutor e dei focal point di FAMOD (altre

PcD di profilo più senior) utilizzando gli strumenti descritti. Ultima fase del processo è stata poi l'analisi dei dati i cui risultati sono riportati nel capitolo successivo.

Una sintesi dei risultati

In questa sezione presenteremo i risultati principali della ricerca. Non è semplice riportare qui in modo esaustivo la ricchezza delle informazioni raccolte. Ci limiteremo quindi a riportare alcuni punti che sono, a nostro avviso, particolarmente rilevanti. Nell'Appendice 1 sono invece presenti informazioni generali sul campione. Complessivamente possiamo affermare che quello che emerge è un quadro complesso e non privo di criticità. Il mondo imprenditoriale appare ancora fortemente timoroso nei confronti di potenziali lavoratori con disabilità e ancora molto lontano dall'offrire opportunità lavorative su base di uguaglianza e non discriminazione. Solo una minoranza delle imprese ha almeno un lavoratore con disabilità (il 16.5%) sebbene non manchino segnali di apertura soprattutto da parte delle aziende più grandi e maggiormente strutturate. A livello generale, la maggioranza degli imprenditori (il 55.74%) si mostra disponibile ad assumere lavoratori con disabilità mentre solo una esigua minoranza mostra una totale chiusura in tal senso. E' interessante notare come la quota di imprenditori che non sono in nessun caso disposti ad assumere una persona con disabilità sia abbastanza costante nelle varie stratificazioni del campione. Le variazioni maggiori si trovano nelle quote di coloro che si dichiarano disponibili ad assumere un lavoratore con disabilità.

Stratificazione del campione		Si (%)	Dipende (%)	No (%)
Campione totale		55.74	37.50	6.76
Area di ricerca	Maputo	64.86	27.93	7.21
	Beira	41.23	50.88	7.89
	Pemba	64.79	30.99	4.23
N° totale di lavoratori per impresa	1-3 lavoratori	57.30	33.71	8.99
	4-6 lavoratori	57.69	37.18	5.13
	7-9 lavoratori	63.33	30.00	6.67
	10-19 lavoratori	59.18	32.65	8.16
	20+ lavoratori	42.00	54.00	4.00
Classi di fatturato (MTZ per mese)	0-5000	58.49	33.96	7.55
	5001-25000	57.14	42.86	0.00
	25001-100000	54.55	36.36	9.09
	100000-500000	55.56	36.11	8.33
	500000+	51.9	40.51	7.59
Settore produttivo	Agricoltura e pesca	45.45	50.00	4.55
	Industria alimentare e bibite	57.89	36.84	5.26
	Settore tessile	71.43	28.57	0.00

Lavorazione del legno/metallo	66.67	28.89	4.44
Ristoranti, hotel e bar	50.00	50.00	0.00
Commercio al dettaglio	56.36	38.18	5.45
Altri servizi	47.27	41.82	10.91
Altri settori	54.81	31.70	13.49

Tab 2. Percentuale di imprese con almeno un lavoratore con disabilità. Fonte: nostre elaborazioni

Quando andiamo ad osservare la situazione più nel dettaglio ossia quando chiediamo la disponibilità ad assumere persone con delle specifiche tipologie di disabilità troviamo una situazione molto diversa (Fig.1). Più del 50% degli imprenditori si dichiara non o poco disposto ad assumere una persona con disabilità visiva (79.05%), difficoltà nel camminare (59.12%), difficoltà nel comunicare (70.27%), difficoltà di memoria e concentrazione (82.09%), difficoltà nella cura di sé (90.2%), difficoltà nello spostare oggetti pesanti (86.83%), difficoltà nei movimenti manuali di precisione (83.45%). Solo il caso di persone albine o di persone con disabilità uditiva trova una reazione relativamente migliore.

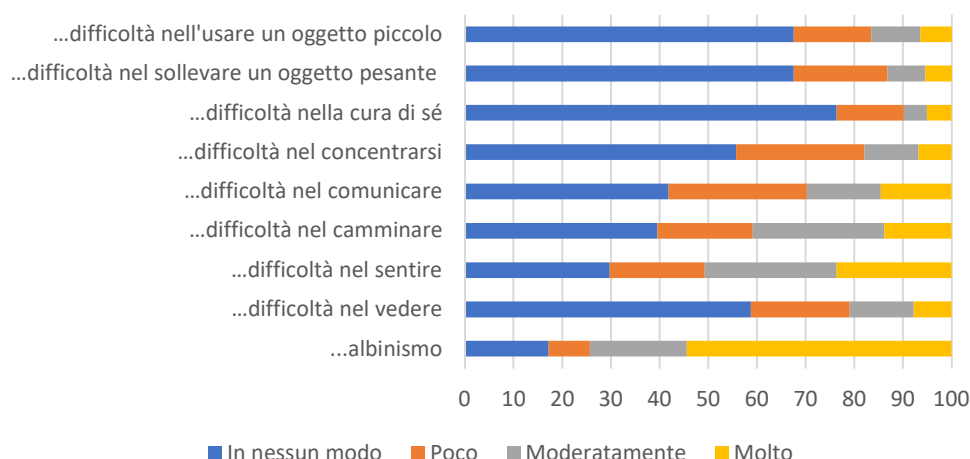


Fig 1. Disponibilità ad assumere lavoratori con varie tipologie di disabilità. Fonte: nostre elaborazioni

Attribuendo un punteggio numerico alle risposte ottenute per le domande sopra indicate possiamo ottenere un punteggio sintetico: si tratterà di un indice compreso tra 0 e 27 dove 0 sarà il punteggio dell'imprenditore che ha risposto in nessun modo in tutti e 9 i casi e 27 il punteggio di chi ha sempre risposto molto.

La media del punteggio nel campione è pari a 8.57 (quindi piuttosto schiacciato su valori bassi). Si osservano valori mediamente più elevati (anche se non radicalmente diversi) per Pemba e mediamente più bassi per Beira (Tab.3). Aziende con un maggior numero di addetti si dichiarano più disposte ad accogliere ,mentre l'entità del fatturato non sembra particolarmente legata al punteggio dell'indice sintetico. Si notano anche differenze di una certa entità a seconda del settore produttivo (con lavorazione di metalli e legname e industria alimentare che mostrano di essere ispettori più "accoglienti").

Stratificazione Campione		Punteggio
Campione totale	Totale	8.57
Area di ricerca	Maputo	8.97
	Beira	7
	Pemba	10.47
N° totale di lavoratori per impresa	1-3 lavoratori	7.04
	4-6 lavoratori	8.65
	7-9 lavoratori	8.8
	10-19 lavoratori	8.65
	20+ lavoratori	9.04
Classi di fatturato (MTZ per mese)	0-5000	8.37
	5001-25000	8.76
	25001-100000	8.84
	100000-500000	8.33
	500000+	8.7
Settore produttivo	Agricoltura e pesca	9.59
	Industria alimentare e bibite	11.31
	Settore tessile	8.57
	Lavorazione del legno/metallo	10.44
	Ristoranti, hotel e bar	7.36
	Commercio al dettaglio	7.48
	Altri servizi	8.01
	Altri settori	8.17

Tab 3. *Disponibilità ad accogliere lavoratori con disabilità: indice sintetico 0-27.*

Fonte: nostre elaborazioni.

Se quindi, scendendo più nel concreto, vediamo come la disponibilità ad assumere una persona con disabilità sia una tematica tutt'altro che scontata, sarà necessario capire quali siano gli ostacoli percepiti come più rilevanti da parte degli imprenditori. Stando a quanto emerso durante il survey (Fig.2) gli ostacoli che con maggiore frequenza vengono percepiti come rilevanti sono la necessità di avere un accompagnamento della persona sul lavoro (i.e. di avere una persona che garantisca una qualche forma di supporto nelle varie fasi di inserimento sul posto di lavoro) e la difficoltà di trovare persone con competenze tecniche e esperienza (i.e. il “saper fare”) adeguate. Al contrario la mancanza di istruzione “formale” è indicata come rilevante da un numero piuttosto limitato di imprenditori: questo potrebbe essere anche indice di una scarsa fiducia nella capacità del sistema educativo di formare al lavoro. La pericolosità di alcune mansioni viene percepita come rilevante da un numero abbastanza importante di imprenditori così come la mancanza di accessibilità del luogo di lavoro. La discriminazione da parte di clienti e colleghi è stata indicata come rilevante o abbastanza rilevante da un numero minore ma non del tutto trascurabile di imprenditori.

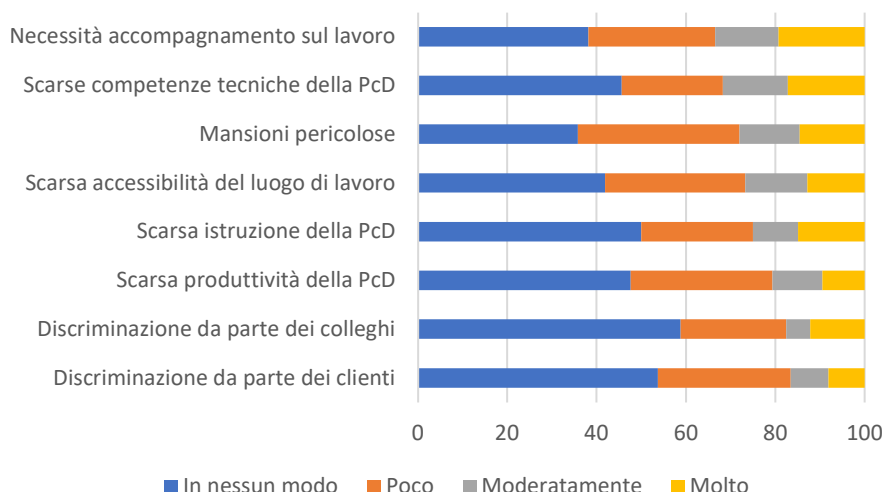


Fig 2. Ostacoli all'assunzione di lavoratori con disabilità secondo le percezioni degli imprenditori
 Fonte: nostre elaborazioni

Oltre all'analisi degli ostacoli e delle barriere, anche quella dei possibili facilitatori in vista dell'assunzione di un lavoratore disabile risulta altrettanto importante. Il seguente grafico (Fig.3) riporta alcuni possibili interventi che dovrebbero\potrebbero favorire l'assunzione. Per ognuno di questi, gli imprenditori hanno indicato il livello di rilevanza ed efficacia da loro percepito. L'erogazione dei contributi per l'adattamento ragionevole della postazione di lavoro è indicata come l'intervento potenzialmente più importante seguito dall'introduzione di nuove tecnologie volte a favorire l'accessibilità e dalla possibilità di poter accogliere lavoratori in periodi di stage e tirocinio. La possibilità di avere sconti fiscali, in modo inatteso, risulta invece essere il tipo di intervento meno rilevante, forse anche a causa dell'elevato tasso di informalità delle imprese (anche tra quelle in possesso del codice NUI - Taxpayer's Single Identification Number).

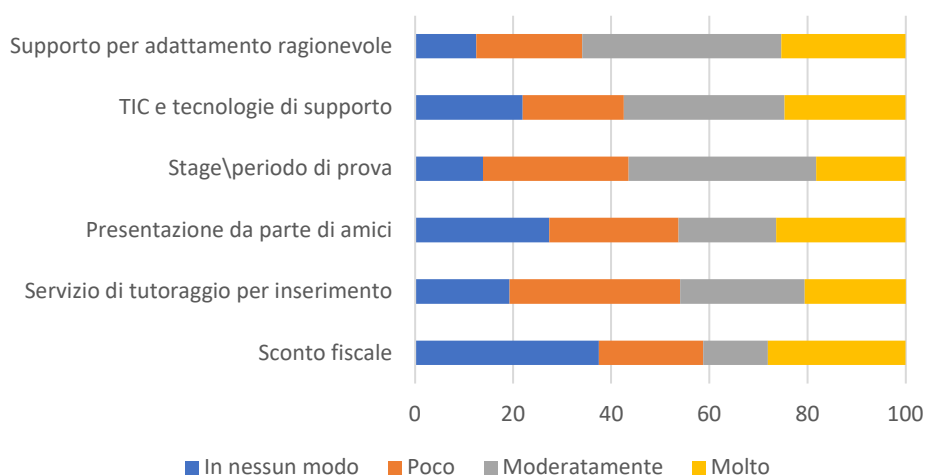


Fig 3. Possibili facilitatori all'assunzione di lavoratori con disabilità secondo le percezioni degli imprenditori. Fonte: nostre elaborazioni.

Le barriere all'inclusione non sono solo di carattere meramente tecnico o economico ma anche culturale. Che l'ostacolo sia anche culturale lo dimostra il fatto che imprenditori che vivono da vicino la disabilità (essendo essi stessi disabili o avendo un familiare prossimo disabile) sono più inclini ad inserire in azienda un lavoratore con disabilità⁶. Questo offre una prospettiva strategica rilevante: la disabilità è infatti parte rilevante delle vite di molti imprenditori. Se infatti soltanto una minoranza degli imprenditori ha una disabilità (5.74%)⁷, più di 8 imprenditori su 10 (esattamente l'84.8%) hanno una relazione prossima con una persona con disabilità. Questo ci porta ad un 87% di imprenditori che hanno una relazione rilevante con una persona disabile o hanno essi stessi una disabilità, o entrambe le cose.

Complessivamente, i risultati sembrano indicare che sia elementi tecnici che elementi di carattere culturale contribuiscono ad ostacolare l'ingresso nel mondo del lavoro delle PcD. Proprio la questione delle barriere culturali è stata sottolineata con nettezza anche dai giovani con disabilità e dallo staff dei centri di formazione coinvolti nella ricerca (nei FG e nelle interviste) e che a più riprese hanno sottolineato la necessità di interventi in tal senso.

Ulteriore fattore sottolineato dai giovani e dallo staff dei centri di formazione è stata il sostanziale scostamento esistente tra il quadro legale-normativo (abbastanza avanzato) e la sua effettiva applicazione sia in ambito formativo che in ambito lavorativo. Questo scollamento è alla base di una generale sfiducia e disillusione nei confronti delle istituzioni pubbliche, soprattutto da parte dei giovani mozambicani con disabilità.

Tale sfiducia non si traduce però in un proporzionale aumento di proattività degli stakeholder. Sia dalle interviste allo staff dei centri IFPELAC che dai FG con i giovani emerge una sostanziale difficoltà a proiettare l'analisi di ciò che non funziona in un progetto di cambiamento (collettivo o personale, propositivo o rivendicativo) che vada aldilà di una generica richiesta di intervento del governo (spesso così definito, senza curarsi di specificare quale sia l'articolazione delle istituzioni governative che dovrebbe intervenire). Ad esempio dai giovani con disabilità non emergono osservazioni tecniche particolari come ad esempio competenze che il sistema formativo non è in grado di rafforzare, opportunità lavorative che per qualche motivo non è possibile cogliere, esempi di buone pratiche etc. Allo stesso tempo, da parte dei formatori emerge una scarsa consapevolezza riguardo quello che dovrebbe essere il ruolo dell'istituzione formativa. Anche prescindendo dalla mancanza di meri dati quantitativi sul numero di studenti con disabilità che frequentano i centri,

⁶ Siamo giunti a queste conclusioni conducendo alcune analisi di regressione tramite l'utilizzo di modelli *logit* e *tobit*. Questo tipo di analisi prende in esame l'effetto contemporaneo delle determinanti (le variabili indipendenti) sugli outcome (o variabili dipendenti)

⁷ Definiamo la disabilità tramite l'utilizzo dello short-set di domande del Washington Group on Disability Statistics (<http://www.washingtongroup-disability.com>).

quello che manca è la consapevolezza della necessità di percorsi individualizzati nei quali si ragioni sulle risorse necessarie e su quelle a disposizione, sugli obiettivi raggiunti e su quelli realisticamente raggiungibili. Un altro dato che emerge costantemente è la mancanza di collegamento tra i vari attori che costituiscono (o dovrebbero costituire) la filiera dell'inserimento lavorativo, ovvero OPD, centri di formazione e imprese. Se da una parte lo stato non riesce a offrire quel quadro di certezza del diritto che sarebbe necessario, dall'altra il mondo del lavoro e quello della formazione professionale appaiono abbastanza scollegati. A esempio i centri di formazione sembrano essere estremamente focalizzati sugli aspetti tecnici della formazione stessa mentre gli imprenditori dichiarano un grande interesse nei confronti delle cosiddette competenze trasversali (capacità relazionale, puntualità, impegno, capacità di lavoro in gruppo, attitudine alla risoluzione dei problemi) che, a livello formativo, sono del tutto trascurate o date per scontate.

Conclusioni

Un primo dato che emerge ripercorrendo il percorso di ricerca emancipatoria è il sostanziale successo dell'attività. Il processo di co-creazione del protocollo di ricerca e di co-design dei relativi strumenti ha portato a identificare un protocollo coerente, rilevante e sostenibile in termini di fattibilità.

I 3 gruppi di lavoro si sono mostrati partecipi in ogni fase della ricerca e, in particolare, al momento della raccolta dei dati. Le analisi svolte ci mostrano come le attività di raccolta dati abbiano rispettato quanto stabilito quanto a quantità e qualità delle informazioni raccolte, nonché in termini di rispetto delle tempistiche. Tale risultato ci conduce a ipotizzare che alle spalle vi sia stata una forte ownership di tutto il processo sia a livello di singoli ricercatori che da parte di FAMOD e delle OPD federate. Possiamo anche notare come i gruppi di lavoro abbiano visto un assoluto protagonismo giovanile con un ottimo bilanciamento di genere. Questo è da considerarsi un ottimo risultato data la difficoltà dei giovani ad emergere come leader anche nell'ambito del movimento delle PcD.

In fase di formazione e co-creazione del protocollo di ricerca molti partecipanti hanno a più riprese sottolineato il loro timore nei confronti dell'attività di raccolta dati. In molti casi il timore era relativo sia al contenuto tecnico (i.e. fare una buona intervista) che al contenuto relazionale (i.e. parlare in pubblico, intervistare una persona di status sociale più elevato). Questi elementi sono stati discussi e affrontati durante la formazione: le esercitazioni hanno consentito di acquisire dimestichezza con gli strumenti e le persone hanno potuto specializzarsi nel tipo di attività nel quale si sentivano maggiormente a proprio agio. Le difficoltà emerse durante la raccolta dati sono state

gestite con efficacia anche grazie al supporto dei tutor delle OPD (appositamente formati durante tutte le tappe del processo di ricerca) i quali hanno facilitato in particolare gli aspetti logistici. La facilitazione dei focus group è stata al contempo l'attività che ha creato maggiori difficoltà e maggior stimoli. Se le interviste con questionario strutturato offrivano infatti un riferimento più rigido e sicuro, la facilitazione del focus group ha costituito una sfida maggiore proprio a causa della flessibilità richiesta ai facilitatori sia nella conduzione della discussione che nella "estrazione" dei risultati. Allo stesso tempo, il coinvolgimento richiesto ha generato un entusiasmo tale che le OPD hanno continuato a organizzare gruppi di discussione anche dopo la fine della raccolta dati relativa alla ricerca.

Un'altra nota sicuramente positiva di questa ricerca è stato il coinvolgimento di molteplici tipologie di attori: centri di ricerca, ONG internazionali, OPD, AICS, istituzioni pubbliche quali INE e IFPELAC hanno collaborato attivamente alla realizzazione della ricerca. Ancora più numerose le entità che, a vario titolo, hanno contribuito all'elaborazione del protocollo di ricerca.

Detto questo la ricerca non è priva di limiti. Quello più rilevante è che è una ricerca che si è focalizzata su aree urbane in un paese che è ancora in gran parte rurale. Allo stesso modo la ricerca si è limitata alle zone della costa (Pemba, Maputo e Beira sono tre città costiere) in un paese che ha vaste aree interne. Questi sono limiti da tenere ben presenti mentre si leggono queste conclusioni e le relative raccomandazioni dato che ne circoscrivono la generalizzabilità. Future analisi potranno colmare questo gap.

Provando a sintetizzare i risultati, la partecipazione al lavoro delle PcD è ancora scarsa e coinvolge una minoranza delle imprese. L'attitudine nei confronti di potenziali lavoratori con disabilità è caratterizzata da una complessiva diffidenza che colpisce soprattutto (ma non solo) le disabilità cognitive e psico-sociali. Tale diffidenza risulta essere legata a molteplici fattori tra i quali la mancanza di competenze ed esperienza lavorativa. D'altra parte le competenze richieste dalle imprese non sono solo di carattere tecnico ma anche trasversali (legate cioè a capacità relazionali e attitudinali). Inoltre la disponibilità ad assumere PcD sembra legata da un lato alla conoscenza della disabilità (vissuta in prima persona o nella relazione con un familiare) oltre che alle dimensioni e alla "robustezza dell'impresa stessa"

Prendendo in considerazione il punto di vista dei giovani con disabilità coinvolti nei FG e il personale dei centri di formazione IFPELAC intervistati è possibile fornire un punto di vista differente della questione. I giovani hanno avuto l'opportunità di condividere le proprie esperienze, di descrivere gli ostacoli incontrati e di proporre strategie di miglioramento sia per quanto riguarda il sistema di formazione professionale che i processi di inserimento nel mondo del lavoro. D'altra parte le interviste ai direttori e agli insegnanti dei centri di formazione hanno descritto un quadro

abbastanza chiaro dell'accessibilità dei centri di formazione, della formazione degli insegnanti sul tema disabilità e dell'inclusione delle PcD nei corsi di formazione, oltre che esplicitare strategie possibili per i singoli attori coinvolti.

L'analisi congiunta dei risultati ottenuti ha permesso di identificare alcuni elementi di riflessione e proposta che attengono alla necessità (i) di migliorare l'accessibilità dei centri, (ii) di investire sulla formazione degli insegnanti, (iii) di rafforzare il rapporto con le imprese e i datori di lavoro in modo da poter creare continuità tra l'esperienza formativa e quella professionale e (iv) di valorizzare il ruolo decisivo del governo (e, più in generale, delle istituzioni pubbliche) nel promuovere campagne di sensibilizzazione, politiche inclusive e leggi che garantiscano il diritto all'accesso alla formazione e al lavoro per i giovani con disabilità. Quest'ultimo punto è particolarmente rilevante: la presenza delle istituzioni è infatti debole e la distanza tra il quadro normativo e la sua effettiva applicazione genera una complessiva sfiducia nel ruolo del pubblico. Lavorare sull'inclusività a livello istituzionale avrebbe dunque il duplice scopo di migliorare la qualità della vita delle persone con disabilità e di rafforzare il quadro istituzionale nel suo complesso.

In questo quadro così eterogeneo e dinamico nella sua complessità, esistono diverse possibili strategie. Interventi formativi e infrastrutturali sui centri di formazione sono sicuramente necessari così come auspicabili sono interventi di carattere culturale e di adattamento ambientale sulle aziende. È poi essenziale colmare il gap esistente tra il quadro legale e la sua applicazione. A fianco di tutto questo sono però necessarie azioni di sistema volte cioè a “cucire” l'azione dei vari attori: pensiamo alla strutturazione di percorsi di inserimento lavorativo integrati basati sulle fasi di scouting (identificazione delle aziende “accoglienti”), formazione, matching (incontro tra domanda e offerta di lavoro), coaching e tutoring (accompagnamento del giovane lavoratore con disabilità e suo affiancamento in azienda).

Per concludere, stiamo parlando di un fenomeno e di un contesto evidentemente complessi. Molte sono le sfide da affrontare e moltissime le incognite. Quello che però è chiaro è che qualsiasi tipo di intervento non può prescindere dall'ascolto delle voci degli attori interessati (primi fra tutti i giovani con disabilità): la ricerca emancipatoria ha dimostrato di essere uno strumento valido per muoversi in questa direzione.

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Acronimi

Aics	Agenzia Italiana per la Cooperazione allo Sviluppo
Aifo	Associazione Italia Amici di Raoul Follereau
Arco	Action Research for CO-Development
Crpd	Convention on the Rights of Persons with Disabilities
Famod	Forum delle Associazioni Mozambicane di Persone con Disabilità
Fg	Focus Group
Ifpelac	Instituto de Formação Profissional e Estudos Laborais Alberto Cassimo
Ilo	International Labour Organization
Ine	Istituto Nazionale di Statistica
Iscos	Istituto Sindacale per la Cooperazione allo Sviluppo
Opd	Organizzazioni di Persone con Disabilità

Pcd	Persone con Disabilità
Red	Ricerca Emancipatoria sulla Disabilità
Rids	Rete Italiana Disabilità e Sviluppo

Appendice. Informazioni generali sul campione di imprese coinvolte nella ricerca

I gruppi di lavoro hanno complessivamente raggiunto gli obiettivi che erano stati posti (relativamente all'inchiesta con gli imprenditori) intervistando un totale di 296 imprenditori (111 a Maputo, 114 a Beira e 71 a Pemba).

Uno degli aspetti dei rischi più rilevanti dell'inchiesta era costituito dalla necessità di evitare una eccessiva presenza di imprese unipersonali informali dato che queste costituiscono una fonte di sostentamento per l'imprenditore ma spesso non hanno un potenziale di sviluppo tale da considerarle generatrici di opportunità di lavoro per altri. Proprio per questo è stato sviluppato un piano di campionamento stratificato che, partendo dai pesi derivati dal *Survey of Mozambican Manufacturing Firms* sovra-campionasse le imprese di maggiori dimensioni. La seguente tabella riporta la numerosità degli strati del campione (normalizzata a 100). Come vedremo, anche per quanto riguarda il campionamento, i ricercatori sono riusciti a rispettare quanto stabilito in fase di redazione del protocollo di ricerca.

	Tipologia	N°	di cui con codice NUIT
Pianificato	<= 9 lavoratori	70	27
	>10 lavoratori	30	30
Realizzato	<= 9 lavoratori	67	31
	>10 lavoratori	33	28

Tab A1.1. Criteri di campionamento: piano vs realizzazione. Fonte: nostre elaborazioni.

Gli imprenditori intervistati sono in larga parte mozambicani (95.94%) e maschi (70.27%). L'età media degli imprenditori è di 40 anni (42 per Maputo e Pemba e 37 per Beira). Come era logico aspettarsi il livello di istruzione degli intervistati è significativamente maggiore rispetto alla media nazionale⁸ e più alto tra le imprenditrici che tra gli imprenditori.

Livello di Istruzione completato	M	F	Totale
Nessuno	1.44	1.14	1.35
Primario	10.58	6.82	9.46

⁸ Comparando con dati WB (2017) possiamo vedere, ad esempio, come la percentuale di popolazione over 25 con livello di istruzione secondario (2° ciclo) sia dell'8.68% (ben al di sotto del 23.99% del nostro campione).

Secondario (1° Ciclo)	27.40	14.77	23.65
Secondario (2° Ciclo)	21.15	15.91	19.59
Superiore (12a classe)	24.04	23.86	23.99
Laurea	10.10	26.14	14.86
Altro	5.29	11.36	7.09

Tab A1.2. Livello di istruzione. Fonte: nostre elaborazioni.

Soltanto una minoranza degli imprenditori ha una disabilità (5.74%)⁹ mentre più di 8 imprenditori su 10 (esattamente l'84.8%) hanno una relazione prossima con una persona con disabilità (come riportato nella tabella 5.2). Questo ci porta ad un 87% di imprenditori che hanno una relazione rilevante con una persona disabile, hanno essi stessi una disabilità, o entrambe le cose. In altre parole, questi dati ci mostrano come la disabilità sia parte rilevante delle vite degli imprenditori.

Tipologia di relazione	(%)
Genitore o fratello con disabilità	16.55
Partner o figlio\figlia con disabilità	5.41
Altro familiare con disabilità	25.68
Amico con disabilità	29.73
Volontariato con PcD	3.38
Altro	4.39
Nessuna relazione	14.86

Tab A1.3. Relazioni tra imprenditore e persone con disabilità Fonte: nostre elaborazioni.

Nella maggioranza dei casi l'intervistato è il proprietario o uno dei proprietari (71.96%) mentre in un 15% dei casi gli intervistatori hanno interloquuto con un manager che però non era anche proprietario dell'azienda. Per più di 8 imprenditori su 10 (83.45%) l'impresa costituisce la principale fonte di reddito.

Spostando la nostra attenzione dagli imprenditori alle imprese, possiamo innanzi tutto notare che si tratta di imprese piuttosto giovani (il 50% delle imprese ha meno di dieci anni). Il seguente grafico mostra come l'inchiesta sia riuscita a coprire un vasto numero di settori. Come era lecito aspettarsi il settore agricolo è poco rappresentato dato che la ricerca si concentra su tre aree urbane. Il settore dei servizi è di gran lunga quello più rappresentato. La categoria "Altri servizi" comprende principalmente servizi alla persona (ex. parrucchieri e saloni di bellezza). E' interessante notare come l'artigianato costituisca una parte rilevante del nostro campione (fabbri, falegnami, sarti, produzione di generi alimentari) così come il settore della ristorazione. Non si denotano differenze rilevanti tra le tre città oggetto dell'inchiesta.

⁹ Definiamo la disabilità tramite l'utilizzo dello short-set di domande del Washington Group on Disability Statistics (<http://www.washingtongroup-disability.com/>).



Fig. A1.1. Settore prevalente in cui opera l'impresa. Fonte: nostre elaborazioni

Le imprese oggetto di questa indagine statistica differiscono notevolmente per quanto riguarda le dimensioni (qui approssimate dal numero di addetti). La seguente tabella ci mostra un numero medio di addetti pari a 25.3 anche se la maggior parte delle imprese si colloca nelle categorie 1-3 o 4-6 lavoratori (che rappresentano rispettivamente il 30.07% e il 26.35% del campione). L'utilizzo di lavoro part-time o occasionale è molto più diffuso nelle imprese piccole mentre ben il 92.5% dei lavoratori nelle grandi imprese (quelle con più di 20 addetti) è a tempo pieno.

N° lavoratori (cat)	%	Totali	...di cui full-time	
			N°	(%)
1-3 lavoratori	30.07%	2.35	1.06	44.98%
4-6 lavoratori	26.35%	4.83	2.56	53.05%
7-9 lavoratori	10.14%	7.87	4.00	50.85%
10-19 lavoratori	16.55%	13.82	8.78	63.52%
20+ lavoratori	16.89%	120.32	111.00	92.25%
Totale campione	100%	25.39	21.60	85.08%

Tab A1.4. Dimensioni dell'impresa e tipologia di lavoratori Fonte: nostre elaborazioni.

Il 60.14% delle imprese possiede un codice NUIT¹⁰ ed è quindi definibile come impresa formale (in conformità ai criteri adottati dall'INE, l'istituto nazionale di statistica mozambicano). Ovviamente la percentuale di imprese formali è inversamente proporzionale alle dimensioni dell'impresa stessa: solo l'8% delle imprese con 20 o più addetti sono privi di codice NUIT contro il 57.3% di quelle con 1-3 lavoratori.

Un altro indicatore della dimensione dell'impresa è il fatturato. Ovviamente il fatturato è un dato sensibile e, in quanto tale, soggetto a errate dichiarazioni (di solito sottostima). Il dato che riportiamo nella tabella di seguito deriva dal dato grezzo (i.e. quello riportato dall'intervistato) sottoposto a una procedura di

¹⁰ Il codice NUIT è il Numero Unico di Identificazione Tributaria delle imprese in Mozambico.

imputazione che ha tenuto conto di altre variabili (ex. collocazione geografica, settore etc.)¹¹. Il campione è costituito da imprese che presentano livelli di fatturato estremamente diversi con una dispersione attorno alla media piuttosto ampia e una coda destra della distribuzione molto lunga (ben il 26% delle imprese si trova nella categoria 500000 o più). Come atteso, i dati ci mostrano che imprese con un fatturato maggiore tendono ad avere un maggior numero di addetti e un maggiore grado di formalità.

Categorie di fatturato (MTZ per mese)	%	N° medio addetti	% con codice NUIT
0-5000	35.81	8.339623	50.00
5000-25000	14.19	9.261905	52.38
25000-100000	11.15	14.87879	78.79
100000-500000	12.16	16.61111	50.00
500000+	26.69	65.22785	74.68

Tab A1.5. Dimensioni dell'impresa e tipologia di lavoratori Fonte: nostre elaborazioni

¹¹ Più specificamente, è stata utilizzata la procedura *m.i.c.e.* (*multiple imputations by chained equations*) del software di analisi statistica Stata 14 (Royston and White, 2011).

PAEDIATRIC SURGERY AND INTERNATIONAL COOPERATION: CASE STUDY AT MALINDI SUBCOUNTY HOSPITAL, KENYA

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Abstract

The present study analyses the characteristics and needs of surgical practice in the paediatric population of Malindi Subcounty Hospital, Kenya. The non-interventional observational retrospective study was conducted on 1019 patients from 0 to 18 years (including 29 new-borns) hospitalized from 1/3/2017 to 24/5/2019. The distribution of surgical diagnoses, the incidence of septic surgery (14.5%), the use of anesthesia (general 56%, spinal 28%, local / sedation 16%), the length of hospital stays (10.2 days on average, range 1-121 days), mortality (1.27%) and its causes were analysed. The study was integrated with a perspective narrative part carried out through interviews with the hospital staff regarding the referring system, the availability of surgical instruments, the hygienic conditions, the costs incurred by the patients, the hypothetical improvements. Our data highlight a profound connection between paediatric surgery and society, as many surgical indications are the earliest signs of poverty and bad habits. In addition, many accesses to the operating room are due to septic surgery. Too high a number of caesarean sections still emerge in adolescents, denouncing unwanted pregnancies and obsolete obstetric practices. The staff, in the interviews, demonstrates a good understanding of possible solutions. Africa needs sustainable development strategies: the health of children, including those suffering from surgical diseases, is one of the essential keys.

Il presente studio analizza le caratteristiche e le necessità della pratica chirurgica nella popolazione pediatrica del Malindi Subcounty Hospital, in Kenya. Lo studio, retrospettivo osservazionale non interventistico, è stato condotto su 1019 pazienti da 0 a 18 anni (di cui 29 neonati) ricoverati dal 1/3/2017 al 24/5/2019. Sono state analizzate la distribuzione delle diagnosi chirurgiche, l'incidenza di chirurgia settica (14,5%), l'utilizzo dell'anestesia (generale 56%, spinale 28%, locale/sedazione 16%), la durata delle degenze (10,2 giorni in media, range 1-121 giorni), la mortalità (1,27%) e le sue cause. Lo studio è stato integrato con una parte narrativa prospettica realizzata mediante interviste con lo staff dell'ospedale in merito al sistema di riferimento, alla disponibilità di strumentazione chirurgica, alle condizioni igieniche, ai costi sostenuti dai pazienti, ai miglioramenti ipotizzabili. I dati evidenziano una profonda connessione tra la chirurgia pediatrica e la società, in quanto molte indicazioni chirurgiche sono i primissimi segnali di povertà e di scorrette abitudini. In più, tanti accessi in sala operatoria sono dovuti a chirurgia settica. Emerge ancora un numero troppo alto di tagli cesarei in adolescenti, che denuncia gravidanze indesiderate e pratiche ostetriche obsolete. Lo staff, nelle interviste, dimostra una buona comprensione delle possibili soluzioni. L'Africa necessita di strategie di sviluppo sostenibili: la salute dei bambini anche di quelli affetti da patologie chirurgiche ne è una delle chiavi essenziali.

Keywords

Paediatric Surgery, Kenya, Students' cooperation, International cooperation

Introduction

Africa has a large burden of unmet surgical needs in children (Lawal 2019); Eastern Africa counts on only one paediatric surgeon every 7.000.000 inhabitants (Derbew 2019), 39% of them < 14 years of age (World Factbook Website), entailing a ratio of 1 paediatric surgeon every 2.700.000 children, while in Europe there is 1 paediatric surgeon every 26.000 children < 14 years of age (Parigi 2018), a density more than a hundred times higher. Demographic and epidemiological studies on paediatric surgical needs in Africa are awfully scanty as well: out of the 33.602 quotes in Medline of the keyword “paediatric surgery”, just 354 (0,01 %) are linked also with the keyword “Africa” (Medline website).

There is therefore a strong need to fill this unbearable gap, also with epidemiological studies within limited reach: this observation prompted us to carry on an analysis of the paediatric surgical activities at the Malindi Subcounty Hospital (Msh), in Kenya. *Primary endpoint* of the study will therefore be a detailed quantification of the pediatric surgical pathologies observed, together with treatment adopted and results achieved; *secondary endpoint* the analysis of some ancillary aspects in the description of pediatric surgical problems in Malindi and the formulation of a set of recommendations for the planning of future cooperation projects in this field.

Materials and methods

Msh is located in the former Coast province of Kenya, today in Kilifi county, having an area of 12.245 Km² and a population of 1.453.787 inhabitants (website), 567.000 of them (39%) below 14 years of age. Its catchment area includes the communities of Malindi, Watamu, Marereni, Balala, Chakama, Garsen, Marafa, Kijanaheri, Langobaya, Sabaki. The hospital has 230 beds, of which 44 + 8 cots in the Paediatric Ward (PW). Hospital employees are 300 in total, of whom 9 are specialised doctors and 16 general medical doctors.

Primary endpoint was studied through a retrospective cross-sectional non-interventional study on pediatric surgical activities at Msh from 1/3/2017 to 24/5/2019. Enrolled in the study were all patients admitted in PW (≤ 12 years of age) with a surgical diagnosis – both those undergoing surgery and those treated conservatively - and all patients 13 to 18 years of age undergoing surgery. Data were collected from clinical reports from Operating room (OR) and PW; they included sex, age, diagnosis, emergency/cold case, date of the operation, procedure performed, category (major/minor), specialty surgery group (general surgery, Ear Nose and Throat –Ent –, Obstetrics and Gynaecology – O&G -, etc.), type of anesthesia, incidence of postoperative sepsis, length of stay (Los), postoperative conditions, final outcome. Due to the lack of a uniform method of

diagnosis codification and registration, all diverse ways adopted to formulate diagnoses were standardized according to the ICD-10-CM classification, 2016 version.

Secondary endpoint was analysed through interviews with the hospital staff on actual status and possible improvements about: 1) How the referring system works and which pathologies cannot be treated in Malindi; 2) Availability of surgical instruments and hygiene conditions in the OR; 3) Anesthesia issues; 4) Costs to be paid by surgical patients.

Due to the typical qualitative value of the narrative prospective study devoted to the secondary endpoint, not attributable to numerical or tabular evaluations, what gathered from the interviews will be summarized directly in the Discussion.

Results

In total 1019 patients were enrolled: 859 from the PW (≤ 12 years), 231 operated upon (26,9%) and 628 treated conservatively (73,1%), and 160 from the OR (13 to 18 years), all of them by definition undergoing surgery. Age range went therefore from birth to 18 years, with an average of 6,3 years

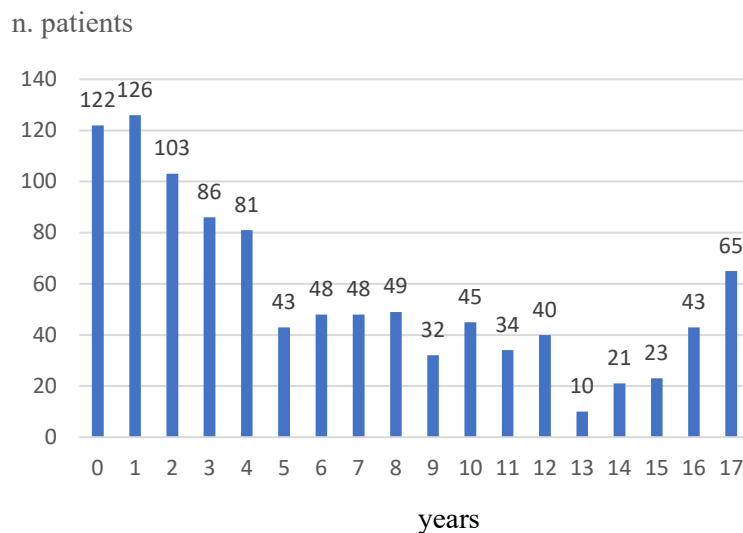


Fig. 1. Study population age distribution

(5,1 M; 7,6 F); out of the 122 patients below 1 year of age, 29 were neonates. Age distribution of the study population is presented in fig. 1.

In the age group ≤ 12 years M:F ratio is 2:1, while in the age group 13 to 18 years M:F ratio is 1:4,6. This difference can be easily explained with the high number of O&G procedures needed in female age group (tab. 1).

Age	M	F	not registered	Total
0 days to 1 month	13	16		29
1 month to 1 year	60	32	1	93
1 to 12 years	488	246	3	737
13 to 18 years	37	123		160
Total	598	417	4	1019

Tab. 1. Study population sex stratified by age

13 out of the 1019 patients died (see later); 13 (1,3%) were discharged upon request during treatment; 27 (2,6%) were referred to other hospitals; 799 (78,4%) had a successful recovery, while for the remainder no data are recorded.

Indications for surgery

231 children ≤ 12 years underwent surgery (157 M, 74 F), the 6,7% of the 3.440 operations performed in total during the studied period. Of these, 143 were major procedures (61,9%), 88 minor (38,1%); 126 cold cases (54,5%), 105 emergency cases (45,5%); breakdown of surgical procedures performed is presented in tab. 2. Under “miscellaneous” are listed, among others: Injury of urinary and pelvic organs, Urethral stricture, Child abuse, Fistulae involving female genital tract, Myositis, Pilonidal cyst and sinus, Polyps of female genital tract; of particular interest are the bleeding problems secondary to traditional uvulectomy, especially in children < 3 years. 7 of the 231 patients were infants from 2 to 11 months of age, operated for abscess drainage (4 cases), post uvulectomy bleeding, phimosis and inguinal hernia. No intraoperative deaths were recorded.

Operation type	#
Adenotonsillectomy	38
Traumatic cut wound suture	30
Herniotomy and hydrocelectomy	29
Ingested foreign bodies removal	20
Fracture surgical fixation	19
Abscess incision and drainage	16
Orchidopexis	10
Thoracic drainage (pleural effusion and pneumothorax)	10

Circumcision	9
Pyogenic arthritis drainage	8
Appendectomy	6
Neoplasms (benign and malignant) biopsy/removal	6
Hypospadias correction	4
Explorative laparotomy for intestinal obstruction	3
miscellaneous	23
TOTAL	231

Tab. 2. Surgical indications in patients ≤ 12 years

628 children ≤ 12 years of age admitted in the PW with a surgical diagnosis were treated conservatively, either because no slot available in the OR, or because of too many patients or no surgeon available or too long waiting list; conservative treatment was also adopted as a temporary measure while waiting for a referral in a third level centre for particularly complex surgical pathologies (27 cases). Breakdown of surgical specialty groups treated conservatively is presented in fig. 2.

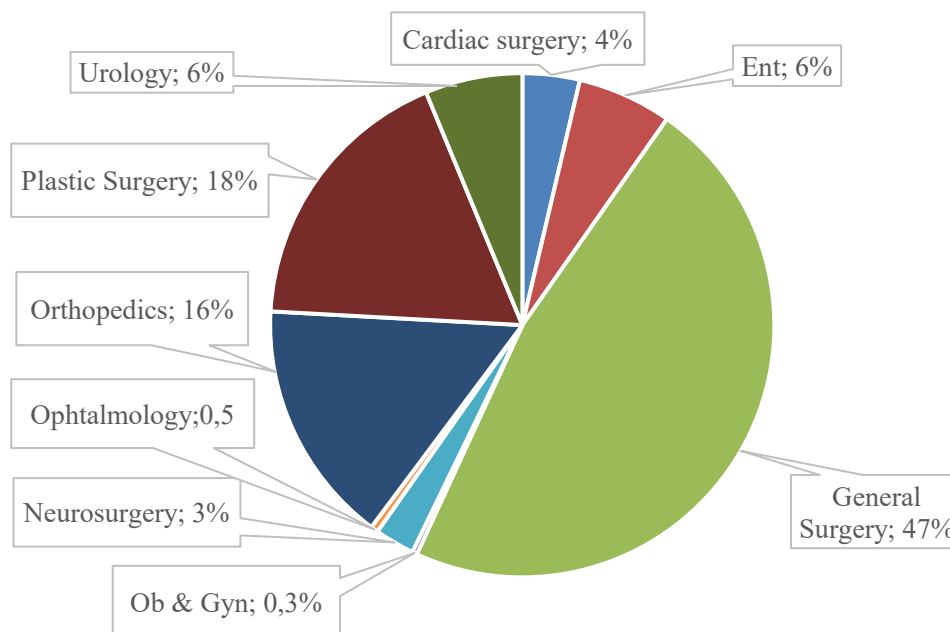


Fig. 2. Conservative treatment in patients ≤ 12 years of age per specialty group

“General Surgery” group includes, in decreasing frequency order: abscesses, other local infections of skin and subcutaneous tissue, hydrocele, inguinal hernia, injury of unspecified body region, paralytic ileus and intestinal obstruction without hernia, superficial injury of head, toxic effect of contact with venomous animals.

“Plastic surgery” group refers exclusively to burns, an accident related to the presence of an open fire in every hut, usually in the middle of it.

“Cardiac surgery” group applies to children with non-specified cardiac pathologies, usually admitted to the PW with a congestive heart failure, diagnosed through chest X-Ray or simple clinical evaluation, treated in acute condition but afterwards suggested to refer to Nairobi to get proper surgery, not having Msh a paediatric cardiologist, let alone a cardiac surgeon. Unfortunately, this suggestion is usually disregarded due to the unbearable involved costs.

Other specialties involved in the daily routine of conservative treatment are: orthopaedics (fracture of femur, pyogenic arthritis); urology (undescended testis); Ent (stomatitis and related lesions, foreign body in alimentary tract, chronic diseases of tonsils and adenoids); ophthalmology (chalazion, anophtalmos, disorders of the globe).

In the 160 patients 13-18 years of age operated upon (37 M, 123 F), emergency operations are by far more common than cold cases (134 vs 26; 83,7% vs 16,3%), as well as Major vs Minor operations (118 vs 42; 73,7% vs 26,3%). Actually, in this age group the most represented operation is caesarean section (C-section - 77 cases equal to 62,6% of the total). More in detail, 5 of these girls were 14 years old, 8 of 15, 21 of 16 and 43 of 17. One girl aged 15 died during the procedure. Out of the 123 female patients, 106 (86,2%) entered OR with an O&G indication (fig. 3).

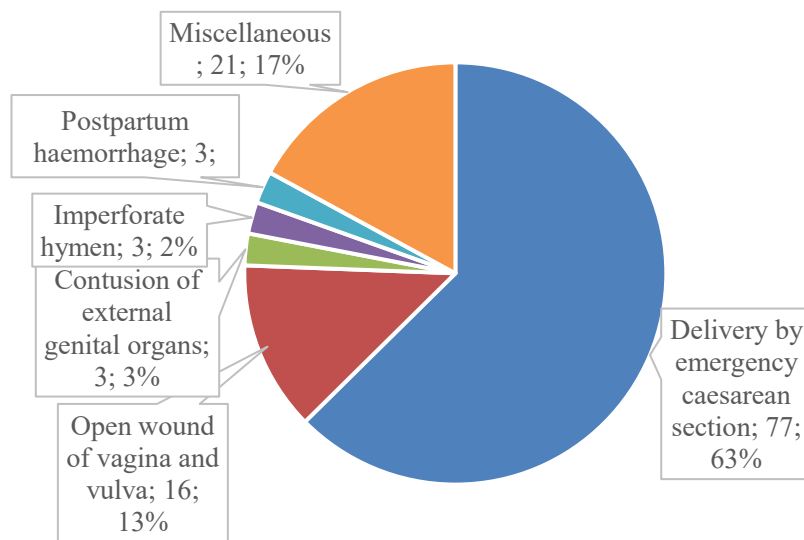


Fig. 3. Female patients 13-18 years: indications for surgery

Summing up all data related to the 391 children 0-18 years of age operated upon, it becomes possible to quantify the relative need of each surgical specialty, stratifying the differences among patients in terms of age groups and sex.

Operations performed in males from 0 to 18 years belong to General Surgery in more than half of cases (mainly inguinal hernia, hydrocele, acute appendicitis), then to Ent (mainly

adenotonsillectomy and removal of foreign body in the alimentary tract – being kids rarely under supervision, it is rather common to find coins or other objects in their oesophagus), to Urology (undescended testis, disorders of prepuce, hypospadias) and to Orthopaedics (traumatic fractures and pyogenic arthritis).

On the other hand, in females 0 to 18 years old a huge part of surgical indications is represented by O&G issues, mainly emergency C-sections. Another 13% of the surgical indications in this group is due to an open wound of vagina and vulva: it is uncommon to have a specified cause on the clinical chart, but one main option is sexual abuse. General surgery indications do not exceed 17% (abscess incision and drainage) and equal those of Ent (mainly adenotonsillectomy). Orthopaedics issues (pyogenic arthritis and traumatic fractures) are the least common problem; in particular, fractures in females are half of those in males, because girls are encouraged to stay at home helping mums in housework, while boys more commonly go out either to play or to do small jobs. Older boys drive motorbikes with no helmet, no licence and unclear traffic laws. Fig. 4 and 5 emphasise the differences among boys' and girls' surgical indications.

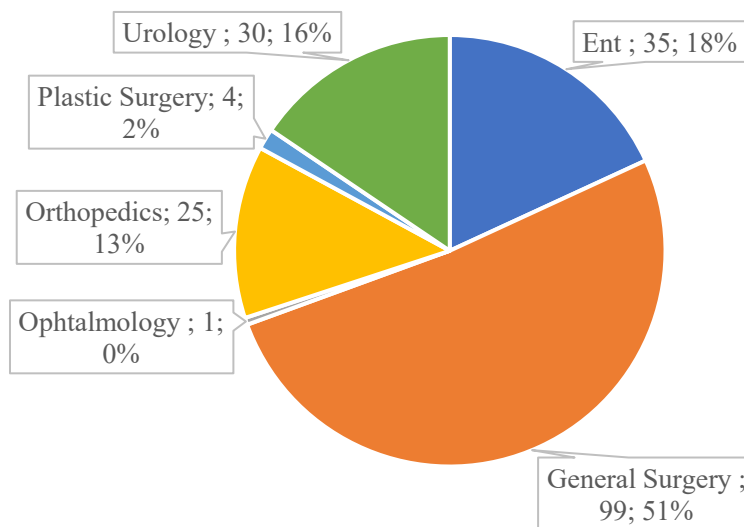


Fig. 4. Male population 0-18 years. Indications per surgical specialty group

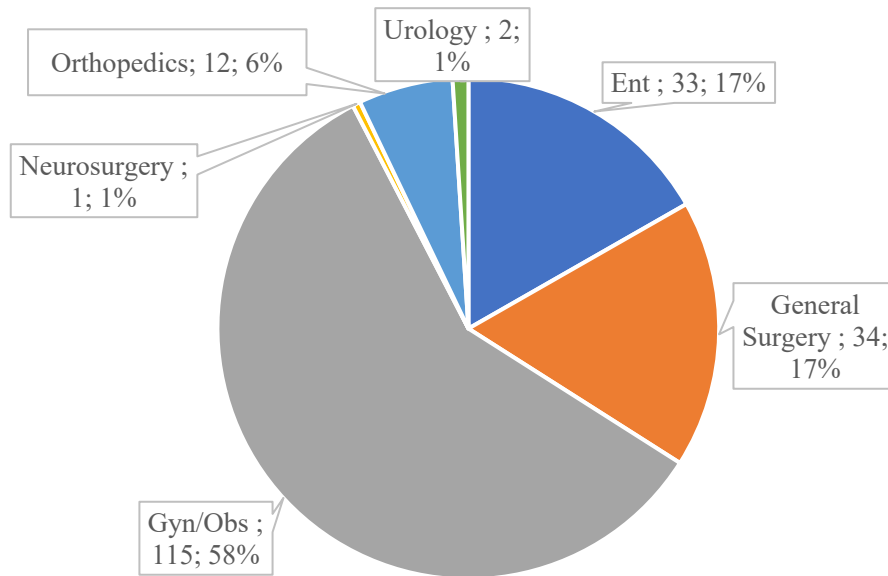


Fig. 5. Female population 0-18 years. Indications per surgical specialty group.

Septic surgery

Out of the 391 operations studied, 57 (14,5%) recognised a septic indication, with a major role of abscess incision and drainage. Other common septic surgery turned out to be preputial strictures following repeated local infections and needing a circumcision; drainage of pleural effusion (not better specified); drainage of pyogenic arthritis.

Anesthesia issues

In Msh available types of anesthesia are: General anesthesia (GA), Epidural and Spinal Anesthesia (SA), Local Anesthesia (LA) and sedation. GA is performed through ketamine, diazepam and muscle relaxation drugs; intubation is indicated for all surgeries above the waist and for all children ≤ 12 . Fig. 6 gives details on the utilisation of the various types of anesthesia.

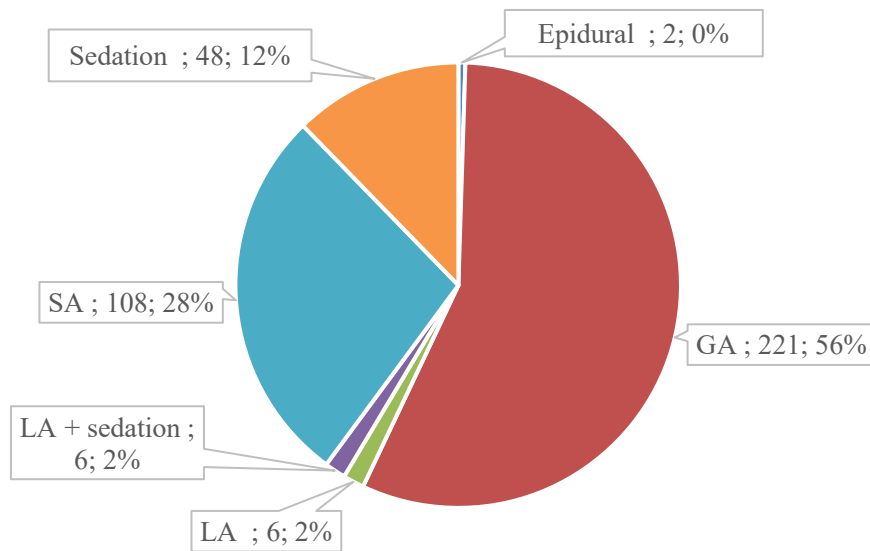


Fig. 6. Types of anesthesia utilized

Fig. 7 gives details on the type of anesthesia utilized according to the surgical intervention (major/minor). On a total of 391 operations, including 263 major and 128 minor procedures, GA is used 221 times, turning out to be the most used type of anesthesia in any kind of surgery. Spinal anesthesia is the second most used anesthesia for major procedures, while sedation is the second most used technique in minor procedures.

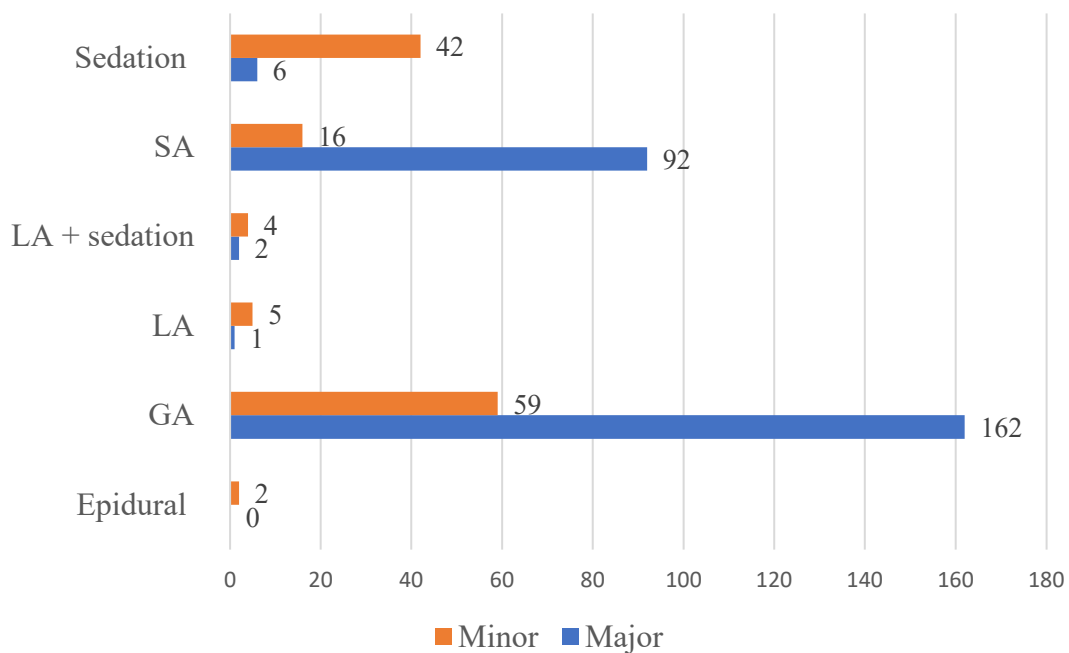


Fig. 7. Types of anesthesia utilised according to the surgical intervention.

On a total of 239 Emergency procedures (60,8% of the total number of operations performed), 145 are targeted as major and 94 as minor. Overall GA is the most applied type of anesthesia, while considering only major emergency procedures the most utilized becomes SA (75 cases), strictly followed by GA (63). Conversely, among the minor emergency procedures, GA is the most used, with a noticeable number of cases managed through sedation.

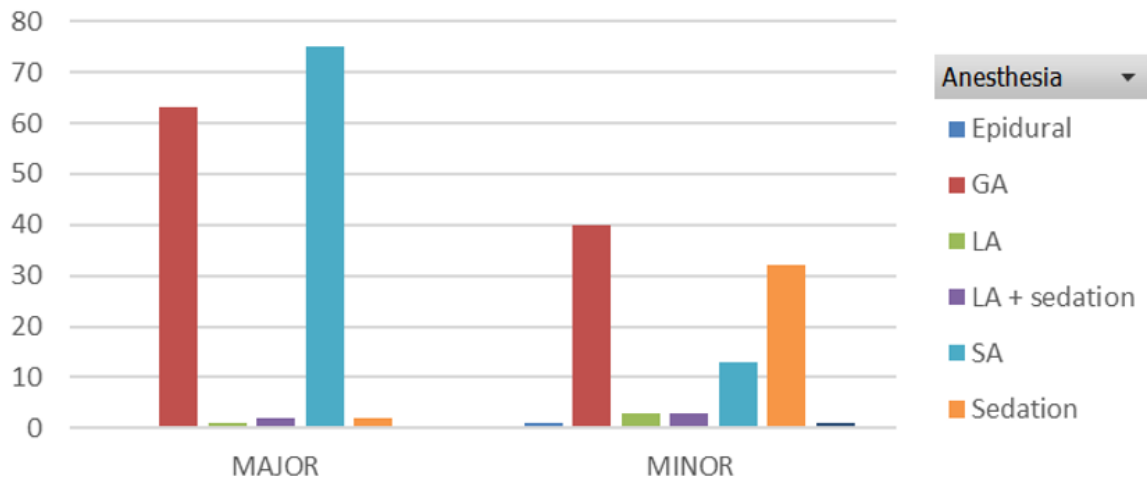


Fig. 8. Types of anesthesia utilised in Emergency procedures

On a total of 145 elective procedures, 115 are targeted as major and 30 as minor; GA is the most used anesthesia in both groups (112 cases - fig. 9).

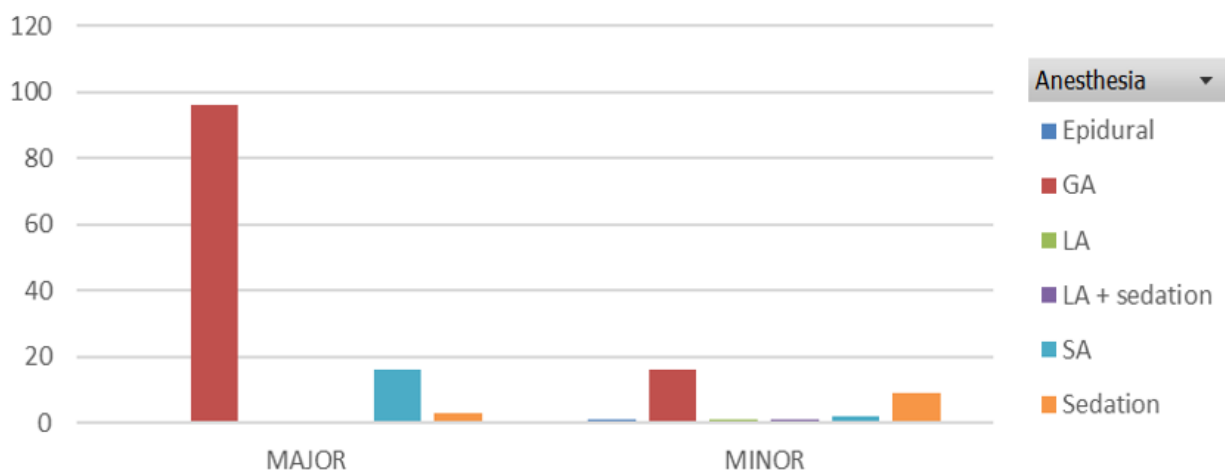


Fig. 9. Types of anesthesia utilised in elective surgery.

Length of hospital stay

The hospitalization length in the study period ranges from a minimum of 1 day to a maximum of 121 days (tab.3). The longest hospital stays are required for patients with severe burns, but also for orthopaedic issues. On top of that, patients often occupy a bed while waiting for the surgery to be done or while doing physiotherapy after it.

Type of treatment	Ent	General Surgery	O&G	Orthopaedics	Plastic surgery	Urology	Average
Surgical treatment - Major	3,6	7	6	16,9	-	12,7	9,1
Surgical treatment - Minor	2,2	12,7	1,5	34,3	6	11,7	10,1
Conservative treatment	6,4	6,9	-	14,3	17,2	6,5	10,3
Average	4,5	7,4	3	15,6	17,1	7,8	10,2

Tab. 3. Average Length of Stay (Los) expressed in days.

Mortality incidence and causes

13 patients died during the studied period (1,3% of the total study population). Among these, 12 were patients treated conservatively (2 new-borns and 10 \leq 12 years); the only death related to surgery is the 15 years old girl died in the OR due to C-section complications.

One of the two new-borns died less than one day after admission with a diagnosis of “Injury of unspecified body region”, while the second one died after 31 days of admission with a diagnosis of “Retention of urine”. There is no clue on the medical chart about whether this patient was taken to the OR or not, but probably not, according to the Msh habit not to anesthetize new-borns.

Among the patients \leq 12 years, 4 died one day after admission with the diagnosis of: “Cutaneous abscess, foruncle and carbuncle”, “Open wound of head”, “Paralytic ileus and intestinal obstruction without hernia”, “Undescended and ectopic testicle”. One patient died after 6 days for “Complications and ill-defined descriptions of heart disease”, another one after 17 days for “Heart failure”. Other children passed away with the diagnoses of: “Crush injury and traumatic amputation of abdomen, low back, pelvis, and external genitals”, “Mastoiditis and related conditions”, “Other diseases of biliary tract”. There are no details on the chart about whether surgery was performed or not on these patients.

Discussion

Our study emphasizes once more the “*large burden of unmet surgical needs in African children*” (Lawal 2019): actually, data presented allow to calculate for Msh catchment area one surgical operation performed every 1206 children 0-18 years, while in Europe this ratio is one operation every 111 children 0-14 years (Parigi, 2018), much more than ten times higher considering the difference in age span. While children 0-14 years represent a bit less than 50% of the total Kenyan population, paediatric surgical operations in Msh account for less than 7% of the total, thus sadly supporting the aforementioned statement.

The lack of paediatric surgical services is highlighted also by the high number of children (73,1% of the total) with a surgical diagnosis but not operated upon because of structural restraints, mainly due to overwhelming workload on staff and services. Rather scanty, on the other hand, the number of referrals to third level centres for complex surgical procedures not amenable to be treated at Msh (3,1% of the total).

One of the main problems encountered in the primary endpoint study has been the lack of a uniform codification method for the diagnoses observed and for the surgical procedures performed at Msh, variously defined both in English or Swahili, sometimes with different terms for the same pathology and procedure. Needless to say, this situation hinders any attempt at a quantitative metric evaluation of the performances achieved. Reformulation of diagnoses and procedures according to the ICD-10-CM standard has therefore represented both an obstacle for the study and an opportunity offered to the hospital staff to durably adopt the system.

As far as diagnostic breakdown is concerned, particularly worrying is the far too high number of pregnancies in adolescent girls, often needing a C-section potentially dangerous, raising some hot questions: why in Kenyan society is so widely accepted such an early pregnancy? Why these girls are frequently not even married – so that they are no guaranteed about the new-born’s paternity? How common is sexual abuse inside the family, as denounced by the rather high number of open wounds to vulva and vagina? On the other hand, why is a C-section needed in such young mothers, considering that literature (Entringer 2018) shows a heavy risk increase related to the use of surgery instead of natural delivery?

Going outside the O&G sphere, this study likewise highlights the deep connection between paediatric surgical pathologies and society. Indications that led to surgical treatment are the very first signs of wrong habits, cruel traditions, poverty. This is the case of the high number of burns in children, in average age 2,5 years old, due to the habit of keeping burning an open fire in the middle of each hut (18% out of the 628 patients ≤ 12 years old with a surgical diagnosis treated

conservatively, i.e. 113 cases), or of the high number of septic cases (14,8% of the ≤ 12 years patients), due to the very poor hygienic conditions where children are grown up.

The majority of people in Malindi region have few or wrong ideas about hygiene rules, and some educational campaigns would be needed. Some of the problems relate also to poor access to water or to the presence of contaminated water in many rural regions, some others relate to traditional cultural habits (for example: overcovering children with multiple layers of cloth, even with warm temperatures, putting herbs on open wounds, cutting the skin all around a snake bite). All this explains why, when an injury occurs, the first aid may not be the right one.

The problem of social factors heavily compounding clinical ones is further emphasized by the data recorded about Los, showing a value some five-fold the one recorded in Western hospitals (Papandria, 2018). This difference can be easily justified by the long distances between home and hospital with related transport difficulties and costs, leading often parents to prefer to pay more days of admission than to travel back home and return later; patients' mums sleep in the garden of the hospital. In addition, there are no laparoscopic surgery options, so that everything is done via open surgery, thus increasing the postoperative days needed to recover.

Analysing eventually mortality data, it is encouraging to observe as there is only one case of perioperative death, because of a complication during a C-section. A common feature of many of the remainder mortality cases is the lack of a conclusive diagnosis, just suggesting underlying complex pathologies beyond the diagnostic possibilities of Msh, even more so the possibilities of a therapy.

Discussing now the secondary endpoint of our study, aiming to analyse from a broader perspective the problem of pediatric surgical pathology in Malindi region and to formulate some possible recommendations, we can conclude that Msh staff - facing daily this heavy burden of paediatric surgical cases - shows a clear understanding of the possible solutions, according to the interviews gathered in the framework of this study matched with the factual results recorded.

More specialised surgeons, e.g. paediatric surgeons, are badly needed, since children are operated by general surgeons, while some of the most serious cases must be referred elsewhere. There is a great need for specialised medical education in the whole sub-Saharan Africa: according to Derbew (2019), there are now in Kenya just only 17 paediatric surgeons. Half of Kenyan population being in paediatric age, the lack of paediatric surgeons needs surely to be tackled.

More specialised equipment is needed as well: basic instruments, such as clamps, surgical sutures and abdominal retractors are available, but quality wise there is ample room for improvement. Instrumentation handling is also matter of concern: technical problems are common, for example the ones with electrocautery or suction, often malfunctioning if not fully out of order; air

conditioning failure sometimes forces the surgeons to operate in tropical temperature, and so on. More sophisticated equipment is lacking, and instruments fit for adults cannot be adapted to suit paediatric patients, such e.g. a paediatric cystoscopic instrumentation, unavailable in all hospital of the Kenyan coast. On the other hand, top level equipment such a CT scan is available, but not specialised hospital staff able to use it; the instrument is available only for the patients who can afford to pay out of pocket a doctor and a technician trained in its use.

Neither day surgery nor laparoscopic surgery is provided in Msh, because of lack of proper equipment and appropriate training: this forces the surgeons to perform only open surgery, entailing more prolonged Los as well.

Sterility inside the OR can be much improved, even if there are some good habits. Everything is sterilized in autoclave; sterile cotton fabric is used in order to create the operatory space over the patient. There is no air filter, so that it is very common to find flies in the OR, flying and touching patient and instruments. Contacts between staff outside and inside the sterile area are also frequent. Some basic rules are respected (for example, not to touch anything else except patient and instruments while operating), but they are not enough to guarantee sterility. It would be also a great enhancement to provide functional soap dispensers for the sinks outside the OR: at the moment, surgeons touch with the hands soap bottles while scrubbing, making the scrubbing itself less effective. Moreover, almost once every week there is shortage of water, making all the scrubbing procedures even more difficult.

Surgeons working in Msh regularly complain that anaesthesia issues are totally covered by nurses, who often lack the proper training, resulting in a reduction of technical choices for the patients. In other words, nurses are confident with a limited number of anesthesia techniques: as a consequence, patients can be refused from the OR because the anaesthetist does not know how to deal with them, particularly in the case of new-borns or infants. The extensive use of GA, even in minor procedures, suggests that the complaints of Malindi surgeons are well supported by evidence. In fact, some choice in the possible types of anesthesia should be introduced, especially considering that literature agrees that an extensive use of GA, also for minor operations in which an alternative technique could be adopted, gives no advantages but more risks for the paediatric patient (Serafini 2005).

Last but not least, another heavy obstacle to a proper delivery of paediatric surgical care is the financial burden that families must afford to deal with a pathology affecting their children. Those <5 years old receive free healthcare, while for the others it is not possible to know in advance the overall cost of admission, not even for elective surgery, and this often forces the parents to give up to require an admission to the hospital if not in extreme conditions, when it is possibly too late to receive an effective treatment (6 of the 13 recorded deaths happened within the first day of

admission). A sustainable development strategy in this area is therefore badly needed and may lead to a great impact on economic growth, also in a Country investing just 169 \$ per capita per year in health (WHO website). Children's health is a “collective good”, leading to a healthy society and improving the wellbeing of everyone: it must therefore have the paramount consideration it duly deserves.



During my stage at Msh I spent most of my time in the OR, but I used also to check particular cases in the paediatric ward, to make sure that we were doing the best that we could. That day, while I was visiting a kid with ascites, this woman helped me with the translation swahili-english. Then she asked: «Can you visit also my child?»

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COLLABORAZIONE INTERISTITUZIONALE PER FORMAZIONE E RICERCA SU ONE HEALTH : L'ESPERIENZA DEL CCM E DEL CISAO, UNIVERSITÀ DI TORINO

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Abstract

Il concetto di One Health (OH) riconosce la relazione imprescindibile esistente tra la salute umana, animale e ambientale. Questo approccio consiste nell'analizzare la salute nella complessità dei suoi determinanti e nell'implementazione di strategie per garantirla, attraverso un dialogo aperto e continuo tra comunità locali, soggetti istituzionali, organismi profit e non profit e mondo della ricerca. Oggi due terzi delle malattie infettive emergenti sono di probabile origine animale (zoonotiche); cambiamenti climatici, sovrappopolazione mondiale, globalizzazione, perdita di biodiversità stanno modificando la salute dell'ambiente, degli animali e dell'uomo. OH è una strategia ideale per affrontare i problemi che caratterizzano il ventunesimo secolo e contribuire a raggiungere la salute globale e lo sviluppo sostenibile. Questo articolo presenta esperienze di ricerca azione tra istituzioni locali e internazionali diverse su OH e ne sottolinea l'importanza per una salute globale.

The concept of One Health (OH) recognizes the relationship between humans, animals and environment. The approach analyses health in the complexity of its determinants and of the strategies to be implemented in order to guarantee it, through an open, collaborative and continuous dialogue among local communities, institutional actors, profit and no-profit organisations and academic institutions. Today two third of emerging diseases is of animal origin (zoonotic) and climate change, globalization, global overpopulation and loss of biodiversity are profoundly altering the health of the environment, animals and people. OH is the ideal approach to tackle problems that characterize the twenty-first century and to contribute to the achievement of global health and sustainable development.

Keywords

One Health, formazione, Educazione, coinvolgimento delle comunità

Introduzione

Sin dalla fine degli anni 90 le organizzazioni, governative e non, hanno iniziato ad affrontare l'interrelazione tra salute umana, animale e ambientale. In seguito all'epidemia di influenza aviaria, WHO (World Health Organization), FAO (Food and Agriculture Organization) e OIE (World Organization for Animal Health) hanno unito le forze per quello che è stato chiamato coinvolgimento "tripartito" per affrontare le nuove patologie globali. Entità diverse si sono unite per affrontare argomenti di ricerca, di formazione e di strategie comuni. Il passaggio dalla ricerca a programmi di vera integrazione delle tre discipline è ancora una strada da percorrere nella sua

interezza, perché la tendenza di ciascuna di esse è quella di rimanere ancorata ai propri metodi, indirizzi, finalità, senza volontà fattiva di vera interazione, così come spesso accade con la segregazione delle discipline specialistiche in ogni ambito. La OH deve essere introdotta nelle linee strategiche operative volte a migliorare la salute delle comunità, degli animali e dell'ambiente in cui essi vivono.

Il concetto di OH è espresso bene nella fig 1. (H.Lerner and C.Berg 2015): multidisciplinarietà e uso di tecnologie moderne sono requisiti necessari per rendere operativo questo concetto.

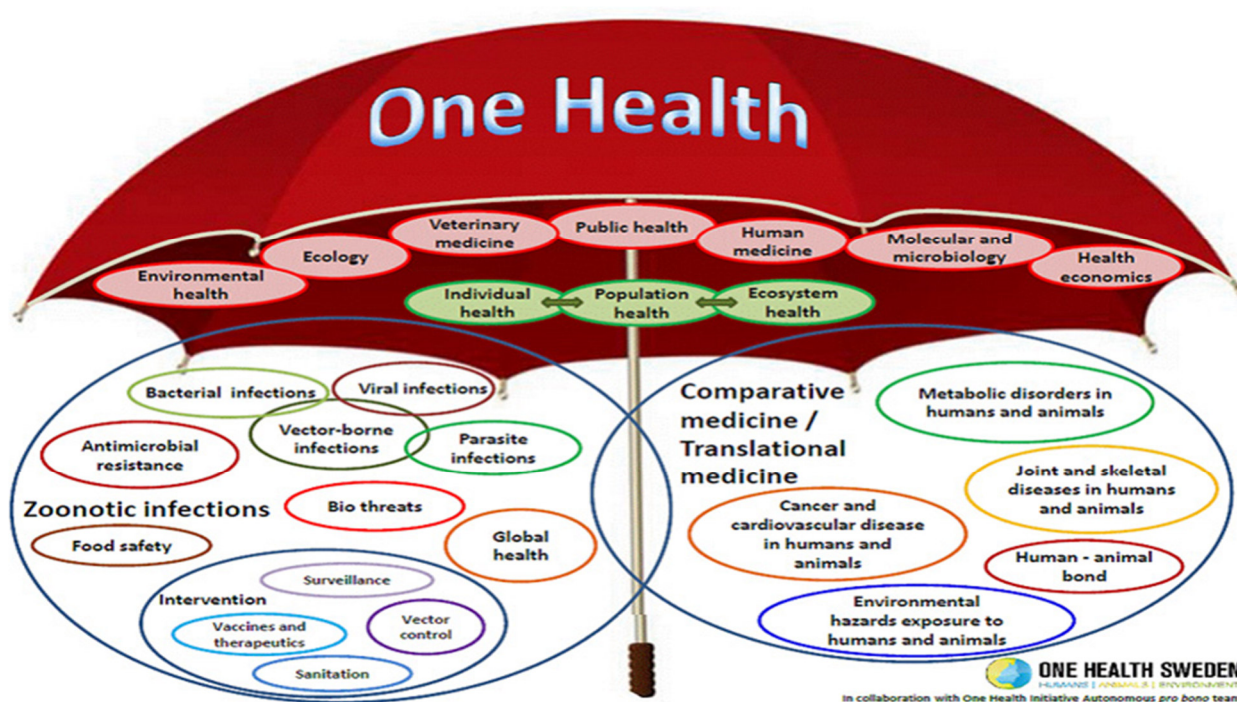


Fig 1. Da H Lerner and C.Berg 2015. Rappresentazione per immagini dell'idea di OH.

Background

Dal 1984, il Dott. Calvin Schwabe ha iniziato a pubblicare studi sulla importanza della collaborazione tra medici e veterinari (“*One Medicine*”), sottolineando come da questa interazione non derivasse solo un beneficio di sommazione: infatti, oltre ad ottenere un miglioramento della salute e del benessere delle popolazioni umane ed animali in studio, si aveva la possibilità di rilevare più velocemente la comparsa delle epidemie (*outbreaks*) riducendo i tempi che consentono di mettere in atto strategie sanitarie più efficaci e meno costose (Schwabe C.W. 1964, 1969, 1984, 2004; Zinsstag J. *et al.* 2012).

Sin dal 1999, lo zoologo Meffe (1999) ha introdotto il concetto di “ecosystem health” su cui i successivi studi di antropologia medica hanno innestato la relazione tra cultura e società (Singer and Baer 2012)

L’approccio “One Health” (integrazione tra salute umana, animale e ambientale) ha ricevuto un’attenzione crescente sin dal 2004¹, diventando un concetto-chiave per chi si occupa di Salute Globale con un interesse crescente della classe politica e delle agenzie internazionali, influenzando la ricerca e le politiche degli stati. L’interesse è aumentato ulteriormente quando si è focalizzata l’attenzione sulle zoonosi e l’interrelazione tra ambiente, animali selvatici, animali da allevamento e uomini (e.g. pandemia da coronavirus SARS e MERS, pandemia da influenza da virus H5N1 and H1N1 da virus Nipah, da virus Hendra, da virus dell’immunodeficienza umana [HIV] dal virus Ebola e dalla recente pandemia di COVID-19 2020). Nel 2007, il WHO ha sottolineato come, a partire dal 1970, le nuove malattie infettive siano state prevalentemente zoonotiche e favorisce perciò lo sviluppo di discipline che considerino salute umana, animale ed ambientale in modo integrato.²

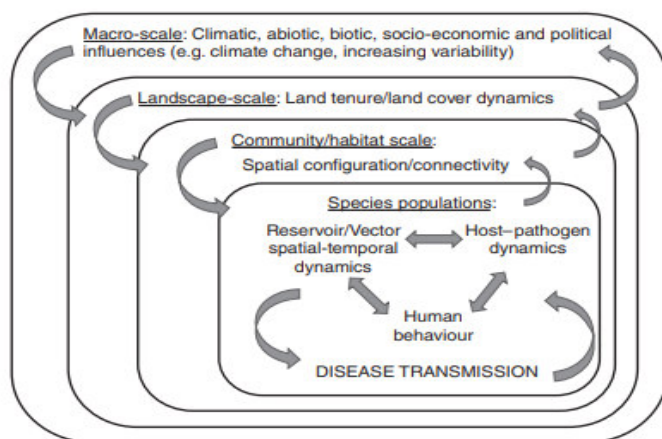


Fig 2. Interazione tra salute umana, animale ed ambientale (Lambin,2010)

Nei prossimi anni, nuovi studi e nuovi argomenti approfondiranno ulteriormente la complessa relazione tra mutamenti ambientali e malattie umane ed animali. Una attitudine di ricerca e lavoro “olistico”, favorendo l’interazione tra ecologia, malattie animali ed umane a livello globale, potenzierà i risultati delle ricerche svolte in campi separati³.

¹ Il concetto è stato lanciato ufficialmente nel corso della conferenza internazionale “One World, One Health: Building Interdisciplinary Bridges to Health in a Globalized World”, organizzata da Wildlife Conservation Society con il support della Rockefeller Foundation. Molte delle istanze presentate alla conferenza sono legate all’emergenza dell’influenza aviaria dell’inizio degli anni 2000.

² Tra gli altri King et al. (2008), Lee & Brumme (2013); Zinsstag et al. (2009); Zinsstag et al. (2011).

³ Esempi al riguardo includono report di FAO-OIE-WHO (2010), WHO (2008), World Bank (2010), e FAO (2013) e numerosi articoli di sintesi in giornali scientifici importanti Zinsstag et al. (2009); Zinsstag et al. (2011); Zinsstag et al. (2012); Hueston et al. (2013).

La diffusione di questo metodo di lavoro integrato consentirà inoltre di identificare l'insorgere di nuove pandemie in tempi stretti, consentendone una cura più precoce ed efficace⁴. Ciò rende prevedibile anche un risparmio economico grazie alla sinergia di cure ad animali e uomini condotte contemporaneamente⁵.

Il miglioramento dell'ecosistema, grazie al miglioramento dei pascoli, arresto della deforestazione, miglioramento dell'accesso all'acqua pulita, contribuirà ulteriormente all'efficacia dell'applicazione di questo metodo di lavoro⁶ (Galaz, 2015).

Di seguito nell'articolo sono riportate esperienze di molti attori che lavorano sul campo, ma soprattutto di CCM e CISAO_Unito, nella loro applicazioni pratiche dell'approccio One Health.

Il CCM lavora da oltre 40 anni nelle regioni rurali dell'Africa sub sahariana, in particolare in Kenya, Etiopia, Somalia dove la popolazione è dedita alla pastorizia transumante. Pastori e animali migrano alla ricerca del pascolo e dell'acqua.

Il sistema sanitario in queste regioni dell'Africa è scarsissimo di risorse e di strutture in grado di offrire servizi adeguati per la salute umana, specie per queste popolazioni che si spostano continuamente. Le ricerche condotte dal CCM nel 2004-2005 e nel 2015-2016 hanno infatti evidenziato modifiche importanti della situazione nella stessa area. In entrambe le ricerche i pastori transumanti hanno raccontato di privilegiare la buona salute degli animali, garanzia di sopravvivenza del villaggio, sottostimando la salute del singolo individuo. Sono disposti a spendere di più per la cura di un cammello che per la cura di una persona, (cura per cui dovrebbero raggiungere servizi sanitari spesso molto distanti allontanandosi così dal villaggio e dai propri animali per un periodo di tempo ritenuto troppo lungo). Per le cure sia di uomini che di animali privilegiano inoltre le "cure tradizionali".

Progetti storici

Sin dal 2005 il CCM ha iniziato a lavorare con i veterinari di AVEC in Regione somala dell'Etiopia (Ogaden) su One Medicine. Uno studio antropologico condotto in quegli anni aveva evidenziato come «dalla vita di un cammello dipende la vita di 4 persone» e quindi per migliorare la salute umana era necessario partire dal miglioramento della salute animale seguendo le argomentazioni del

⁴ Gli autori sono estensori di articoli in CDC (2011), come Dry and Leach (2010), Galaz (2014).

⁵ Su questo argomento gli autori sottolineano: World Bank (2012), Grace (2014), Zinsstag *et al.* (2006), Narrod *et al.* (2012).

⁶ L'articolo è il risultato di una revisione della letteratura pubblicata su OH dal 2007 all'inizio del 2014, di documenti di policy scritti tra il 2004 ed il 2013, e di 83 interviste condotte tra il 2008 ed il 2013 tra esperti di OH che lavorano sul campo (Galaz *et al.* 2015, p. 1).

Dr. Schwabe. Lavorando sul campo inoltre abbiamo potuto verificare come il movimento dei pastori e delle loro mandrie arrestasse l'avanzata del deserto, con un beneficio dell'ambiente.

Con analogo progetto abbiamo lavorato in Etiopia, regione somala a: Gode e Kelapho (un finanziamento della CE nel 2005 ProgettoHR088_981). In accordo con la comunità locale (clan Awdak, Awliyan and Bahgari) abbiamo realizzato progetti integrati in cui era prevista vaccinazione degli animali, vaccinazione di bambini (contro il morbillo che richiede solo una singola somministrazione del vaccino), miglioramento dei sentieri di percorrenza delle mandrie, redazione di una carta dei diritti dei pastori nomadi transumanti. Obiettivo del progetto era preservare, rafforzare e rivitalizzare la vita di questi pastori, parallelamente alla conservazione dell'ambiente. Sono state raggiunte circa 7000 persone ed è stato presentato alle autorità di zona e statali una richiesta di diritti dei pastori nomadi.

A Filtu e Dollo Oddo, Progetto finanziato dalla cooperazione austriaca No. 1986-00-02 e dalla cooperazione italiana, in accordo con HDSP (Health Development Sector Program of MAE-Italian Cooperation) dal 2005 al 2007 è stato allestito un sistema volto a migliorare i servizi sanitari accessibili questa popolazione. Nelle comunità oggetto del progetto è stata condotta la selezione degli Agenti di Comunità, (HHA *Household Health Agent* - sempre due, un uomo e una donna). Gli HHA sono stati formati per la gestione delle principali patologie umane ed animali, ed è stato creato un sistema di riferimento che favorisse l'accesso a servizi sanitari più qualificati.

Nell'ambito di tale progetto, in collaborazione con il Dipartimento di Scienze Veterinarie, Università di Torino, è stata realizzata una tesi di laurea in medicina veterinaria (candidata Giada Callà) e sono state condotte alcune ricerche su zoonosi, es. brucellosi e Q fever⁷ e su malattie trasmesse da zecche, incluse alcune zoonosi⁸. Le attività sono state poi sospese per mancanza di fondi legati a cambiamenti di strategie sanitarie sia del donatore che del Paese.

Progetti di ricerca sul campo

Dal 2015 abbiamo ripreso a lavorare a Filtu, sempre con i pastori nomadi transumanti (*pastoralists*), attraverso una ricerca operativa volta ad analizzare se fosse mutata la realtà locale, ad analizzare attitudini e comportamenti delle comunità pastorali nomadi dell'area nei confronti della salute umana, animale e ambientale e a verificare l'efficacia e la sostenibilità dell'approccio One Health che rispondesse ai bisogni delle comunità pastorali rilevate. Il progetto è stato svolto nella woreda di Filtu, Liben Zone, Somali Region, Ethiopia.

⁷ De Meneghi, D., Tomassone, L. et al., pubblicata in "Experimental and applied acarology", vol 56, 4.

⁸ Tomassone, L., De Meneghi, D., et al., pubblicata in "Ticks and Tick-borne Diseases", vol. 7, 6.

La Liben Zone ha una popolazione stimata di 539,821 abitanti, con 45% di donne e 82,5% di persone dedite alla pastorizia transumante⁹. Il CCM conosce la zona perché vi ha lavorato sin dal 2003, occupandosi prevalentemente di salute materno infantile, ma anche di One Medicine. Grazie alla capitalizzazione delle precedente esperienza abbiamo ritenuto possibile iniziare da questa zona per riprendere i progetti di OH, in partenariato con *Somali Regional State Health Bureau* (SRHB), the *Somali Regional State Livestock, Crop and Rural Development Bureau* (SRLCRDB)¹⁰ and the *Bureau of Finance and Economic Development* (BOFED) of Ethiopia grazie ad un finanziamento della Cooperazione Svizzera.

Questa ricerca operativa è stata condotta con TriM Applied Geography Experts che ha aiutato il CCM nello studio (rilevazione ed elaborazione) delle previsioni climatiche, visto il cambiamento del clima nella zona, legato ai cambiamenti climatici attribuibili al Niño e ha consentito a esperti di salute umana, animale e antropologi di muoversi sul terreno.

A Filtu la sedentarizzazione dei pastori è aumentata, aumentando perciò il numero di *agro pastoralists* che hanno migliorato le condizioni di vita dell'intero villaggio aumentando la loro flessibilità. L'ipotesi di base di chi vive la pastorizia transumante è che se gli animali sono in salute e vi rimangono, lo stesso capita ai pastori. Il benessere dei pastori è legato alla quantità, qualità e produttività delle mandrie, ma solo un pastore in buona salute può accudire bene le proprie mandrie. Il tutto in un ambiente il più favorevole possibile.

Lo studio ha inoltre confermato le conflittualità esistenti tra pastori e agro pastori (competizione per pascoli e fonti di acqua) specie in un periodo di siccità ricorrente come quello attuale. La ricerca operativa ha permesso di concordare, con le autorità locali, di pianificare il miglioramento dei sistemi sanitari sia umani che animali nella zona, iniziando a migliorare la formazione di tutto il personale, informando i pastori dei problemi di salute presenti nell'area e su come poterli risolvere, promuovendo la ricerca e supportando economicamente i servizi disponibili.

Oltre al miglioramento degli *health post* e degli *health center* stanziali (attrezzati con materiale sanitario di qualità e personale formato) si è rilevata la necessità di costituire team di operatori sanitari mobili, che possano raggiungere i pastori nelle aree di pascolo, team attrezzati per mettere in atto misure preventive e per poter diagnosticare e curare malattie tramite HHA formati ed aggiornati. Per registrare le variazioni climatiche sono state formate persone capaci di rilevare precipitazioni, temperature e di inviarle ad un centro raccolta dati, che può segnalare alle autorità locali e statali le variazioni climatiche e lanciare segnali di pericolo documentati. Un focus

⁹ CSA (2008). 2007 Population and Housing Census.

¹⁰ In accordo con la Direzione Federale, alla fine del 2015 il Governo federale ha istituito il Ministero di Livestock Development and Fisheries, per separare argomenti di agricoltura dall'allevamento; conseguentemente a livello Regionale è stato istituito il Livestock and Pastoralists Development Bureau.

particolare è stato posto sui rischi legati a gravidanza e parto non seguiti in strutture idonee e sull'importanza dell'allattamento al seno.

Lavorando con la comunità si è confermata l'importanza di informarle sui rischi di diffusione delle principali malattie umane ed animali, sul corretto uso di farmaci (dosi e tempi), sulle zoonosi, sui metodi di prevenzione di diffusione di epidemie sia tra animali che uomini.

Per diffondere le informazioni sanitarie gli HHA passeranno di casa in casa, nella scuola, nei mercati, grazie anche alla interazione con personale sanitario tradizionale (TBA - *Traditional Birth Attendants*/Levatrici tradizionali e *Healers* ossia guaritori tradizionali) e grazie a coinvolgimento di leader religiosi e anziani di villaggio. L'uso di tecnologie, come telefoni satellitari e non, la creazione di mappe (grazie all'intervento di TRIM) permetteranno di individuare la presenza di servizi sanitari disponibili, di strade percorribili, di insorgenza di urgenze particolari (epidemie, sentieri crollati, pozzi prosciugati ecc.).

Il supporto economico alla comunità serve non solo per lo svolgimento del programma ma anche per migliorare le conoscenze su andamento del mercato degli animali, potrà consentire la messa in atto di assicurazioni sanitarie, e consentire alle donne di iniziare progetti di attività redditizie per potere pagare servizi scolastici e sanitari ai propri figli. Sarà importante anche la creazione di cooperative.

Studi di ricerca potranno approfondire localmente la presenza e distribuzione di zoonosi.

Importante è anche il coinvolgimento delle autorità locali, promuovendo una migliore collaborazione tra chi si occupa di salute umana, di salute animale, acqua, accessibilità delle strade, variazioni climatiche in team che insieme hanno l'obiettivo di migliorare la vita delle persone che abitano queste zone semi aride dell'Africa.

Oltre ai permessi ottenuti dalle autorità locali, indispensabili per qualunque progetto sia in Etiopia che in Kenia, i progetti in corso hanno coinvolto i dirigenti locali sia con la discussione dei piani progettuali sia la formazione di figure responsabili di settori di salute umana, animale ed ambientale.

Progetti in corso

A partire dai risultati dello studio di ricerca abbiamo avviato una serie di progetti con altri attori riconoscendo l'importanza di un lavoro integrato.

Abbiamo lavorato con il CISP focalizzando lo studio ed il progetto sulla resilienza dei pastori nomadi (finanziamento AICS 2017 “mitigazione degli effetti della siccità in Etiopia “AID 10783).

Un altro progetto è stato svolto a North Horr contea di Marsabit (Kenya) con VSF (veterinari senza frontiere) Germany, TriM (Translate into Meaning), DIST (Dipartimento Interateneo di Scienze, progetto e politiche del territorio, Politecnico ed Università di Torino, che è un membro del CISAIO) focalizzando il progetto sulle zoonosi e sistema di decisioni presa in modo comunitario (finanziamento AICS 2016/337/000148/5 “One Health :approccio multidisciplinare per promuovere la salute e la resilienza delle comunità pastorali in Nord-Kenya”). Il progetto ha raccolto dati geo-spaziali per la mappatura e analisi dell’accessibilità sia alle risorse sanitarie che alle variazioni climatiche che a emergenze ambientali presenti sul territorio. Ha formato *Community Health Workers* (CHW) e *Community Diseases Reporters* (CDR) su pratiche igieniche, su trasmissione delle zoonosi e possibili misure preventive, fornendo sia assistenza tecnica che supervisione dei servizi sanitari e veterinari offerti da CHW e CDR. È stata creata una Squadra Mobile per l’erogazione integrata di educazione e servizi preventivi (vaccinazioni) e curativi (primo soccorso). È stata creata una Unità Zoonotica locale, formata da personale sul campo e dalle autorità locali keniate per potere avere una notifica tempestiva dei casi sospetti di zoonosi nella sub-contea.

Recentemente abbiamo iniziato un progetto regionale, in Kenya, Somalia ed Etiopia con VSF Suisse, ILRI (International Livestock Research Institute) e Comitato Collaborazione Medica (CCM) sempre focalizzandoci su servizi di salute integrati (finanziamento cooperazione svizzera) Il progetto dal titolo “HEAL: One Health Units for Humans, Environment, Animals and Livelihoods” sarà svolto in Etiopia, Moyale of Dawa Zone, Filtu of Liben Zone (Somali Regional State) e Moyale and Miyu Woredas of Borena Zone (Oromia Regional State), in Somalia, Beled Xaawo, Dollow and Luuq (3 di 6 distretti della Regione di Gedo), in Kenya, North Horr sub-county of Marsabit.

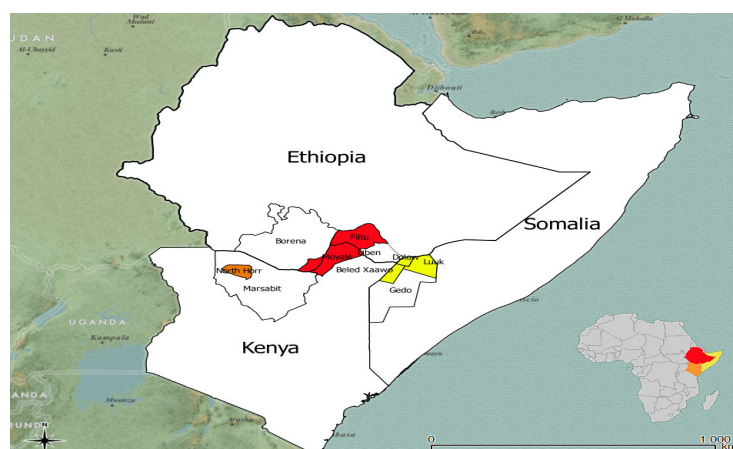


Fig 3. Aree geografiche dove si sta svolgendo il progetto HEAL

Il progetto intende supportare le comunità partendo dalle esigenze dei pastori, in un contesto di partecipazione comunitaria. Saranno formate delle *One Health Units* (OHUs) in cui gli esperti di salute umana, animale ed ambientale lavoreranno insieme collaborando con i dipartimenti governativi e servizi privati presenti sul territorio, sviluppando strategie sostenibili. Le *best practices* e le informazioni apprese nel progetto inter-paese saranno monitorate strettamente e saranno condivise con i governi dei paesi ospitanti. Le piattaforme *multi-stakeholder* faciliteranno l’approccio bottom-up. Il monitoraggio delle variazioni climatiche consentirà alle comunità ed alle autorità locali di identificare precocemente sia disastri naturali che emergenze sanitarie a cui sarà possibile porre velocemente rimedio.

Luogo	data	partner	donatore
Ogaden (Etiopia)	2004-5	AVEC ONG -HDSP	ADEC (cooperazione Austriaca)
Gode e Kelapho (Etiopia)	2005	-	C.E.
Filtu – Dollo.oddò (Etiopia)	2005-2007	AVEC-HDSP	ADEC e cooperazione italiana
Filtu (Etiopia)	2015	SRHB,SRLCRDB, BOFED e TRIM	Cooperazione svizzera
Filtu (Etiopia)	2017	CISP	DGCS
North Horr -Marsabit (Kenia)	2017	VSF Germany, TRIM, DIST	DGCS
Kenia, Somalia, Etiopia	2018	VSF Svizzera, ILRI	Cooperazione svizzera

Progetti in Italia

L’esperienza ottenuta in Africa ha spinto il CCM a diffondere le proprie conoscenze acquisite sul campo anche in Italia. Per questo nel Novembre 2018 abbiamo organizzato a Torino un convegno dove sono stati trattati argomenti quali biodiversità (Franco Correggia), sguardo allargato su OH (Jacob Zinsstag), la salute umana in ottica OH (Micol Fascendini) e l’approccio OH nel diritto internazionale e dell’Unione Europea (Pia Acconci), la GH (Global Health) security agenda, esempi di OH nei progetti di cooperazione allo sviluppo: in Zambia (Daniele De Meneghi), i cambiamenti climatici e il loro impatto (Alessandro Pezzoli). Sono stati inoltre presentati i progetti del CCM

svolti tra le popolazioni pastorali nel Kenya del nord, esponendo i risultati di ricerche sul campo su cambiamenti climatici e studi antropologici.

Torino, 13 novembre 2018

Campus Luigi Einaudi, Lungo Dora Siena 100 A
dalle ore 9:00 alle ore 17:00



convegno scientifico

One Health

relazione tra
salute umana,
animale e
ambientale



8.45	Registrazione partecipanti	13.10	Discussione
9.00	Saluti e introduzione alla giornata Egidio Dansero, UNITO Dip. di Culture, Politica e Società Marilena Bertini, presidente CCM	13.30	pranzo
9.15	Biodiversità: una risorsa chiave nella lotta alle criticità ecologiche globali. Franco Correggia, presidente Ass. Terra, Boschi, Gente e Memorie, referente agenzia internazionale Ager	14.30	Introduzione al pomeriggio Daniela Rana, desk officer CCM
10.00	Introduzione alla One Health Jakob Zinsstag, Swiss Tropical and Public Health Institute	14.45	Presentazione del progetto Etiopia Alessia Villanucci, già capo progetto e esperta della ricerca antropologica per il CCM Elena Cristofori, Chief Scientific Officer TRIM
10.45	La salute umana in ottica One Health Micol Fascendini, Regional Health Advisor CCM	15.15	La cura nell'antropologia: il progetto a North Horr Alberto Salza, antropologo e consulente CCM
11.15	L'approccio One Health nel diritto internazionale e dell'Unione Europea Pia Acconci, Università degli Studi di Teramo	16.00	Presentazione delle ricerche sul campo Anna Setran e Ingrid Vigna, borsiste Uni.COO Velia Bigi, consulente tecnico scientifico in salute ambientale DIST
11.45	pausa	16.30	Discussione e conclusioni
12.00	Global Health Security Agenda Marco Cristofori, CERSAL (Centro di Ricerca e formazione per la Salute unica e l'Alimentazione)		Moderata: Marilena Bertini, Medico e Presidente CCM
12.20	L'uso di acaricidi in Zambia: l'approccio OH in un progetto di cooperazione allo sviluppo Daniele De Meneghi, UNITO Dip. di Scienze Veterinarie, presidente CISAO		INGRESSO GRATUITO ISCRIZIONE OBBLIGATORIA
12.40	I cambiamenti climatici e l'impatto sull'uomo Alessandro Pezzoli, consulente tecnico scientifico senior in salute ambientale DIST		per iscrizioni: www.formazione-sanitapiemonte.it
			per informazioni: Lisa Di Mascolo formazione@ccm-italia.org , tel. 011 660 2793 www.ccm-italia.org

Con il patrocinio
dell'Ordine dei Medici Veterinari
della Provincia di Torino



Con il patrocinio di



POLITECNICO
DI TORINO



UNIVERSITÀ
DEGLI STUDI
DI TORINO

In collaborazione con



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CITTÀ DI TORINO

Fig 4. Programma della giornata organizzata a Torino su OH nel 2018.

Più recentemente il CCM ha pianificato, con l'Università di Torino, polo universitario S. Luigi di Orbassano, la realizzazione di un corso per studenti di medicina e chirurgia su OH.

Riteniamo infatti che la OH sia una componente essenziale della *Global Health* e contribuisca al raggiungimento della copertura sanitaria completa (prevista dalla WHO) di cui i futuri medici debbano essere informati e formati

Anche in alcuni corsi offerti dal Dipartimento di Scienze Veterinarie, campus Agroveterinario di Grugliasco sono state incluse unità didattiche su argomenti di OH e sono stati organizzati seminari tematici quali “*Integrated Approaches to Human and Animal Health in Africa with a One Health Perspective*” che ha visto la collaborazione di relatori anche internazionali, appartenenti a vari settori disciplinari (fig. 5).



Seminar

“INTEGRATED APPROACHES TO HUMAN AND ANIMAL HEALTH IN AFRICA WITH A ONE HEALTH PERSPECTIVE”

21st October, 2019 hrs 8.30-11.50, Aula Monti

AGROVET Campus, L.go P. Braccini, 2 - Grugliasco (To), Italy

The seminar is organized in the framework of the teaching activities of the Inter-Departmental Course in *“Animal Sciences [C.I. Animal production (and health) in tropical areas]”*, with the coordination and support by CISAO_UniTo. Students of the undergrad and post-grad courses at Grugliasco campus, including students of the two Research Doctorate Schools, as well as researchers/teachers and staff members from the Departments associated to CISAO_UniTo are kindly invited to participate.

The seminar will be held in English

8.30 – Welcome by the Directors DSV, DISAFA and SAMEV, and introduction by the Director & President, CISAO_UniTo

8.40 - Andrea Calcagno, medical doctor, tropical diseases expert, Dept. of Medical Sciences, University of Turin, Italy: **“Major infectious diseases of humans in Sub-Saharan Africa: which strategies for sustainable prevention and control?”**

9.30 - Paolo (Paul) Motta, veterinary epidemiologist, EuFMD Technical and Coordination consultant, c/o FAO_Rome, Italy: **“Transboundary Animal Diseases and Livestock routes: characterizing and modelling cattle movements in Cameroun”**

10.20 - Uriel Kitron, eco-epidemiologist, Emory University, Atlanta (GA), USA: **“Applications of GIS and remote sensing to vector-borne diseases and One Health in Sub-Saharan Africa”**

11.10 – Daniela Rana, Kenya desk-officer, CCM Centro Collaborazione Medica ONG, Torino: **“Experiences of CCM in Primary Health care cooperation projects in Africa: focus on North Horr case study”**

11.30 – discussion and conclusions

11.50 – closure of the seminar

Fig. 5 programma del seminario organizzato dal CISAO e Università di Torino nel 2019.

Il CISAO, UniTO (Centro Interdipartimentale di Ricerca e Cooperazione Tecnica-scientifica con l’Africa) ha coordinato il master internazionale *“Securité alimentaire et Durabilité”* (project R.U.S.S.A.D.E. EU-EDULINK), nell’ambito del quale è stato applicato un approccio integrato *One Health*; tale master è stato svolto presso il CRESA, Niamey (Niger) in collaborazione con Università del Niger, Burkina Faso e Chad; alcuni eventi ed attività didattiche in ambito del progetto R.U.S.S.A.D.E. EU-EDULINK II sono state organizzate anche presso UniTO (Fig.6) .



**CONVEGNO
PROGETTO RUSSADE**
*(Réseau des Universités Sahéliennes pour la Sécurité Alimentaire et
la Durabilité Environnementale - FED/2013/320-115)*

10 MARZO 2017
14.30 – 18.00
AULA MAGNA DEL RETTORATO, Via Verdi 8 -TORINO

SALUTI ISTITUZIONALI DELLE AUTORITÀ
Monica Cerutti, Assessora della Regione Piemonte per le Pari Opportunità, Diritti Civili, Diritto allo Studio, Politiche giovanili, Immigrazione, Cooperazione.
Stefania Giannuzzi, Assessora del Comune di Torino per l'ambiente, fondi europei, energia, sviluppo tecnologico, qualità dell'aria ed igiene urbana, verde pubblico, illuminazione e tutela animali
Moussa Baragó, Vice Rettore per la Ricerca e le Relazioni Internazionali, Università Abdou Moumouni di Niamey (Niger)
Daniele De Meneghi, Presidente del CISA0 (Centro Interdipartimentale di Ricerca e Cooperazione Tecnico Scientifica con l'Africa) in rappresentanza del Magnifico Rettore dell'Università di Torino

PRESENTAZIONE DEL CISA0 - Riccardo Fortina, Direttore del CISA0 (Centro Interdipartimentale di Ricerca e Cooperazione Tecnico Scientifica con l'Africa) dell'Università di Torino

PRESENTAZIONE DEL PROGETTO RUSSADE (FED/2013/320-115)
Le ragioni del Progetto ed i risultati ottenuti - Carlo Semita (Project Manager RUSSADE)
Il punto di vista dei partner (Rappresentante delle università saheliene partner)

MAIN LECTURE
"CRISI AMBIENTALE, SVILUPPO E TRASFERIMENTO DEI SAPERI"
Grammenos Mastrojeni, Consigliere d'Ambasciata in servizio presso la Direzione Generale Cooperazione allo Sviluppo (DGCS) del Ministero degli Affari Esteri e della Cooperazione Internazionale

TAVOLA ROTONDA – PROSPETTIVE FUTURE DELLA COOPERAZIONE INTERUNIVERSITARIA E DELLA COOPERAZIONE ALLO SVILUPPO
Moderatore: Giorgio Garelli (Regione Piemonte)
Intervengono: Gianmaria Ajani (Magnifico Rettore – UNITO), Rappresentanti delle Università saheliene partner, Rappresentanti di Coordinamento delle ONG Piemontesi (COP), Coordinamento Comuni per la Pace (CO.CO.PA.), Rete dei Comuni solidali (RECO.SOL), Centro Piemontese Studi Africani (CSA).
Sono stati invitati: Rappresentati del Politecnico di Torino, Università del Piemonte Orientale, Coordinamento Universitario per la Cooperazione allo Sviluppo (CUCS).



Fig 6. Convegno organizzato all'interno del progetto Russade.

Alcuni ricercatori del Dipartimento di Scienze Veterinarie (DSV), membri del CISA0, UniTO hanno partecipato e contribuito alla COST Action NEOH (Network for Evaluation of OH Initiatives), nell'ambito del quale è stato sviluppato un protocollo per la valutazione qualitativa di progetti ed iniziative OH, utilizzando indicatori che tengono in considerazione aspetti quantitativi e qualitativi dei singoli progetti, finalizzati a favorire la realizzazione strategie OH più efficaci. Il protocollo è stato applicato a numerosi casi studio ed iniziative OH svolte in diversi Paesi membri del network COST. A prosecuzione di tale progetto, gli stessi ricercatori hanno preso parte al progetto Europeo Co_eval-AMR: *Convergence in evaluation frameworks for integrated surveillance of antimicrobial resistance (AMR) and antimicrobial use (AMU)*, finanziato dal programma europeo JPIAMR- *Joint Programming Initiative on Antimicrobial Resistance*, mirato ad applicare protocolli di valutazione delle iniziative di sorveglianza su AntiMicrobial resistance (AMR).

Sempre in tema di AMR ed uso prudente del farmaco, il DSV è titolare del Progetto "Uso consapevole del farmaco in Medicina Veterinaria, con approccio OH", Fondo di finanziamento quinquennale del MIUR (2018-2022).

Nel Settembre 2019 a Trento il Coordinamento Universitario per la Cooperazione allo Sviluppo (CUCS) ha organizzato un convegno dal tema “Cittadinanza e beni comuni; Università e cooperazione per la sicurezza, l’ambiente e la sostenibilità dello sviluppo”. In questo Convegno c’è stato uno spazio per l’argomento OH in una sessione intitolata “ *One Health* : approccio multi-settore e multi-attore per promuovere la salute e lo sviluppo sostenibile a livello locale e globale”.

Hanno partecipato a questa sessione Elena Cristofori, TRIM; Alessandro Pezzoli, DIST; Rudi Cassini, Università di Padova, Dipartimento di Medicina animale, produzioni e salute; Pierangelo Casale, Veterinari senza frontiere Italia; Martin Barasa, VSF Germany; Francesca Declich, Università di Urbino.

ONE HEALTH: MULTI-SECTORAL AND MULTI-STAKEHOLDER APPROACH TO PROMOTE HEALTH AND SUSTAINABLE DEVELOPMENT AT LOCAL AND GLOBAL LEVEL	165
Ricerca antropologica per lo sviluppo sostenibile	165
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Fig 7. Titolo delle relazioni tenute al Convegno CUCS a Trento nel 2019.

In un mondo sempre più globalizzato ed interconnesso è indispensabile che più discipline affrontino lo stesso problema. E’ sempre più necessario affrontare problemi sociali, economici, ambientali, di salute animale ed umana che sono interrelati e che, solo affrontati complessivamente, da più punti di vista potranno trovare una soluzione più efficace, socialmente ed economicamente vantaggiosa.

La transdisciplinarietà ha bene evidenziato come siano necessarie discipline scientifiche differenti per identificare e cercare soluzioni a problemi “sanitari” in senso lato (Pohl C., 2008).

Ma anche la presenza di attori differenti sul terreno facilita il raggiungimento di una migliore salute per tutti. Partendo dalle esigenze delle comunità locali, utilizzando le NGO che lavorano sul campo, le Università che approfondiscono con la ricerca argomenti puntuali ed enti statali che dovranno costruire politiche adatte, tutti potranno contribuire ad un diritto alla salute veramente inclusivo ed esteso anche ad animali e ad ambiente.

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Acronimi

Ccm	Comitato Collaborazione Medica
Cisao	Centro Interdipartimentale di Ricerca e Cooperazione Tecnico Scientifica con l’Africa
Oh	One Health
Who	World health organization
Fao	Food and Agriculture Organization
Oie	World Organization for Animal Health
Mers	Middle East Respiratory Syndrome coronavirus
Sars	Severe acute respiratory Syndrome
Avec pvs	Associazione di Cooperazione con i Paesi in Via di Sviluppo Onlus
Hdsp	Health Development Sector Program
Mae-Italian Cooperation	Ministero Affari esteri e cooperazione italiana
Hha	Household Health Agent
Srhab	Somali Regional State Health Bureau
Srlcrdb	Somali Regional State Livestock, Crop and Rural Development Bureau
Bofed	Bureau of Finance and Economic Development
Tba	Traditional Birth Attendant
Cisp	Comitato Internazionale per lo sviluppo dei popoli
Vsf	Veterinari senza frontiere
Dist	Dipartimento Interateneo di Scienze, Progetto e Politiche del Territorio Politecnico di Torino
Trim	Translate Into Meaning
Chw	Community Health Workers
Cdr	Community Diseases Reporters
Ilri	International Livestock Research Institute
Ohus	One Health Units
Neoh	Network for Evaluation of OH Initiatives
Amr	Antimicrobial resistance

**THE INVOLVEMENT OF UNIVERSITIES
IN THE PROTECTION OF HUMAN RIGHTS DEFENDERS
AND CASES OF VIOLATIONS AGAINST ACADEMIC FREEDOM:
THE ATTACKS ON STUDENT EXPRESSION IN COLOMBIA**

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Abstract

Lo scritto si propone di porre in risalto come le Università possano contribuire nel sostenere il ruolo e la tutela dei difensori dei diritti umani. Allo stesso tempo si dà atto di come le stesse Università possano subire forme di repressione e di come accademici e studenti possano essere esposti a gravi minacce e a restrizioni delle loro libertà.

L'esempio è fornito dalle ripetute violazioni ai diritti umani perpetratesi in Colombia tra ottobre e dicembre 2018, durante le proteste degli studenti, a novembre 2019 durante il “paro nacional” e nel periodo a seguire fino alla mobilitazione di massa contro il governo e le disuguaglianze iniziata il 28 aprile 2021 che vede i giovani in “primera línea”. Nello specifico viene esaminato il caso dell'Università del Cauca.

This paper concerns the involvement of Universities in supporting the role and the protection of human rights defenders. At the same time, it sheds light, through a case study, on how Universities themselves can face repression and how academics, students and teaching staff, can be victims of threats to their lives, liberty and well-being.

This specific case is about the human rights violations occurred in Colombia from October to December 2018 in the framework of the national students' protest, during the *paro nacional* in November 2019 and in the following period until the mass mobilisation against the government and inequalities that began on 28 April 2021, with young people in “primera línea”. A specific focus will be given to the case at the University of Cauca.

Keywords

Academic Freedom; Colombia - Cauca; Human Rights; Human Rights Defenders; Students' protest.

Introduction

States, higher education communities and civil society have a responsibility to take action to protect the academic freedom, namely, by referring to the UNESCO definition, the right to research, teach, disseminate knowledge and be educated without any undue interference by the State or other organizations. The recognition of the academic freedom as a key element of the sustainable development, in particular the achievement of the Sustainable Development Goals enshrined in the 2030 Agenda, depends on whether the right to education, teaching and research can be only fully enjoyed in an atmosphere of academic freedom (Stromme 2020, pp. 35-38; Macfarlane 2012). Despite the awareness about the essential role played by the academic freedom in the educational

advancement and the development of humankind and modern society, the academic community and education institutions are increasingly vulnerable to interference, pressure or repression from states, the business sector or other non-state actors. The consequences affect society by shrinking the civic space for the inclusive democratic participation, free speech and empowerment of all citizens and «by depriving future generations of high-quality academics and researchers» (EP 2018, p. 2). This paper, through the analysis of a case study, remarks as students and civil society have the right to freedom of expression and freedom of assembly, but at the same time an obligation to exercise those rights peacefully and responsibly. In this case, academics and students in addition to being individuals whose rights are being violated, become human rights defenders who are being attacked. In front of this, a response is needed both at international and national institutional levels, but also it should come from higher education itself, civil society and the public at large scale.

The Universities' internal advocacy for the social wellness and the involvement in supporting the role and protection of human rights defenders

Although the primary responsibility for the protection of human rights lies on states, other organs of the society as well as different groups and the individuals themselves play important parts in furthering the cause of human rights. Academic institutions have a long history in supporting civil society organizations and human rights activism in various ways, which could be in all areas of internal and external activities.

Human rights defenders are recognized by the UN declaration of 1997 as who individually or with others promote and protect peacefully the human rights and the fundamental rights of freedom. The protection for human rights defenders can be embedded in the universities' as internal advocacy for the social wellness, the promotion of public service values, the enjoyment and the respect of human rights (Brems 2019; Hazelkorn 2019).

This knowledge and experience exchange is not unidirectional. Human rights defenders (Hrds) can bring their own skills and experiences to the service of their host community.

Good practices regarding the involvement of the universities in the protection of Hrds, as well as the partnership with the civil society, not to mention the human rights activism in general are contributions which emphasize the added value that universities are able to lead in a proactive approach and take the importance of mapping experiences. The same shed light on the importance of applying a gender perspective when approaching the issue of Hrds and the relevance of ensuring an holistic approach and psychosocial support mechanisms during the temporary relocation of Hrds at risk. With regard to women Hrds, an intersectional perspective is essential to understand the various forms of discrimination affecting women, as misogynistic attacks and gender-based

violence, less support when they are attacked and difficulties accessing the protection mechanisms and because of that experiencing feelings of isolation.

The measures that involve national, regional and international organizations for swift assistance and protection to Hrds of foreign countries in danger, such as emergency visas and facilitation of temporary shelter, have been considered the extrema ratio. Those measures should, in any case, not become a substitute for the overall objective to bring about an environment where human rights defenders can operate freely.

The last annual reports from Scholar at Risk International provided documentary evidence that attacks carried out, by both state and non-state actors, on scholars on higher education communities around the world occur with alarming frequency using a variety of legal, economic and administrative means, but with the common motivation to control or silence higher education institutions and their personnel. Consequently, academics can be victims of threats (Sar Free to think 2018, 2019 and 2020). The attacks concerning scholars and students killed, arrested, or subjected to other coercive force in connection with their expressive activity, not only harm their immediate victims but also damage the university space more broadly.

Despite the absence of cases reported for the year 2018 in the Sar's Academic Freedom Monitoring Project¹ regarding Colombia (as this article will exemplify a large number of violations is not recorded), five cases have been registered for the period of April-September 2019 and eight cases of killings and violence from November 2019 to November 2020. All these concerned violent threats, aggressions and incidents occurred against students in several institutions, such as in University Javeriana, University of Cundinamarca, National University of Colombia, Universidad del Valle, University of Antioquia, National University of Colombia and Medellin, and National Pedagogic University. As underlined in the report SAR, «such attacks threaten the future of strong, nonviolent student movements, which are important to understanding contemporary issues and to the development of future leaders» (Sar Free to think 2020, p. 4).

The students protested over planned government reforms or/and against cases of corruption in public universities. Their first request consisted of more funding for public education and the dismantling of the Mobile Police Riot Squadron (Esmad) and these requisitions are still valid. The State has the power to ensure the security of higher education communities and, more in general, to provide for the public order; at the same time, the response of State authorities should respect the criteria of necessity and proportionality and not interfere with peaceful exercise of the rights to freedom of expression and freedom of assembly. In particular, Esmad has been accused of using excessive force against the protesters, including beatings and the abusive use of “less-than-lethal”

¹ For more details, see: <https://www.scholarsatrisk.org/academic-freedom-monitoring-project-index/>

weapons. Since November 2019, students, labor unions, indigenous groups, and civil society members have held a series of nation-wide anti-government protests that have shown a convergence on critical issues. This leads us to remember how it is important to identify attacks on academic freedom as part of a global phenomenon and to recognise that «claims to academic freedom fall under existing human rights law, derived from the right to education and the rights to freedom of expression and of opinion» (EP 2018, p. 4).

The alarming situation of human rights defenders in Colombia

Before referring to our case study, which does not result in the Sar's Academic Freedom Monitoring Project, it is worth mentioning, although briefly, the alarming situation of Hrds in Colombia, particularly in rural regions worst affected by the conflict, and the persistence of disparities in the enjoyment of economic, social and cultural rights. This context is determined not only to define the reasons and requests of the mobilizations led by students, but also to understand the testimonies from students and professors involved in the demonstrations occurred in the University of Cauca.

Even though, the Peace Agreement between the Government of Colombia and the Revolutionary Armed Forces of Colombia (Farc) had “well-developed human rights based approach” and it set out “specific provisions on the rights on indigenous people” as well as “mechanisms for the protection of human rights defenders and rural communities” the effective implementation of the Accord has encountered difficulties. The delays are linked to lack of resources, political support by some sectors, interinstitutional coordination and an integrated state presence, particularly in rural areas with a historic presence of the Farc-Ep².

The failure of State in ensuring protection of the civil population in these areas has allowed several smaller illegal armed groups, Farc dissidents, drug trafficking gangs and illegal economies to enter. Consequently, the enemy is nowadays much harder identifiable, mass displacements continue to occur, and those who oppose their interests, such as the ones who support the “Comprehensive Program for Substitution of Crops” envisaged by the Peace Agreement, become easy targets (Forst 2020, p. 10).

² After the South America's longest guerrilla conflict, the revised peace agreement between the Colombian government of President Juan Manuel Santos and the Revolutionary Armed Forces of Colombia (FARC-EP) was ratified by Both houses of Congress on 29-30 November, 2016. The parties agreed on a program “with combines truth telling, public acknowledgment of responsibility, reparations and non – repetition with reduced sanctions for perpetrators (Cassel 2018).

Despite the reduction of the number of general murders by 40% in the Country, the violence against Hrds and social leaders is alarmingly increasing, especially against categories most at risk living in rural and poor areas, who are most affected by criminal groups and illicit economies. From 2016 to 30 June 2019, Colombia was the country with the highest number of murders of Hrds in Latin America, according to the case compiled and verified by the United Nations (Forst 2020, p. 6). Half of the killings occurred in just four provinces, including the Colombian department of Cauca (UN Human Rights Colombia May 2019). Several cases of widespread generalized violence and lethal attacks continue to be registered against indigenous peoples, Afro-Colombians, farm workers, defenders of the rights of L.G.B.T.Q.I.A.+ community (Limpal 2019), and journalists working on human rights issues and corruption (UN Human Rights 2019; M. Forst 2018). The killings of female Hrds increased by almost 50% in 2019 compared to 2018.

According to the records published by UN Human Rights Colombia, 120 activists were killed during the year of 2019. This terrible trend has further increased in 2020, with 66 massacres documented until December, in which 255 people, including 120 Hrds, have been killed in 18 departments (UN Human Rights December 2020).

The Nasa community, in Northern Cauca department, has been one of the worse affected indigenous groups. Only in the first six months of the year 2019, 36 of its members have been killed; six of them defended human rights, 53 have been threatened with death and 8 have been victims of assassination attempts (UN Human Rights Colombia August 2019). During 2020, the number of killings has increased to 66 and repeatedly indigenous guards and leaders have been threatened with death by putting bounties on their heads (UN Human Rights December 2020). The Nasa community is one of the 102 indigenous peoples that live in Colombia and that peacefully withstand the conflict for social justice, the rights and autonomy of indigenous people. This territory is particularly coveted by drug trafficking, because it is suitable for the production of coca and marijuana, but also targeted by international and national companies, particularly by those in the hydroelectric and extractive sector, as the illegal mines.

It is significant how Eduin Mauricio Lectamo, leader of Pueblo Nasa and coordinator inside the *Asociación de Cabildos Indígenas del Norte del Cauca* (Acin) of the project *tejido* (tissue) for the defense of the life and the human rights, define himself: “they say I am a human rights defender, but I am only a man engaged in the protection of earth and of my enlarged family, namely my *Pueblo*”³. On the eve and after the local and regional elections, planned for the 27 October 2019, the situation became even more dramatic, reaching 33 Hrds killed between May-September 2019, especially

³ Extracted from the report held by Eduin Mauricio Lectamo on 24 November 2018 in Verona during the conference “La difesa della terra e della Comunità” (Verona, Società Letteraria, 24 November 2020).

defenders of land and opponents of illegal armed and economic groups⁴, and the threats against all those who adopt a position for political culture and non-violence have been increasing since then.

It is worth remembering that Karina García, who was running for mayor in the municipality of Suarez (Department of Cauca), in week after the signing of a pact for political culture and non-violence in the election campaign, was killed on 2 September 2019 in a terrible attack in which almost five other individuals died (UN Human Rights Colombia November 2019).

Even after the last elections, won across the country by the center-left, the number of indigenous people killed in the area raised sharply as armed groups seek to seize control. On 29 October, the governor Cristina Bautista of the Nasa Tacueyó indigenous community and four indigenous guard volunteers, who are tasked with protecting communities and who do not carry arms other than traditional wooden staves, were killed.

The day after the attack, President Duque travelled to Cauca to announce a major deployment of up to 2.500 soldiers to the region. Human rights organisations have opposed the decision to further militarise the region, saying that this could lead to violations by state security forces.

Following the decision pronounced by the Constitutional Court in 2016⁵ that in its turn recalls the international human rights treaties ratified by the Colombian Congress, the State is required to adopt measures on prevention and protection in close consultation with the beneficiaries, in this case the authorities of the Nasa Pueblo. The State response for an effective protection of physical and cultural integrity of the indigenous people and the territories most affected by illegal groups cannot consist of merely security and armed operation, but requires also other measures, such as support for the education, access to justice, health, infrastructure, social programs and positive measures to implement a culture for human rights.

The Colombian Constitution recognises the rights and the autonomy of indigenous people, as well as the Afro-Colombian populations, not only their rights to govern themselves with own authorities to have a special jurisdiction, but also their social-economic-cultural identity. Furthermore, the rights of indigenous people have been defended by the ILO Convention no. 169.

It is increasingly urgent to tackle the structural causes that sustain violence against Hrds, in order to prevent the attacks and to prosecute the responsible for the violations conferring on the victims and their families a right to justice, truth and reparations. As requested by the international bodies for

⁴ According to the Special Rapporteur, M. Forst, environmental defenders “have been particularly affected and criminalized for their participation in peaceful assemblies against extractive and business projects for the defence of environmental”, and in the majority of judicial process concerning the criminalization of defenders in the context of social protest, they are apprehended and subjected to preventive detention (Forst 2018, p. 11).

⁵ Corte Constitucional de Colombia, Sentencia T-030/16, Accion de tutela para obtener cumplimiento de medidas cautelares ordenadas por la Corte Interamericana de Derechos Humanos en sus Sentencias, <http://www.corteconstitucional.gov.co/relatoria/2016/t-030-16.htm>.

human rights, Colombia urgently needs the adoption and the development of a comprehensive security and protection policy on prevention and protection of Hrds (Pao)⁶ in close consultation with the *Procuraduría* and, especially, the national Nhris, called *Defensoría del pueblo*⁷. This has been accredited with an A status, that means a status fully compliant with the Paris Principles. Its mandate includes competences to investigate complaints and provide effective protection.

The State should value the essential contribution of defending human rights adopting a strategy against the stigmatization of Hrds (blamed as “guerilleros, internal enemy, terrorists, anti-development, or informants”), but “the vast majority of them are unable to work in a safe and supportive environment. They lack positive social and public recognition and are undermined and criminalized because of their human rights work by State and non-State actors” (Forst 2020, p. 17). Forst’s report about the Hrds’ situation in Colombia for the forty-third session of Human Rights Council (from February, 24th to March, 20th 2020) underlines also as national and international corporations operating in rural communities are adversely affecting the human rights situation. The Special Rapporteur expresses concern about corporate abuse and recommends that companies, even if they are not responsible for these attacks, they should work to prevent and mitigate them, in accordance with the UN Guiding Principles on Business and Human Rights.

Forst’s presentation should be followed up by a second visit before the end of Special Rapporteur’s term, but the Government vehemently disagreed with Forst’s findings and it has been critical of the work of the OHCHR office in the country, despite a recent renewal of its mandate.

On the 2nd March 2020, 430 Colombian NGOs and 41 international NGOs expressed their support for the work of the OHCHR Office⁸. The same organizations required that the Colombian State did not use measures in response to the Sars-CoV-2 pandemic as a pretext to weaken or withdraw protection for Hrds and social leaders⁹. In fact, on 15 December 2020, the Commissioner for Human Rights, Michelle Bachelet, called on State authorities “to take stronger and much more

⁶ The Organisations for human Rights at international at national level welcomed the decision taken by the Government to adopt on 19 November 2018, the decree 2137 signed by the President which creates the Inter-Institutional Commission for the development of the “Plan de Acción Oportuna de Prevención y Protección para los Defensores de Derechos Humanos, Líderes sociales, comunales y periodistas” (PAO), <https://www.mininterior.gov.co/sala-de-prensa/plan-de-accion-oportuna-de-prevencion-y-proteccion-pao>.

⁷ This is an organism part of the institutional architecture of State but independent, that acts to guarantee and protect human rights and human rights defenders. On 20th of December 1993, the General Assembly of the United Nations formally recognized the “importance of developing, in accordance with national legislation, effective national institutions for the promotion and protection of human rights”. Although the resolution is merely exhortative, in the past twenty years the number of National Human Rights Institutions (Nhris) has significantly grown. The resolution endorsed the Paris Principles, which represents the minimum standards applicable to Nhris entrusted with a mandate to protect and promote human rights. The level of compliance with those principles is reflected by the accreditation status accorded to Nhris (E. Brems et al. 2013; Linos - Pegram 2016; Mertus 2012).

⁸ Respalmdados la labor de la Oficina en Colombia de la Alta Comisionada de Naciones Unidas para los Derechos Humanos y a su Representante Alberto Brunori, 2 Marcho 2020, <http://www.ishr.ch/>

effective action to protect the population from this appalling and pervasive violence (...) dismantling the criminal groups that succeeded paramilitary structures and their support networks (...) and implementing a whole range of comprehensive public policies, not only to clamp down on those responsible for the violence, but also to provide basic services and safeguard the fundamental rights of the population" (UN Human Rights December 2020)¹⁰.

The national students' protest and the case law of Unicauca

The region of Cauca, marked by an incessant and unacceptable violence suffered by the communities and indigenous peoples, as it has been described in the previous paragraph, would miss an emancipatory force if it were not for the University of Cauca (UniCauca)¹¹, a well-known public institution located in the city of Popayan, in the Cauca Department, offering higher education for 180 years to students from the region and country.

The violence emerge not only in the act of throwing stones during the protests, but also in structural inequalities that affect the civil society. In the same way, the student organisation and platform *Unidad Estudiantil* (Unees)¹², which is the first students' organization in Colombia that succeeded in negotiating with the national Government, declares itself sensitive to the requests of the indigenous and rural movements.

This convergence should have been visible also due to the coincidence in time of their protest, but in fact, the students' protest anticipated the widespread demonstration and collective action, locally known as *Minga*, which the Regional Indigenous Council of Cauca (Cric) led at the Cauca Valley since the 10 March 2019 for the defense of life, territory, democracy, justice and peace. The manifestation reminded many of the last major such protest in 2011 and received support and endorsement by teachers, parents, representatives of different social sectors and trade unions who

⁹ Several Organisations, including PBI, express the urgency of protecting these rights in this situation of pandemic, particularly for the population historically excluded from the enjoyment of such fundamental rights: <https://www.peacebrigades.org/en/news/now-more-ever-we-must-all-defend-human-rights>.

¹⁰ About the risks that Colombian Hrds face and their experiences of protection measures see also Cousins and Schmitz 2021, pp. 130-157.

¹¹ On 13 June 2019, Unicauca was once more recognized a quality University, although events similar to the disorders arrived the year before seriously prevent the accreditation (Resolución Ministerio de Educación Nacional, n. 6218, <https://www.unicauca.edu.co/versionP/documentos/resoluciones/resoluci%C3%B3n-6218-por-medio-de-la-cual-se-renueva-la-acreditaci%C3%B3n-institucional-de-alta-calidad-la>).

¹² UNEES was founded in March 2018 to facilitate the relations among the components of the Federación des Estudiantes Universitarios (Feu). In September 2018, the members of UNEES sent their claims to the Government preannouncing the protest in case of failed negotiations. In the same month, the internal structure of the platform was developed with the establishment of specialised committees. In addition to the "academic Commission", with political and organisational functions at national and local level, the committees "human rights", "communication" and "health" played an important role during the protest.

sought after a free, dignified, inclusive and quality education. In this case, as during the education sector protests, criminalization in the context of social protest involved arbitrary arrests and the excessive use of force by the public security forces (Forst 2020, p. 9).

Back in 2009, the Special Rapporteur of the situation of Hrds, Mrs. Margaret Sekaggya, following her visit to Colombia included students and youth activists in the categories of defenders who suffered a situation of persistent insecurity and a systematic stigmatization by Government officials and non-State actors.

The UN Special Rapporteur on the situation of Hrds, Michel Forst, in his final statement at the end of his mission to Colombia expressed concerns about the situation of over 100.000 students mobilized in Bogota and major cities in Colombia since the 10 October 2018. The protest was against the decision of the national government to reduce the budget for the higher public education, the government actions against armed groups that targeted teachers and social leaders, the subjugation of higher education to market demands and other reforms, apparently and singularly not so relevant, but able to damage the education and social-cultural rights (Forst 2018, p. 13). Strikes led to the closure of 32 universities. University students have been protesting since 2018, on certain campuses, over corruption, perceived unmet promises for increasing the education budget, and alleged abuses by the police against education-related protesters (GCPEA 2020, p. 1).

In addition to the claims decided at national level, the programme of each student representation contained specific requests. The UniCauca students demanded more democracy, freedom of expression, recognition of Unees within the university as a social movement engaged for the higher education space and, nonetheless, specific training about human rights, managing risk and strengthening protection.

The report, in the part concerning students' demonstrations occurred in Bogota and in other cities, makes reference to “shrinking civic space and criminalization of social protest”, due to the testimonies collected about unnecessary use of force by Esmad; repeated threats against student leaders by emails, telephone calls, text messages and pamphlets; criminalization of social protest and the presence of violent infiltrators and several people arrested, of which 95 only in the demonstration occurred on 15 November in Bogota, some of them in judicial process (UN Human Rights December 2018).

In November 2018, the UN Human Rights Office in Colombia expressed its concerned for the incidents occurred during the students strike in the region of Cauca and in Bogota and requested that the competent authorities at national and local levels with regard to the maintenance of law and public order prevent all forms of abuse by members of the security forces (UN Human Rights Colombia November 2018).

The Organism for the United Nations urges Government to ensure the promotion and protection of human rights in the context of peaceful protests in accordance with the Protocol on the right to social protest, adopted in August 2018 by the Ministry of Internal Affairs,¹³ and the international standards relevant to freedom of assembly, freedom of expression and participation in public affairs, such as the Covenant on Civil and Political Rights under articles 19 and 21. Only the assembly organized with peaceful intentions are protected by international human rights instruments but “assembly organizers should not be held liable for the violent behaviour committed by others” (UN Human Rights January 2013).

The clashes occurred in Popayan have been among those with worst consequences at national level. In this case, the mobilization began on 11 October 2018 and intended to continue indefinitely until the achievement of requests. They were conscious that the main difficulty was not to start the strike, but to proceed it keeping the legitimacy by the public opinion. The students moved from the University area to the main square of the historical centre, a place that represents the heart of the city at religious, touristic and economic levels. The square became the head quarter of the camp, with a student presence 24/7. The demonstrators were aware of the serious danger to their safety arising from this choice. They continued to proactively seek a dialogue with local decision-makers, but no results were achieved. On the other hand, at least a part of the citizens was with students. The more the participation and the support to students increased, the more the press attempted to delegitimize the movement¹⁴. The students were defined by the press as “hoodeds”, “vandals” (for the writings on the walls) and “lazies”.

Regardless of the efforts of the Dean, on 23 November at 6 pm the response of the army was requested. Because the army is trained only to attack the enemy, the consequences would have been disastrous. Once again, the human rights institution and the University avoided the worst. They negotiated, as a last resort, that a professor near to students and at risk for his engagement at political and social level, persuaded them to clear the road and to demobilize the camp inside the Faculty of engineering. However, the protests did not stop.

The students convened a march at national level for the 13 December 2018 in order to claim the start of negotiations with the Government. That day other clashes between the demonstrators and

¹³ Ministerio del Interior, Resolución no. 1190/2018 - Protocolo para la coordinación de las acciones de respeto y garantía a la protesta adoptado el 3 de agosto de 2018, https://www.elespectador.com/sites/default/files/pdf-file/resol-1190-18-adopta_protocolo_protesta_pacifica.pdf

¹⁴ “The violence being reported in the media is another *falso positivo*, explains one student, referring to the past practice of the state forces of seeking pay bonuses by murdering poor people and disguising them as guerrillas” (S. Hide, Student strikes continue: The march of the pencils, The Bogota Post, 16 November 2018). More in general, about the role of mass media in the delegitimation of contemporary student protest against market-oriented reforms in higher education see Mampaey J., De Wit K. & Broucker B. (2019).

the police were spotted in Popayan and in other cities. Next to students there were parents, teachers, workers.

Wounded and arrested students during the demonstration were needed to persuade the Government to finally open the negotiations in December.

At least for now, it does not seem that the agreement signed on 14 December 2018 has been implemented by national authorities both regarding funding and human rights claims, although there are testimonies and proofs about abusive use of force by police, menaces to students and professors. For these reasons, the situation has been considered an attack to the higher education.

In the following month the students, in the meantime, requested the negotiations to continue and the national protocol for the social protest has been followed¹⁵.

Otherwise, it might have been expected, the students protest did not wait until the outcome of the regional elections before eventually restarting. In fact, in September 2019 after reportedly Esmad's violent response (with injuries and at least two students and one professor arrested) against an anti-corruption protest led by students from FJCDU University, in Bogota several universities took to the street to denounce violent tactics deployed by the security forces to repress pacific demonstrations¹⁶. Shortly after, it was the students who started on 21 November the *paro nacional*, followed immediately by trade unions, human rights groups, indigenous organisations and opposition parties, among others. The governmental neoliberal reforms for labor and pension have been criticized; the slow-walking of the rollout of the peace agreement; the lack and/or the inadequacy of the government action against corruption and the protection of social leaders and indigenous people; the compression of the right to demonstrate. The 18-year-old student Dilan Cruz, who died on 26 November 2019, has become a symbol of protest and excessive use of force by Esmad, that are responsible for the deaths of 34 people from 1999 until today, according to a report of the NGO *Temblores* (Temblores 2019).

In the Region of Cauca the solidarity of the indigenous communities in defense of students was manifested out of universities with human chains to avoid acts of abuse of force by special forces. The UN High Commissioner for human rights in Colombia raised concerns about the high number of messages on social media and in newspapers that stigmatised social protest or that recalled the use of violence in the mobilization of numerous sector (UN Human Rights Colombia November 2019).

¹⁵ The Special Rapporteur Forst expressed concern about “bill No. 281 of 2018 which could contribute to the criminalization of social protests, and the apparent failure to implement the National Protocol on Social Protest adopted within the framework of the National Committee on Safeguards” (Forst, 2020, p. 9).

¹⁶ The events of the FJCDU protest are reported also by SAR's Academic Freedom Monitoring Project: <https://www.scholarsatrisk.org/academic-freedom-monitoring-project-index/>

While most of the protests have been peaceful, some properties were vandalised when the demonstrations first broke out. The government response closed Colombia's borders and deployed 170,000 members of the security force, towards which President Duque has reiterated his support.

Conclusion

The condemnation by the international community of the “heightened violence being carried out by non-state armed groups, criminal groups and other armed elements in Colombia” joins with the call on the Colombian authorities “to provide a safe environment to enable people from all sectors of society to participate in public and cultural affairs, free of fear, intimidation or stigmatization” (UN Human Rights Colombia December 2020). This request, renovated by the Office of the UN High Commissioner for Human Rights in December 2020, concerns also the topic treated by this paper: the academic freedom and the active participation of students in the social movements. It seems, therefore, appropriate to conclude by trying to make an assessment, albeit partial, about the results of this student demonstration at national and local level. In this regard, it is important to highlight how, a direct experience, or also a direct knowledge of the different testimonies of the actors involved in the protest at different levels - students, teaching and administrative staff, NGOS and Institutions - is crucial in order to know better their reasons and the achieved results. This paper, therefore, takes into account the different testimonies shared during a meeting held in July 2019 at the Unicauca in addition to the reports from international and national human rights organisations. At national level the position of the Government and the requests of students seem still far to find a common ground, although some concessions have been made, partially, in the area of higher education funding. However, it is known that an adequate and reliable level of funding for education is a basic assumption for implementing the right to education and the academic freedom. More extensive results have been achieved as it concerns Unees and its affirmation inside of Unicauca and in relation to its coordination with other social movements in that area. It is important to call the attention to these results because they demonstrate a positive example given by a student movement to engage in a dialogue with the University administration and the social forces engaged on the territory, and, meanwhile, the involvement by the University administration to meet such requirements of students in the perspective of a collaboration for advances towards the objectives of free, dignified, inclusive and quality education.

We can mention, as an example, the creation, since the month of May 2019, of the new course *Diplomado en Derechos Humanos con Énfasis en Políticas Públicas de Prevención y Protección* required by students, which is opened to the community, in addition to the development in the

drafting of the new regulation for students written by themselves¹⁷. It is a meaningful decision the one taken by the *Rectoria* in November 2019, after following this training, to formally recognize as Hrds, in conformity with the UN Declaration of human rights, the components of the students committee for human rights. This act, and the subsequent visibility given to it, is highly significant. The fact that the university itself recognises, protects and trains the committee's members also means that in times of tension during protests they can be considered as important channels for dialogue between the parties. Another relevant result obtained at local level (although was also requested by the student movements at national level) has been the free enrolment of the students from lower social classes during the pandemic. The growth of this student movement as an important social movement in the region for the defence of human rights has been evidenced by the new presence of one representative student of Unees inside the *Mesa de garantías en materia de DD.HH. en el departamento del Cauca*. This commission, composed by only ten spokesmen from the many social movements for human rights in the region, aims to analyse the human rights context, in order to prevent accidents and issue early warnings, as well as to investigate threats and attacks against the integrity and lives of social leaders.

Unicauca declares “tenir un compromiso histórico, vital y permanente con la construcción de una sociedad equitativa y justa en la formación de un ser humano integral, ético y solidario”. It means that the University must be engaged in solving societal problems and strive for the achievement of peace in the territory, interpreted not only as physical space, but also as social-cultural space. In this way, a public University not only respects the negative legal obligation under international human rights law, but also takes effective action to promote and fulfil the rights in a positive dimension.

As pointed out by the Dean of Unicauca, these objectives require a unified action inside the University's organizational process and a structured space of coordination among its members, including teaching staff, administrative staff and students, who will benefit from the long term results of human rights enforcement.

Dialogue and negotiations between the parties and State commitment to safeguard human rights have been invoked as the only possible solution in response to the worrying developments of the mass mobilization that erupted on 28 April 2021 highlighting the failure of the state to address a widespread social dissatisfaction, which with the pandemic has only further increased. Even after the presidency announcement on 2 May that the proposed reform, which would have lowered the

¹⁷ “Este ejercicio académico tiene el objetivo de darle la posibilidad a los participantes de conocer, identificar y entender los fundamentos de los Derechos Humanos, focalizado en lo histórico, conceptual y práctico, ilustrando la protección que a nivel nacional consagra la actual Constitución Política de Colombia, como también conocer el sistema de prevención y alerta para reacción rápida a la presencia, acciones y/o actividades de las organizaciones, hechos y conductas generales que pongan en riesgo los derechos de la población”.

salaries taxes should be withdrawn, the protests continued, above all in Cali and Popayan, expanding in other regions and taking an anti-system connotation against the neoliberal policies and the violence of State in Colombia.

Young people of the cities have been in “primera línea” in the protests since 28 April, but they have not been alone: workers, farmworkers, artists, mums and, mostly indigenous people, such as members of the Regional Indigenous Council of Cauca (CRIC)¹⁸, have joined them to the streets and cooperated in collective experiences aimed at reorganising the civic space from below. For example, they have developed community kitchens and transformed unused police stations into libraries, in particular in the most deprived neighbourhoods of the cities forgotten by urban development projects. As pointed out by the president of the Commission for human rights inside the European Parliament, Maria Arena, the number of attacks on, and intimidation of, human right defenders has continued to multiply in the context of social protests (European Parliament, 2021).

The requests incessantly submitted by the demonstrators even after the withdrawal of the health reform have been related to the end of the repression, a basic income, a radical change in public policy to assist the disadvantaged social classes¹⁹ and guarantees for the right to health and education. At the same time, they have also insistently requested for the dismantling of the riot police force Esmad, accused of systematic violence against the population, and the defence of the territories of indigenous communities threatened by extractivism, armed groups and drug trafficking. In addition, the social dissatisfaction has been considered a symptom of how the Duque Government has progressively lost democratic legitimacy. There are several worrying signs of how a process of democratic erosion is taking place in the country, such as acts of violence (including murders, hundreds of disappearances, dozens of deaths, victims of sexual violence and arbitrary detention), the indiscriminate use of force by the police against the demonstrators documented by dozens of amatorial video²⁰, the aggressions against independent journalists, the deployment of military troops to Cali and other centres of the protest established with the emergency decree 575.

On 25 May the Inter-American Commission on human right (IACHR), which, until the 4 June, was not granted permission by the government to conduct an observation visit to monitor the situation of

¹⁸ The indigenous people shared food and natural medicines, spiritually accompanied the mobilised communities and staged the traditional protest and collective action “Minga” blocking several roads.

¹⁹ In the last year, the Colombian economy contracted by 6.8 % and unemployment rose by 16 %. 42 % of Colombians live below the poverty line and the government has not provided any form of support for the poorest social groups (MORI (2021)). In Cali, the third biggest city in Colombia and the epicentre of the protests, during the pandemic, the number of people in poverty has increased three times more than in the rest of the country.

²⁰ In May 2021, the Interamerican Commission on Human Rights (IAHCR) has received thousands of complaints linked to an excessive use of force and violent acts, thus the Commission has repeatedly requested to conduct an observation visit to monitor the situation of human rights in the context of social protests, but the Government has been against it (IAHCR (25 May 2021)).

human rights in the context of social protests, reminded the State of Colombia its international obligations²¹. On 30 May the UN High Commissioner for Human Rights, Michelle Bachelet, called for a swift investigation because she considered that “it is essential that all those who are reportedly involved in causing injury or death, including state officials, are subject to prompt, effective, independent, impartial and transparent investigations and that those responsible are held accountable” (UN Human Rights May 2021). At the same time, it’s crucial to find a political solution and to support who are engaged at local level in the challenge to find the basis for an initial agreement establishing a process of dialogue between the parties and setting out several guarantees to be respected in the prospective of the longed-for territorial peace²².

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²¹ On 4 June the IAHCR announced its visit in Bogota and Cali from 8 to 10 June in order to “dialogar y recibir información de amplios sectores” and “escuchar a las víctimas de violaciones a los derechos humanos y sus familiares para recibir testimonios, denuncias y comunicaciones” (IAHCR (4 June 2021)).

²² On 13 May, the Rector of Unicauca in a statement in response to the clashes in Popayan, to the cases of arbitrary detention and violence reported by students of the same University, called for guarantees in favour of the integrity of the university campus and reaffirmed once again that “La Universidad del Cauca seguirá dando condiciones para que nuestra comunidad universitaria siga aportando a la construcción de un mayor país y a lograr la paz territorial que tanto anoramos, por la vía del diálogo y la concertación en medio de la diversidad y la diferencia”.

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Acronyms

Cric	Regional Indigenous Council of Cauca
Esmad	Esquadron Movil Antidisurbios
Farc	Revolutionary Armed Forces of Colombia
Feu	Federación des Estudiantes Universitarios
Nhris	National Human Rights Institutions
Pao	Plan de Acción Oportuna de Prevención y Protección para los Defensores de Derechos Humanos, Líderes sociales, comunales y periodistas
Sar	Scholar at Risk
Unees	Unidad Estudiantil
UniCauca	Universidad del Cauca

GLOBAL CITIZENSHIP EDUCATION: LEARNING FROM THE EUROPEAN DEBATE AND PRACTICES

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Abstract

The paper provides an overview of the current Global Citizenship Education framework and key European Union policies and studies. It also presents two case studies offering examples of how to integrate Global Citizenship Education in formal education and to enhance its cross-curricular and transformative learning aspects in higher education. It focuses on the European award process facilitated by the Global Education Network in Europe which provides promising documentation and research opportunities in order to facilitate peer reviews and learning to ground the debate and policy measures concerning the introduction and the integration of GCE in non-formal education as well as in formal education settings and curricula.

L'articolo presenta una rassegna degli attuali riferimenti chiave in merito all'educazione alla cittadinanza globale, insieme ad un'introduzione ai programmi e agli studi chiave nell'ambito dell'Unione Europea. Presenta, inoltre, due esempi di progetti che indicano come integrare l'educazione alla cittadinanza globale nei contesti dell'educazione formale e come svilupparne gli aspetti trans-disciplinari e relative agli apprendimenti trasformativi nell'istruzione superiore. Prende in considerazione il lavoro del Global Education Network in Europe di assegnazione di premi in questo ambito a livello europeo e di documentazione e ricerca per facilitare apprendimento e feedback fra pari, elementi importanti per costruire un terreno comune di dibattito e di sviluppo di politiche per l'introduzione e l'integrazione della ECG sia nell'educazione non-formale, sia nei contesti e nei curricula dell'educazione formale.

Keywords

Global Citizenship Education, Transformative Learning.

Global Citizenship Education and International frameworks

According to Sustainable Development Goals' Target 4.7 one of the commitment of the Agenda 2030 is that "all learners acquire knowledge and skills needed to promote sustainable development, including among others through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture's contribution to sustainable development". It is an ambitious target centred on both formal and non-formal educational policies and practices in the field of Global Citizenship. From an educational perspective (Mannion et al. 2011) it is also a controversial statement as on one side it acknowledges the appreciation of cultural diversity and on the other side it takes for granted something that has become almost an oxymoron, the possibility to have "sustainability" embedded in "development" (Boström, 2018). Unfortunately the present

ecological crisis is bearing witness that the current understanding of “development” is far from implying “sustainability” as in the latter case it should be “based on the concept of *parsimony*, rather than on an ever expanding consumption of materials and energy. The objectives of development must therefore shift towards a more equitable *distribution* of the accumulated stock of wealth (including access to resources), and a greater emphasis on the *qualitative* dimension of social and economic progress” (Friend, 1992:160)

At the international level, Global Citizenship Education (GCE) was first addressed within the United Nations with the Recommendation concerning Education for International Understanding, Co-operation and Peace and Education relating to Human Rights and Fundamental Freedoms adopted by UNESCO’s General Conference at its 18th session in 1974. The 6th Consultation on the implementation in 2012-2016 of the 1974 Recommendation reports a disparity between high level of policy commitment and need for more progress in teacher education (UNESCO, 2018a). UNESCO’s education sector programme considers GCE as a strategic area characterized by three notions that distinguish GCE from other educational approaches: (i) “respect for diversity”, (ii) “solidarity”, and (iii) a “shared sense of humanity”. UNESCO (2015, 2018b) summarises three core conceptual dimensions of global citizenship education: cognitive (to acquire knowledge, understanding and critical thinking about global, regional, national and local issues and the interconnectedness and interdependency of different countries and populations); socio-emotional (to have a sense of belonging to a common humanity, sharing values and responsibilities, empathy, solidarity and respect for differences and diversity); behavioural (to act effectively and responsibly at local, national and global levels for a more peaceful and sustainable world).

At the European level, the Council of Europe developed a conceptual model outlining twenty competences that citizens should require to participate effectively in a culture of democracy (Council of Europe, 2016). This model is based on a systematic analysis of over one hundred previous conceptual definitions of democratic competence. This led to the identification of 55 already mapped competences that were checked against a set of criteria and pragmatic considerations in order to identify the key 20 competences. They include three sets of values (Valuing human dignity and human rights; Valuing cultural diversity; Valuing democracy, justice, fairness, equality and the rule of law), six attitudes (Openness to cultural otherness and to other beliefs, world views and practices; Respect; Civic-mindedness; Responsibility; Self-efficacy; Tolerance of ambiguity), eight skills (Autonomous learning skills; Analytical and critical thinking skills; Skills of listening and observing; Empathy; Flexibility and adaptability; Linguistic, communicative and plurilingual skills; Co-operation skills; Conflict-resolution skills), and three bodies of knowledge and critical understanding (Knowledge and critical understanding of the self;

Knowledge and critical understanding of language and communication; Knowledge and critical understanding of the world: politics, law, human rights, culture, cultures, religions, history, media, economies, environment, sustainability).

Recently, Reimers (2020) has grounded GCE within a five-dimension theory including interrelated cultural, psychological, professional, institutional, and political perspectives. Davies et al. (2018:XIV) contributed to re-conceptualised GCE as underpinned by a number of key concepts with special emphasis on five main dimensions:

- (i) Justice, understanding how particular approaches to justice can inform democratic approaches to global citizenship education;
- (ii) Equity, stressing the need to explore citizenship from the perspective of those marginalised or excluded, as well as the need to acknowledge positionality;
- (iii) Diversity, as well as (iv) Identity and belonging, relate to the idea of a culturally responsive learning environment and process;
- (v) Sustainable development, mainly translated into the need to balance economic, environmental and social goals.

In relation to European initiatives in this field, Surian (2018) and Andreotti (2010) outline a colonial bias. As Grosfoguel (2007:211) explains: “Although ‘colonialism administrations’ have been entirely eradicated and the majority of the periphery is politically organised into independent states, non-European people are still living under crude European exploitation and domination. The old colonial hierarchies of European versus non-Europeans remain in place and are entangled with the ‘international division of labour’ and accumulation of capital at a world-scale”. According to Andreotti (2010) such bias should be addressed with a transformative approach taking into account “at least three inter-dependent dimensions of global citizenship education. The first is how educators imagine the ‘globe’ in global citizenship and education. The second is how educators imagine themselves as ‘global educators’ and their students as ‘global citizens’. The third is how educators imagine knowledge and learning beyond Eurocentric paradigms”. Therefore a key challenge is how to take into account alternative ways of thinking about and engaging with others to expand the current GCE focus. In line with this perspective Sharma (2018:43) suggests an intercultural GCE focus, i.e. one that engages with non-Western and less widely known perspectives, for instance those provided by Asian thinkers such as Makiguchi, Gandhi, and Ikeda. Among African scholars Swanson (2015:34) suggests to explore the “Ubuntu” concept in relation to global citizenship and related education initiatives: “Ubuntu is short for an isiXhosa proverb in

Southern Africa. It comes from the phrase, Umuntu ngumuntu ngabantu , a person is a person through their relationship to others. Ubuntu is recognized as the African philosophy of humanism, linking the individual to the collective through brotherhood or sisterhood. It makes a fundamental contribution to indigenous ways of knowing and being.” Therefore, ubuntuizing GCE would serve the purpose of decolonising it. “Ubuntu” is included by UNESCO (2018b) among the concepts that promote ideas that “echo those at the core of GCE” such as “Sumak kawsay” (“Well-being”), from Ecuador. From a Latin American and a youth perspective, Cunha and Gomes (2012:104) consider the work of Enrique Dussel, Aníbal Qijano and Walter Mignolo as crucial in order to understand persisting elements of colonialism and coloniality of knowledge that shape power relations in the social realm after the end of the colonial cycle as such: “colonialism, as a formal political system, may have come to an end, but that it maintains a central role in the social imagination as a system that legitimises roles and relationships of dominators and dominated, citizens and subjects, hegemonies and subalterns, based on cultural differentialism, racism, religion and role in human history”.

European Practices and the Global Education Awards

The European Commission offers to civil society organisations and to local authorities specific awareness raising and education grants managed by the Directorate General Development Cooperation (Unit B1 Gender Equality, Human Rights and Democratic Governance) to ensure the commitment of EU citizens to development and to contribute to sustainable lifestyle patterns of EU citizens. The budget line aims (a) to develop European citizens’ awareness and critical understanding of the interdependent world, of roles and responsibilities in relation to the development issues of the “People” and “Planet” pillars of the Consensus, and (b) to encourage their active engagement with global attempts to address these issues whilst simultaneously promoting fundamental values. The type of actions include (a) awareness raising campaigns and communication actions, and (b) global learning with pilot actions intended to be complementary with those of the European Union Member States’ efforts in “development education”.

In the last twenty years the Global Education Network Europe GENE has been facilitating international networking and peer review process in this field bringing together different policy makers and governmental actors in the field of education and international cooperation, local authorities, civil society organisations (Wegimont, 2018). By “Global Education” GENE offers an inclusive term which is “understood to encompass Development Education, Human Rights Education, Education for Sustainability, Education for Peace and Conflict Prevention and

Intercultural Education; being the global dimension of Education for Citizenship” (O’Loughlin & Wegimont, 2003) as stated in the Maastricht Global Education Declaration drafted at the occasion of the 2002 Global Education Congress organised by the North-South Centre of the Council of Europe.

Since 2015 the GENE programme, funded by the European Commission, includes a programme area called Increase and Innovation. The Innovation part triggered the development of the Global Education Innovation Award, which intends to highlight and to support innovative Global Education initiatives in a diversity of sectors and countries in Europe and to share the learning from these initiatives with policy makers throughout Europe.

GENE’s rationale behind the award is that most Global Education funds reward and highlight success, but not necessarily innovation. GENE deemed as interesting to document not only success but also mistakes and failures as innovation involves risk taking. In turn, risk taking may lead to both successes and failures. GENE considers that in education, as well as in policy making, failure is often hidden while research shows that policy makers and organisations can learn from failure, from new breakthroughs and from creative newness (Nedergaard, 2006:438) in environments that enable such learning. This reflection sparked three editions of the GENE Award focusing on innovation in 2017 and 2018, and on new global education project ideas in 2019. The process included the appointment of an International Selection Committee of the GENE Global Education Awards in order to work in collaboration with the GENE Board around the relevance and value of innovation in Global Education. Following the first edition of the award, the GENE Board and Secretariat undertook a joint reflection with the International Selection Committee on the process itself, the 83 applying initiatives as well as the 32 shortlisted projects. This reflection led to a publication documenting and analysing the range of practices documented across the 32 applications (Trindade Dolejšiová, 2018). The publication enabled researchers to identify similarities and differences in global education values across the European Union taking into account both applicants’ and institutional documents. The analysis was carried out by researchers of University College (CUNY) of New York and of the University of Padova.

Values and case studies across the GENE Global Education Awards

The analysis revealed 48 values that were subsequently organised into 14 major values by meaning and, ultimately, three rhetorical processes: emphasising goals (what), practices (how), or project justifying processes (why). Goal values were the most numerous across the sentences in a full database of applications and institutional documents (1.471 sentences). The focus specifically on

eliminating exclusion was most frequently expressed by the applicants, whereas emphasis on universal values was the most interesting of the institutional documents. Practice values were mentioned in 884 sentences, while project justifying values concerned 783 sentences. These types of values were expressed primarily by the applicants, in line with the applicants' role to advocate for their projects. Practice values emphasised innovations (296), which was the name of the Award, but also, more uniquely with goals emphasising first-hand experience and immersion in practices (241), providing necessary tools and supports (207), and collaborating (77). The most frequent major value expressed the importance of measuring project outcomes. This implied self-assessments (a value within the project justifying group), creating change (a value within the goal group), global-local connections (another value within the goal group), and integrative innovations (a value within the practice group). The combination of these values indicates a balance of goals, practices, and project justifications. Overall, the values expressed by applicants and the institutional documents indicate a shared foundation of Global Education. The applicants are illustrating and not only stating concepts and they prioritise justice, equity, diversity and belonging, and sustainable development. These findings support recent research by Hartmeyer and Wegimont (2016:245-6) and specifically three foci: (a) current educational debates at a European level, including the development of competencies and emerging forms of citizenship, can benefit from, and should be informed by a global learning perspective. (b) A Global Learning perspective will also be needed in the continuing debate about the relationship between education and social change; whether and how Global Education will or can change the situation in the world locally, national and globally. (c) Necessities for Global Education: the need to be challenged by differing and previously excluded perspectives; the need to include challenging, alternative and Southern voices; the need to go beyond the North-South paradigm, and the development paradigm to include a more Global Education perspective (Daiute et al., 2018).

These types of analysis acquire more relevance in connection with recent research carried out by Goren and Yemini (2017) that maps the progress and evolution of GCE research during the last decade. Their work identifies a global trend among educators and policymakers who are seeking to integrate GCE into education curricula (Eurydice, 2017). The 2018 and 2019 editions of the GENE Awards provide significant examples.

In Ireland, WorldWise Global Schools promote the "Global Passport Award" which was awarded by GENE in 2018. Activities include: workshops, curriculum resources, teacher training, Global Passport guide, website, school support visits, annual student conference. The Passport is offered to schools as a Global Citizenship Education quality mark, providing a framework to integrate GCE into all aspects of school life. The framework provides step-by-step guidance on how to integrate

GCE through all aspects of school life, ranging from the curriculum to school policy and ethos. Such passport is self-assessed as well as externally audited accreditation for GCE, and it is offered to all secondary schools in Ireland. In order to participate the auditing process, schools have to rate their level of GCE activity according to six categories (known as passport ‘stamps’). Each Passport Stamp represents a different aspect of school life. The total score achieved in all 6 stamps will determine which of the three passport types is awarded. The award is then presented at the spring Annual Student Conference. Therefore schools can apply for 3 different types of passport: (a) Citizen’s Passport, for emerging engagement with GCE; (b) Diplomatic Passport, for established engagement with GCE; (c) Special Passport, for exceptional engagement with GCE. The Global Passport Award Programme has been running since 2015 with over 150 Awards given. The WorldWide Global Schools website provides inspiring examples for schools to get started and to learn about what is happening in other schools around the country and the WorldWide Global Schools organisation provides a comprehensive range of support around the Global Passport. GCE themes that are integrated by schools in the curricula include Responsible Consumption, Climate Justice, Gender Equality and Food Security.

At higher education level, the 2019 GENE awarded “idea” by the Artevelde University of Applied Sciences (Belgium) seems promising. The educational concept is framed as “The Climate Living Lab” and it builds upon transformative learning principle. The Living Lab includes two innovative educational practices, the ClimateLAB and ClimateFACTORY. At the ClimateLAB students look at the future by using service design thinking. While working on these challenges, teams learn about negotiation skills, innovation, seeing cases from different perspectives (possibly leading to disruption in their own beliefs) and they learn skills broader than their own professional competences. The learning focus is based in on learning through feed-back on teamwork and personal contribution within the team. The process encourages students to take responsibility for the solutions to societal and environmental challenges. The results and learning environment of the Living Lab are made available to everyone. The core idea is to inspire teachers and researchers, and to train students to become change makers who learn to deal with dynamic and controversial sustainability issues. The aim is to scaffold learning environments and process where students can acquire action skills that are instrumental to active citizenship.

The second educational practices, the ClimateFACTORY complements the ClimateLAB in terms of methodology and content, reinforcing the work on “glocal” challenges. While at the ClimateLAB. students design solutions during a whole semester (30 ECTS credits) in interdisciplinary, international and intergenerational teams, the ClimateFACTORY identifies and formulates the climate issue and challenges to be addressed in the Lab. The FACTORY is a voluntary and open

coalition in which everyone (students, staff and external stakeholders) can contribute to climate and global issues in an informal learning environment. The ClimateFACTORY offers students and teaching staff the opportunity to break down the barriers of the different classrooms and lesson subjects and work in an experimental, creative, educational environment to set up actions or raise awareness about global issues within the university college. The ClimateFACTORY stands for the concrete implementation of experiments, prototypes and upscaling of global citizenship action initiatives. Both educational practices influence and reinforce each other. There are exchanges of expertise and ideas between the ClimateFACTORY and ClimateLAB to ensure a coherent approach towards global challenges. Specific to the methodology is the fact that students go through a data study, an experience study, an ideate phase, and at least three prototyping cycles. Students are coached to achieve their professional and 21st century competencies. By giving students the ownership of the product development, the process favours and supports intrinsic motivation. Students also have ownership of the end results, so it is possible for them to turn their work into a start-up. The product line is presented to an external jury to identify potential opportunities for the implementation of the project.

Participants (students, staff and external stakeholders) of the ClimateFACTORY join in teams on a voluntary basis. They work in an informal interdisciplinary way and meet like-minded people from various university departments and external organisations. They work in a real-life setting to create global citizenship awareness and actions on the campus. The ClimateFACTORY uses methods that facilitate innovation (e.g. design thinking, brainstorming, community building, scrum, etc.) and meet every 6 to 8 weeks on specific issues. In this way they become change makers in a more informal extracurricular setting.

These two case studies provide examples of ways to scaffold and acknowledge Global Citizenship Education in formal education (the Irish Passport award) as well as to design formal education in ways that enhance cross-curricular and transformative learning aspects (the Belgian higher education Artevelde Lab). These case studies offer examples of ways to transform formal education in a systemic by addressing and introducing different aspects of GCE's generative principles and pedagogies at different levels, including bottom-up strategies. The award process facilitated by GENE provides promising documentation and research opportunities in order to facilitate peer reviews and learning and to ground the debate and policy measures concerning the introduction and the integration of GCE both in non-formal education as well as in formal education settings and curricula.

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WOMEN ENTREPRENEURS OF THE SALOUM. GENDER CHALLENGES FOR SOCIO-ECONOMIC INNOVATION

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Abstract

This anthropological and economic study, combines quantitative approaches with a qualitative investigation for the analysis of training needs, as well as material or cultural obstacles to female entrepreneurship in the Saloum (Kaolack and Kaffrine Senegalese regions). The reflection on the transformation of "traditional" gender balances reflects a various and complex panorama, where the factors of social innovation (although not internalised) can play an important role on an ecological and cultural level. The trans-generational transmission of models and the institutional support of local and international cooperation bodies will determine the change or the renegotiation of gender balances.

Lo studio, di matrice antropologica ed economica, affianca approcci quantitativi ad un'indagine qualitativa per l'analisi dei fabbisogni formativi e degli ostacoli materiali e culturali presenti nel contesto dell'imprenditoria femminile del Saloum (regioni di Kaolack e Kaffrine). La riflessione sulla trasformazione degli equilibri "tradizionali" di genere restituisce un panorama variegato e complesso, dove i fattori di innovazione sociale (sebbene non interiorizzati) possono giocare un ruolo importante in chiave ecologica e culturale. La trasmissione trans-generazionale di modelli e l'appoggio istituzionale degli enti locali o di cooperazione internazionale determineranno il mutamento o la rinegoziazione degli equilibri di genere.

Keywords

Empowerment, women entrepreneurship, gender studies, Senegal

Introduction

This study was born within the Doolel international cooperation project, in partnership with the Chamber of Commerce of Romagna (Ccr) and the Chambers of Commerce, Industry and Agriculture (Ccias) of Kaffrine and Kaolack, in the first half of 2019. In this framework the University of Modena and Reggio Emilia with its Center for Evaluation of Public Policies and Cim Onlus (study center) played a dual-purpose key role. On the one hand, academic research is called upon to identify the concrete needs of the subjects involved, on the other hand it should be able to co-design interventions based on the research results, together with institutional and local partners. The very theoretical economic framework underpinning the analysis is the capability approach with a high value attributed to agency and the development of capabilities (Addabbo, 2017) and this framework impact on the way the analysis is carried out and the tools of analysis have been

constructed. In this particular case, the aim is to configure the interventions of cooperation, through the identification, together with the local institutions and actors, of the difficulties faced by female-run enterprises of the Saloum. In this sense, the main focus was on empowerment dynamics, understood as bottom-up processes and not as the misleading rhetoric that the term has acquired in recent years (Calves, 2009). At the same time, the gender study, which is focused on the transmission of trans-generational models, on the social stigma of "male domination" (Bourdieu, 1990), and on the renegotiation of traditional roles, therefore involves the analysis of factors with marked cultural components, which will be the focus of this article.

Background

The study was conducted in the regions of Kaolack and Kaffrine. In general, the economy of these two regions is not very dynamic because it relies mainly on agriculture and animal husbandry, which employ around 70% of the active population. There are therefore few enterprises in innovative activity sectors with high added value. Trade is relatively active - the two regions are located in a crossroads area - but remains mainly linked to the sale of products from the primary sector (peanuts, millet, livestock products). In these two semi-arid regions, the development of business activity sectors is still weak. The formal modern private sector is mainly made up of industrial units for the transformation of agricultural products (i.e. the agrifood companies *Suneor* and *Novasen*), the exploitation of salt (such as the *New Salins Company* of Sine Saloum), and oil mills. The informal private sector, where most jobs are created, is made up of small businesses that are geared towards production activities (agriculture and livestock), trade, crafts and processing. In general, the peculiarity of women entrepreneurs in Kaolack and Kaffrine is that they are middle-aged women; where 74% belong to the 40-60 age group ¹. The women entrepreneurs interviewed have a level of education slightly higher than the average of the female population: 45% of the female entrepreneurs interviewed have completed at least primary studies and just 50% are not educated while more than 70% of all women in Kaffrine and 60% in Kaolack have no education.

Methodology

This study is based on a mixed methodological approach, which has followed three steps:

¹Diop M., Crick F., Sow M, Diouf Birame, Diouf Babacar, 2018.

- 1) Desk review of the strategic national orientation documents - public and private - (policies, strategies, programs, plans, reports, etc.) concerning entrepreneurship with a focus on female entrepreneurship and social enterprises;
- 2) A field survey with the use of structured questionnaires, supported by the Kaolack and Kaffrine Chambers of Commerce (CoC). The entrepreneurs sample has been selected with the two CoC, through their GIE/enterprises registration. Selection criteria included: a) Dynamism and participation at the activities of the CoC (tradeshows, tradefairs, etc.) b) The availability of the entrepreneurs to take part to the survey;
- 3) Qualitative research, interviewing "successful" women entrepreneurs. These have been targeted with Ccias support among those who excel in their business and who can be considered as role models. The selection criteria included "biodiversity", participation to CoC's activities, community involvement, different stages of progress of the projects and different areas (rural and urban in both regions).

The field study was conducted in the first months of 2019 in the regions of Kaolack and Kaffrine. The questionnaire was administered to 104 entrepreneurs (including 64 women and 40 men). The entrepreneurs were targeted with the support of the local Ccias of both aforementioned regions.

The questionnaire was drafted by our research group in strict collaboration with University of Modena and Reggio Emilia and with the Ccias in order to collect information on many aspects linked to the administrative, commercial, economic and financial data of enterprises. The main topics covered dealt with the legal form of the company, the resources available to start the activities, the origin of these resources as well as information on the entrepreneurs' assets. The questionnaire also included questions on the business sectors as well as the services offered by the Ccias, which the companies benefited from. Information was also collected regarding the difficulties encountered in starting specific activities as well as training needs. This information allowed the Ccias to have a general framework about the entrepreneurs' needs in order to improve and diversify the training and support services offered. Descriptive statistics have been produced out of the elaboration of the collected quantitative data.

The qualitative work contains an analysis of five "success stories" of women. The in-depth interview method, which included the analysis of life stories, linguistic components, and social context, constituted the tool used for investigating the transversal themes of female business development. The original interview track, agreed upon with the team of researchers, was then remodelled during the interviews, according to the encountered issues that emerged.

The quantitative investigation

The analysis confirms difficulties linked to insufficient access to credit and the lack of competences in business management. Men-run enterprises are most prevalent in the sector of Buildings and Public Works, although also in Transport and Telecommunications. On the other hand, women-run enterprises are mainly in the sector of Hotels, Bars and Restaurants and Trade. Uneducated female entrepreneurs represent the majority, whereas many of the male entrepreneurs are literate or have primary education.

The results of the quantitative survey show that most women work in the food industry (57%) and in food-processing (18%). As secondary activities, women work mainly in trade (48%) and the processing of grain products, fruits and vegetables (17%). In addition, the type of business management is less individual among women than men. Women entrepreneurs are often in partnership and the preferred legal form is the *Groupement d'intérêt économique* (Gie) (56%), whereas the interviewed men enterprises are mainly individual (72%).

Like men (60%), half of the women interviewed started these activities with their own capital (51%). However, some women relied on other sources of funding such as help from friends (10%), public subsidies (10%) or, to a lesser extent, technical and / or financial partners (6%).

Before starting their businesses, most women were housewives (31%) or were employed workers (20%). On the contrary, before starting their businesses, most of the men were employed (67%). The rate of businesses that have benefited from credit and / or financing from a financial institution (bank or mutual) is very low, both for women (26%) and for men (20%).

For both men and women enterprises the main difficulty in their business is access to credit faced by 92% of men enterprises and by 88% of women enterprises, women more than men suffer for lack of management skills (64% females against 40% male enterprises) and a similar percentage of men and women (60%) do face difficulties connected to market identification namely the collection and analysis of the information necessary for making commercial or marketing decisions in business (Figure 1). As expected limits connected to a role conflict with regards household's role is more felt by women (14% against 8% for men) and the experience of discrimination is felt by 19% of women and by 13% of men enterprises (Figure 1). Significantly more important is the perceived lack of management skills for women and Figure 1 shows, and we will analyse also the specific needs of skills expressed by gender in Figure 2.

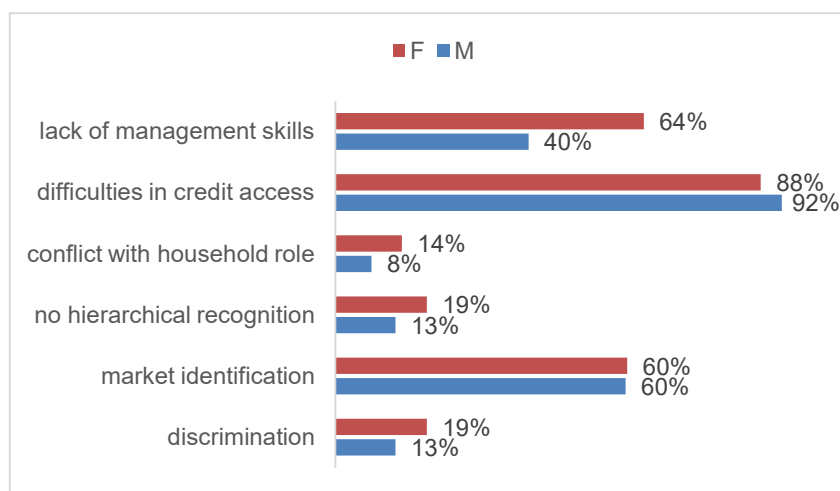


Figure 1. Encountered difficulties by women entrepreneurs in running their business.

Women suffer from a number of obstacles linked to their social status. They have to face the constraints of access to credit which are increasingly aligned with the profitability requirements of financial structures. On the contrary, women's enterprises must focus more on sustainability (being able to run the enterprise over a period of time) and not on typical financial market surpluses, where surplus includes additional paid-in capital and retained earnings. Thus, they must face credit allocation criteria which are increasingly based on conditions which they find difficult to satisfy. Other, equally important constraints remain such as the level of interest rates applied, and the grace periods granted, which rarely exceed two months. Such conditions force women to resort to practices which do not allow them to develop their activities and to improve their financial autonomy, such as those of informal finance (tontine, group loan, etc.). In addition to these various limiting factors, the rate of holding an account varies markedly according to the place of residence. Looking at the Survey on the Reference Situation of Financial Inclusion in Senegal (Esrif), 31.0% of urban residents hold a bank account, against 10.4% in rural areas. In addition, disparities are also noted by region. The region of Dakar is the most inclusive region (with 39% of the population that holds a bank account), alongside the regions of Thiès, Ziguinchor, Louga, Diourbel and Kaolack (12%) considered as localities of average level of financial inclusion. On the other hand, the regions of Fatick, Tambacounda, Saint-Louis, Kolda, Matam, Kaffrine (9%), Kédougou and Sédhiou are dramatically less inclusive due to the 'difficult access to institutions and the lack of information on the latter's service offer. These disparities are likely to widen and affect women more in the context of promoting their empowerment and equality between women and men. We should take into account in the analysis the differences between Kaolack and Kaffrine in terms of access to financial resources.

The survey also highlighted the training needs. Women are more likely to need training on marketing (78% women vs 53% men). Men and women entrepreneurs do feel similarly (65% men and 67% women) needs of training on accounting and finance. Probably due of the type of enterprise more spread amongst the interviewed entrepreneurs, women feel much more need of training on team work (44% of women against 15% of men). Also needs of training on transport and logistic are more spread amongst women (33% for women and 5% of men). Women feel more needs of training in HR management than men (49% women vs 33% men) and ontime management (40% of women vs 8% of men) (Figure 2). This is also clearly linked to the gendered allocation of time that shows to be on the shoulder of women (also if entrepreneurs).

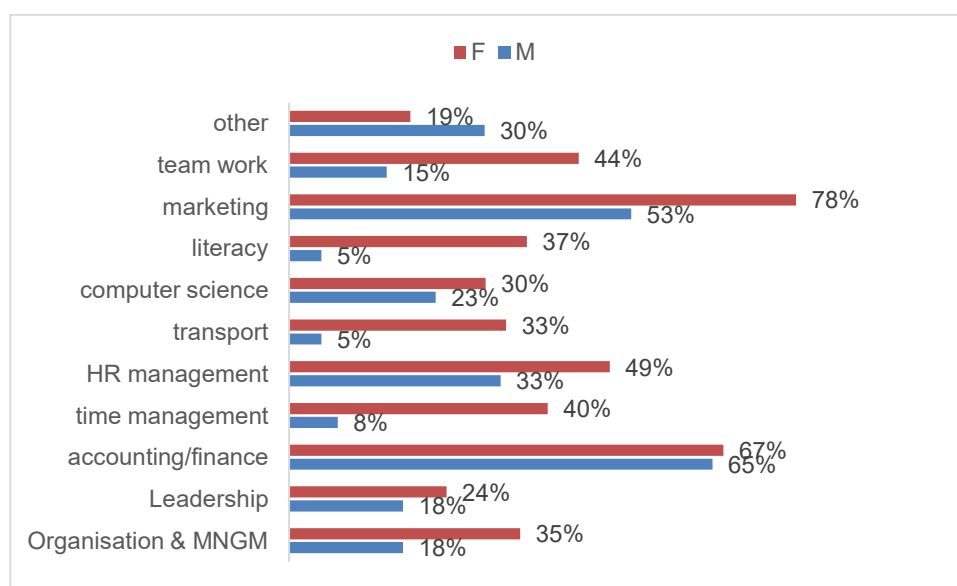


Figure 2. Specific Training Needs pointed out by the entrepreneurs (F/M) interviewed.

The qualitative investigation

Case studies

Four of the companies interviewed are Gie, which deal with the cultivation and transformation of fruits and vegetables. Only one, *Plateforme d'innovation multi acteurs de la filière du lait de Kaffrine* (Pafilkaf) is an individual company that produces milk and dairy products in the Kaffrine region. This proportion reflects, as noted, the types of businesses existing in the regional territory. The agriculture and the community business model which characterises women's organisations, are in fact due to various factors including migratory ones (women take over the lands left by emigrated men). Moreover, the "collective enterprise" structure, is probably due to cultural factors more deeply rooted in the organisation of work and resources at the community level. These associative forms are often evolutions of existing bodies, linked to credit unions or socio-religious groups. For

some authors such as Fatou Sarr (1999), certain forms of aggregations go back to ancestral social configurations, and the task of women is precisely to recover and safeguard pre-colonial solidarity mechanisms. Distinguishing between models of solidarity in contrast with forms of accumulation typical of modern capitalism, groups of women use mutualistic tools such as tontines or common fund, to redistribute profits and strengthen social bonds.. Fatou Sarr believes that the task of women is precisely to recover and safeguard pre-colonial solidarity mechanisms. All these factors can help in reading the individual entrepreneurial stories collected, that we summarize below.

1) Mme Khady Mbaye does not speak French. Khady embodies a "traditional woman": many children, and a life dedicated to her family and to the group of women in the neighborhood. She does not separate the work done in the household from the one done at her place of business. Despite these cultural barriers, Khady has developed, since the 1990's, a network of profitable relationships and in particular one administrator, which inspired the birth of her Gie, called *Pey Mbamba*, and led her to be the President of the *Groupement de Promotion Fèminine* (Gpf)² of Kaffrine. This relationship has also, over time, led to the collaboration with national and international programs and obtaining equipment or arable land.

2) Whereas most women speak only Wolof, Mme Mariam Fall of *Les femmes de la Fayda* speaks a rather refined French and uses specific terminology to describe her project. Her high level of education shines through, which has led her to become a high school teacher. Although the Fayda has never obtained official funding, Mariam's dialectic is useful for maintaining relations with the religious community of Medina Baye (from which the Fayda was born) and with the Ccias, which makes the machinery available for food processing. Her relational and cultural resources in this case have become central in the birth and to the running of the company.

3) Mme Diouf of Pafilkaf is educated and knows the business world. Among the women interviewed, she is the one that most closely follows the "colonial entrepreneurial spirit"³ model. An enterprising woman who is focused on teaching her daughters and doing her job. She does not neglect household chores but manages to insert them into her daily routine through the help of her daughters or a *bonne* (house keeper). The venture was conceived, created, and is run through the funds of her husband's diaspora.

4) After the loss of her parents, Mme Cissé from Nganda had to return to the village without completing her primary education in Dakar. She however managed to establish a network of farmers called *Fédération de Femmes Productrices et Transformatrices de Nganda* (Fpt), obtaining

² Political associations of a non-economic nature. GPFs often incorporate a GIEs collective.

³ Here we mention the distinction proposed by Fatou Sarr, who sees the forms of individual enterprise and non-redistributive character as the result of the colonial encounter.

funding from the *Projet d'Appui aux Filières Agricoles* (Pafa). Aissatou quickly came into contact, thanks to the help of her husband (military in Dakar), with international cooperation programs and even became a spokesperson for the United Nations. These networks, created over the years, allow her to travel and find the means to expand her professional knowledge. Mme Cissé has no children and she dedicates all her time to develop her project.

5) Mme Mbodji from Ndiedieng does not speak French well, but in the village she is almost the only French speaker. Mme Mbodji has adult sons and works in the Municipality, with a political role as a councilor for the defence of women's rights. Her Gie, called *Jappo Ligguey*, was an idea of the village women, and at the time held few lands and no financing. The only internal resources available were credit union related. However, the relational skills of Mme Mbodji led to collaborations with the Ccias (training and use of food processing machinery) and to receive small loans from the *Crédit Mutuel du Sénégal* (Cms).

How were women's enterprises born? What about emancipation?

During the interviews conducted, conflicting elements emerged regarding the genesis of the selected companies. *Les Femmes de la Fayda*, in the Medina Baye (Kaolack) district, where the Great Mosque resides, have followed a path linked to the local religious community, similar to the associational transformations studied by Piraux (2000) in the same territory. The call to mobilise women came in fact from a letter from the Imam, written in the late 1960s, which has now been taken up by today's spiritual guide. The Fayda, also a religious term linked to abundance (means "well that overflows with water"), is a federation of Gie born from the *daira* model: a credit union of a religious nature and with a mixed gender component.

The Khady Mbaye's *Pey Mbamba* association, although not part of a religious circuit, was also founded at the behest of a male politician in the 1990s. A "male" genesis was also that of Pafilkaf, the individual enterprise of Mme Diouf, desired and carried out by her husband with the funding obtained from his work abroad (in Germany). Contrary to the original meaning of the term empowerment, and although these businesses follow organisational forms which are useful for economic emancipation, it was observed that in fact these models reproduce a traditional male hierarchical configuration of power and a vertical relationship between genders.

A different story unites the Gie *Jappo Ligguey* of Ndiedieng and the *Fédération de Nganda*. In both cases, the entrepreneurial initiative derived directly from the group of women, in the first case

through the evolution of a *Nieti Chabi*⁴, in the latter, the history of the Fpt intersects with the personal one of Mme Cissé. Thanks to her charisma, Mme Cissé managed to form an initial group of women that funded the start of the activities in 2012.

The genesis of these companies is reflected in the mission, objectives and innovative potential and gender empowerment underlying the projects. What emerges at the moment is a relative link between the forms of community or individual enterprise and an explicit intent to question "traditional" gender balances. Although in fact all the interviewees agreed with the need for a promotion of the role of women, there is often no awareness of a social redefinition of gender. Although "feminism" is an imported term, some of the interviewees were still questioned on whether they consider themselves as feminists.

In general, the interviewees regarded the term feminism as a far away concept and to be used with caution. Sometimes the term is incorporated in the mission of the association and is reshaped, as in the case of Mme Cissé's "rural" feminism, which promotes the condition of women in rural areas. In the case of Ndiedieng, the women found themselves faced with an unknown word. As Piraux indicates, this "moderate feminism" is probably due to a shared cultural projection whereby:

Even greater than economic dependency, it is the internalised image of their own inferiority that place women in a situation of emotional and psychic dependence. The Wolof Society instilled this model upon which the destiny of their children is a reflection of their behaviour. Guardians of the perpetuation of values, they collaborate, often with pride, to uphold their secondary position (Piroux, 2000, p. 18, translated by author).

The women's internalisation of their social role and the fact that the woman *dafa wara def ndanke* (from Wolof: "the woman mustn't rock the boat"), effectively subordinates their work for the Gie to their role as a mother and housekeeper. This is also in line with the quantitative survey result of a higher difficulty faced by women entrepreneurs in making paid work compatible with housework and with the need of having training on time management (Figure 2).

Material and immaterial obstacles in a gender focus

Combining the time dedicated to home and children with an entrepreneurial commitment is one of the first obstacles that every woman must face. In Saloum, abandoning domestic duties for an entrepreneurial adventure is almost unthinkable. Gie presidents, who can spend more time taking

⁴ The *nieti chabi* (literally: "three keys") is a particular tontine. A group of women forms a petty cash, of which only three people by rotation hold the keys .

care of "extra-family" activities, are retired women, whose daughters can take care of household chores, or in the case of Pafilkaf a woman who can afford a *femme de ménage* (house keeper). On the other hand, almost all employees have limited time availability and the rotation of work shifts is applied to reconcile the various activities. This leads to very low revenues and poor engagement in the development of the company.

In most cases, home-time and work-time do not have a clear division. In particular, in villages there is a tendency to incorporate transformation or cultivation works within a single container of meaning, which generally is grouped under "daily tasks". A meaning therefore different from the exclusive home / work dichotomy, conveyed by the "western" entrepreneurial spirit. While residing in a concept of work and time, rooted in the rhythms of the village, the risk is to not perceive the peculiarity of the "entrepreneurial adventure", thus falling into the same dependency schemes and traditional roles. According to the literature and from what was collected in the interviews, the main obstacles encountered by women's groups in setting up a business are: illiteracy, lack of funding, difficulty in accessing credit, lack of land, lack of skills, lack of time to take care of the home and children, and lack of technical tools. Strangely, during the interviews, these problems are not always traced back to cultural causes of a discriminatory nature. However, the mentioned obstacles are part of a negative spiral generated by gender cultural practices. Illiteracy and lack of education have a higher impact for women, especially in rural settings. The girls' education is underestimated and focuses on housework or taking care of the children. Often from the ages of 15-16, girls go into a marrying-age and it is not uncommon for them to have their first child before the age of 18. Once married and given the high birth rate, the time for specific training or even just thinking about a business project is reduced. In these conditions, making requests for financing and being able to start a business is met by enormous technical difficulties, in addition to the reluctance of the credit institutions. Banks and institutions, in a context where loans to Small and Medium Enterprises are in any case scarce, implement discriminatory policies towards women run enterprises, perhaps precisely in the face of technical shortcomings or statistical discrimination.

In addition to financial problems, another central topic is the availability of arable land. The land system and the hereditary system come into play here. As Piraux notes, only men inherit the land and women must be content to take advantage of the collective fields or lands made available to them by their children or husbands. The male inheritance line therefore prevents the Gies from working on their own land, limiting them to the use of public or concession land. This is a key point and a consistent barrier for the creation of autonomous enterprises.

Deprived of access to training and literacy, confined to the home space and excluded from the hereditary system of material goods, most Senegalese women are effectively removed from contact

with the business world. The latter remains the prerogative of men, creating an economic dependence that justifies and reiterates the subordinate position of women, confined to the role of wife, mother and daughter.

Relational networks

As previously mentioned, women's groups face difficulties in accessing resources (financing, land, training) useful for setting up businesses. So what are the factors that can favour the development of women's enterprises in Senegal? Diouf and Simen (2014) observed the importance of relational networks in supporting women's economic activities. The five testimonies collected are in fact "success" stories of women who overcame the barriers previously identified. In these cases, a good level of education, family or political relationships and local or international funding have been key elements for the creation and sustainability of businesses.

In all the stories collected, the importance of relational networks is central to the creation and development of economic activities. The entrepreneurial path does not therefore follow the classic trajectories of specific training and dialogue with credit institutions, but is built through a mosaic of different resources, often with difficulty and through self-financing. In this context, external resources such as participation in specific financing programs or international cooperation projects can create the opportunity to overcome the initial material and immaterial barriers. In fact, the latter do not prevent female entrepreneurship from building virtuous governance models, producing profits and generating a change of mentality even in rural contexts.

Transmission of models

There is a clear division between the rural and the urban context, the division of which is also not purely geographical, but regards different lifestyles and social frames. The "urban" women of Kaolack and Kaffrine transmit the spirit of entrepreneurial initiative to their daughters, just as their elder female relatives did before them. In rural areas, however, women rarely "think outside the box" and the transmission of innovative values is also more difficult. These trans-generational models are therefore present, but need fertile land on which to take root. If we cannot speak of a gender cultural revolution, the flourishing of these virtuous examples, the increasingly frequent schooling (at least compared to the past), and the advent of more accessible information technologies, can contribute to a change or renegotiation of dynamics of power, and to the opening of multiple spaces of exploration and autonomy.

Social innovation: a word that comes from Elsewhere?

Even in literature the concept of "social innovation" is quiet debated by academics, as the concept of social enterprise". This is not the place to discuss these theoretical forms, nevertheless it is agreed that a company with an innovative and social vocation has to lead initiatives with the explicit objective of generating social value. As such, these initiatives do not aim to maximize profits, but to use market mechanisms to ensure the provision of goods and services with social impact (Borzaga et al., 2012). It can be seen that these characteristics are in part similar to those we have previously identified talking about traditional organizations with a solidaristic and redistributive character. Something that can be considered as "traditional" in one organisational culture, could be considered innovative for another. Perhaps that is the reason why the concept of innovation during the interviews was associated exclusively with the implementation of experiments, often in the sense of technological research. The women interviewed showed to not fully understand the references to the "imported" term of social innovation. However, the cases analyzed are particularly rich in this sense, as evidenced by the examples reported:

Mme Cissé has mobilised nearly 1000 rural women, providing the opportunity to work and fight depopulation and escape to the city. At the same time, the *Fédération* preserves areas and lands at risk from desertification. The organisation is horizontal and inclusive (as per the Gie charter), as it fosters collaboration with associations for disabled people (including albinos) through work inclusive projects. The same Gie works for the promotion of women in international projects and deals with the fight against malnutrition, selecting local and semi-autochthonous varieties against monocultures and the import of treated products. The recovery of tradition is also conveyed by the restaurant project, where local products are used.

The Pafilkaf platform of Mme Diouf has 300 employees (seasonal and permanent) and in addition to experimentation on milk derivatives, it actually promotes the consumption of fresh milk at more affordable prices. Indeed, in Senegal there is a high consumption of milk powder imported by multinational companies. The reasons behind its use are its low cost, long shelf life and a distrust of the quality of fresh milk, believed in the past to be responsible for the transmission of infectious diseases. Nowadays, extensive controls and vaccinations ensure the quality of fresh milk, but the economic advantage remains crucial. The diffusion of projects such as Pafilkaf would help to sensitise the refractory population towards a choice of local production, fighting the malnutrition and commercial hegemony of the multinationals.

The projects of Mme Mbodji, Mme Fall and Mme Mbaye are not limited to generating small profits for the women involved: the renegotiation of the gender roles that this type of activity entails is considered a social factor of innovation.

Reflection on social innovation therefore leads to recognising its multifaceted and culturally defined character. Although the word came from "elsewhere", it undergoes different contaminations and interpretations according to the cultural context in which it is exported. In fact, it can be assumed that the female businesses of Kaolack and Kaffrine have a positive socio-economic impact on migration, desertification and resistance to climate change. Although not entirely internalised, a transformation of gender dynamics is underway, through the silent propagation of enterprising models.

Conclusions and indications

The research work among Saloum women's enterprises has brought forward the emergence of a complexity not always taken into consideration by cooperative empowerment interventions. The study of the social context and the meanings linked to an intangible culture can guide the support actions of NGOs and local institutions and help identify the leverage points to promote innovative projects. If, in fact, the Senegalese "urban universe" has been reflecting on gender issues for some time (through intellectual and social movements), in the rural world the transformation passes through the work of the land, the practice of silent mobilisation, and the slow pace of often hidden negotiations. However, intangible barriers still lead to gender discrimination. The process of liberation from "male domination" cannot therefore be sudden, however it is already underway. The condition of women, which at first sight appears to be a crystallization of traditional roles, is, on the contrary, a sort of dynamic balance, accelerated in this historical moment by migratory factors and climate change. It is therefore fundamental to ensure the transmission of good practices on a trans-generational level. In this sense International cooperation should promote business education program in schools, encouraging all young women to increase their self-esteem and confidence in their abilities. At the same time the support to women-driven SMEs and their key role of inspiration for the new generations, can be strengthened through specific training and through the provision of economic and material tools for business development. Both strategies are in line with the capability approach that underpins our economic and social policies evaluation and guides our suggestions (Addabbo, 2017). They actually go deeper in affecting the development of women and girls' capabilities of working and create businesses in the interweaving of formal training and access to good and services to overcome the limited access to resources, but supportive in the increase of women's agency and awareness in the process. In this complex context, institutions and

International Cooperation role can be decisive, not only for the contribution of resources and funding recognizing also the gender differences in the training needs and in the difficulties faced in setting up a business, but also in establishing a fruitful dialogue and a practical exchange that can generate reflections on innovation models, egalitarian law and gender equality.

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Acronyms

Ccr	Chamber of Commerce of Romagna
Ccias	Chambers of Commerce, Industry and Agriculture
Gie	Group of Economic Interest
Esrif	Survey on the Reference Situation of Financial Inclusion in Senegal
Pafilkaf	Plateforme d'innovation multi acteurs de la filière lait de Kaffrine
Gpf	Group for Female Promotion
Fpt	Fédération de Femmes Productrices et Transformatrices de Nganda
Pafa	Projet d'Appui aux Filières Agricoles
Cms	Crédit Mutuel du Sénégal

URBAN RESILIENCE BUILDING FOR SEA-LEVEL-RISE ADAPTATION AND WHAT IS THE RELATIONSHIP BETWEEN RESILIENCE AND SUSTAINABLE DEVELOPMENT? CASE STUDIES OF ROTTERDAM, THE NETHERLANDS AND YOKOHAMA, JAPAN

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Abstract

As a consequence of climate change, the rise of sea level is disrupting particularly vulnerable delta cities. Nowadays, resilience-building has been put on the agenda in many cities; however, to establish a context-specific “sea-level-rise resilience”, the knowledge about which mechanisms and narratives should be introduced is still limited. Besides, many cities have taken the idea of resilience-building for granted as an element facilitating sustainable development. Whereas the relationship between resilience and sustainability is complicated, with enormous similarities in concepts and overlaps in implementations, which may hinder long-term development. To address these problems, the research 1) adopts a PARA (protect-accommodate-retreat-avoid) risk-reduction framework, shedding light on effective adaptative solutions for sea-level-rise impacts, and 2) develops a diagnostic tool, precisely assessing these strategies in terms of resilience building. The PARA framework and resilience diagnosis are carried out in two case studies: Rotterdam in The Netherlands and Yokohama in Japan. The relationships between resilience and sustainability are also elaborated in both cities. Overall, the objective of the research is to 1) identify all strategies for sea-level-rise adaptation in a systematic way; 2) demystify resilience-building by providing a performance evaluation model; 3) analyze the extent of sustainability and resilience affecting each other for ameliorating future development plans; 4) promote new international cooperation in the specific field for worldwide delta cities.

Come conseguenza del cambiamento climatico, l'innalzamento del livello del mare sta sconvolgendo le città del delta particolarmente vulnerabili. Al giorno d'oggi, la costruzione della resilienza è stata messa all'ordine del giorno in molte città; tuttavia, per stabilire una "resilienza all'innalzamento del livello del mare" specifica del contesto, la conoscenza di quali meccanismi e narrazioni dovrebbero essere introdotti è ancora limitata. Inoltre, molte città hanno dato per scontata l'idea della costruzione della resilienza come elemento che facilita lo sviluppo sostenibile. Mentre il rapporto tra resilienza e sostenibilità è complicato, con enormi somiglianze nei concetti e sovrapposizioni nelle implementazioni, che possono ostacolare lo sviluppo a lungo termine. Per affrontare questi problemi, la ricerca 1) adotta un quadro di riferimento PARA (proteggi-alloggio-ritrattamento-evitamento), facendo luce su soluzioni adattive efficaci per i fili di innalzamento del livello del mare, e 2) sviluppa uno strumento diagnostico, valutando con precisione queste strategie in termini di costruzione della resilienza. La struttura PARA e la diagnosi di resilienza sono applicate in due casi studio: Rotterdam in Olanda e Yokohama in Giappone. Anche le relazioni tra resilienza e sostenibilità sono elaborate in entrambe le città. In generale, l'obiettivo della ricerca è di 1) identificare tutte le strategie per l'adattamento all'innalzamento del livello del mare in modo sistematico; 2) demistificare la costruzione della resilienza fornendo un modello di valutazione delle prestazioni; 3) analizzare l'entità della sostenibilità e della resilienza che si influenzano a vicenda per migliorare i piani di sviluppo futuri; 4) promuovere una nuova cooperazione internazionale nel campo specifico per le città del delta mondiali.

Keywords

Urban resilience, sustainability, sustainable development, sea-level rise, climate adaptation.

Introduction

Preparing for and striving against the effects of climate change is regarded as one of the essential and urgent challenges in the 21st century. This research focuses on sea-level rise. With continuously increasing global temperatures, sea levels have risen at an accelerating rate (The World Economic Forum, 2019). According to the Intergovernmental Panel on Climate Change (Ipcc), owing to increased oceanic warming and loss of glaciers and ice sheets, global sea levels will continue to rise through the 21st century and beyond. Furthermore, a 2°C increase will cause sea levels to rise between 0.30 meters and 0.93 meters by 2100.

Sea-level rise threatens significant property damage—not only homes and businesses but also public assets and critical infrastructure, which adds significant contingent liabilities to the taxpayer (The World Economic Forum, 2019). Various forms of infrastructure and economic activity are at risk from rising sea levels, including roads, railways, ports, internet, sanitation, drinking water, energy, tourism, agriculture. Delta cities, home to more than two-thirds of the world's largest cities and 340 million people (Dircke et al., 2010), are particularly vulnerable to the consequences of climate change such as floods (Francesch-Huidobro et al., 2017). As urban infrastructures such as drainage systems, dikes and dams, together with accelerated land reclamation processes and the training of rivers have disrupted the natural process of land-making, decreasing the capacity of delta cities to cope with excessive water (Meyer et al., 2017). To make the city more resilient to sea-level rise, the idea of adaptation is set to be a priority for delta cities' plans worldwide. From a global perspective, not all countries are equally vulnerable to sea-level-rise impacts. Small Island Developing Nations (Sids) are on the frontline not only due to their low-lying lands but also the lack of technology and development. While Oecd (Organisation for Economic Co-operation and Development) countries use and share efficient, effective and equitable responses for coastal risk management (Oecd, 2019), many Sids can only build higher or expensive sea walls to buttress their islands from escalating tides. Therefore, diverse support and cooperative efforts from developed countries that undermine their roles as leaders are urgently required. On the other hand, the corresponding responses also provide links between resilience building and sustainable development. For instance, investments in disaster risk prevention and reduction, as resilience-building to climate change, can also be drivers of innovation, growth, and job creation (Zurich Insurance, 2018), simultaneously achieving long-term sustainable development.

Rotterdam and Yokohama are two famous delta cities facing with sea-level-rise threads in Europe and Asia. Both cities host numbers of adaptive attempts and have committed to full-scale resilience building. Rotterdam is located at the mouth of the Nieuwe Maas channel leading into the Rhine–Meuse–Scheldt delta at the North Sea, with an elevation of 0 m above sea level (estimated 2019),

and Yokohama is in the south of Tokyo Bay, which is connected to the Pacific Ocean by the Uraga Channel, and in the Kanto plain, with the elevation of 10 m above sea level (estimated 2019). Involving in the global100 Resilient cities (100Rc) network and being faced with the severe threat of sea-level rise, Municipality Rotterdam is actively responding to and preparing for the crisis in urban planning. Corresponding programs include Rotterdam Climate Initiative¹, Rotterdam Resilience Strategy², etc.; being selected as "FutureCity" in Japan, Yokohama is also committed for a sustainable future. The Climate Change Policy Headquarters in City of Yokohama, issued the Yokohama City Climate Change Adaptation Strategy in June 2017, promoting "Zero Carbon Yokohama", one of which strategies clearly address the improvement of "city resilience". By holding the 2019 Asia Smart City Conference (Ascc), Yokohama has a close relationship working with the Association of Southeast Asian Nations (Asean) countries. However, in terms of resilience building to sea-level-rise impacts, comprehensive international cooperation remains extraneous for Rotterdam and Yokohama.

Theoretical framework

Resilience

The word resilience, together with its various derivatives, has a long history (Alexander, 2013). It stems from "resilire" and "resilio", Latin for "bounce". The adoption of the scientific concept of resilience outside mechanics owes much to the theoretical work of a US-Canadian ecologist Crawford Stanley Holling (Alexander, 2013), with the backdrop of "the recognition of our ignorance" and "unexpected future events" (Holling, 1973). Originated from ecology, the concept of resilience gradually applied to other fields.

As the earliest concept of resilience, engineering resilience described a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables (Holling, 1973). Since the level of a system's resilience depends on how quickly it can recover to the initial state after being disturbed, engineering resilience could be hereby estimated by a return time, the amount of time taken for the displacement to decay to some specified fraction of its initial value (Pimm, 1991). However, total recovering to the initial state is impossible in many cases; instead, in conditions far from any equilibrium steady state, where instabilities can flip a system into another region of behavior – that is, to another stability domain (Holling, 1973), ecological resilience is therefore defined as the

¹ A partnership launched in 2006 with the objective of reducing CO₂ emissions by 50% and climate proofing the city.

² Released in 2016, drafted by Resilience Office in Rotterdam. The Resilience office, supporting by 5 staff members, was created in 2014. The Resilience Strategy soon becomes one of the City's top strategic programs.

capacity of a system to absorb disturbance and re-organize while changing to retain essentially still the same function, structure, identity and feedbacks (Walker et al., 2004). In engineering resilience, a single stability domain is implicit, whereas in the ecological resilience concept, multiple steady-states are possible (Gunderson, 2002).

Further, the approach to view resilience and the evolutionary perspective in economic geography is called evolutionary resilience (Davoudi et al., 2012). Evolutionary resilience was interpreted as the ability of complex social-ecological systems to change, adapt or transform in response to stresses and strains (Carpenter et al., 2005). The evolutionary resilience derives from an adaptation thought (Holling and Gunderson, 2002); it requires the understanding of how system’s dynamics behave and evolved, and how in that process the current system has shaped (Teigão dos Santos and Partidário, 2011). The evolution of three resilience concepts (engineering, ecological, evolutionary) (Table 1) reflects a significant leap in resilience's academic explanations.

Concept	Characteristics	Focus on	Status
Engineering resilience	Return time, efficiency	Recovery, constancy	A single Equilibrium
Ecological resilience	Buffer capacity, withstand shock, the existence of the function	Persistence, robustness	Multiple Equilibria
Evolutionary resilience	Interplay disturbance and reorganization, sustaining and developing	Adaptive capacity transformability, learning, innovation	Beyond Equilibrium

Table 1. Comparison of three resilience concepts, created based on Folke, 2006.

Today, numerous cities face acute challenges in managing rapid urbanization — from ensuring adequate housing and infrastructure to support growing populations, to confronting the environmental impact of urban sprawl, to reducing vulnerability to disasters (Un-desa, 2018). Therefore, resilience thinking requires a qualitative capacity to devise systems that can absorb and accommodate future events in whatever unexpected form they may take (Holling, 1973), is gradually situated in the urban context and provides a benchmark of resilience building for urban planners. However, due to the fuzziness of the terminology “resilience”, resilience principles, including traits, attributes, actions, and behaviors that describe specific mechanisms that make a system resilient (Wardekker, 2018), are utilized as design guidelines to help policies and practices enhance resilience. These principles support resilience-thinking in relation to urban adaptation and develop a diagnostic tool in the following research.

Relationships between resilience and sustainability

As the No. 11 Sustainable Development Goals (Sdg) combine resilience and sustainability – make

cities and human settlements inclusive, safe, resilient, and sustainable; the relationships between resilience and sustainability have been discussed in various dimensions. However, due to enormous similarities between the concepts of sustainability and resilience, they are often used without a clear distinction in meaning and purpose for a variety of applications (Marchese et al., 2018).

Firstly, resilience has been seen as a necessary precondition for sustainability; strengthening the capacity of societies to manage resilience is critical to effectively pursue sustainable development (Lebel et al., 2006). Given the fundamental uncertainties of ecological and social dynamics, ensuring the resilience of ecological systems on which our economies depend is obligatory for (Arrow et al., 1996). In recent years, resilience is found to become a component of sustainability as the dominant organizing frame in urban planning (Davidson et al., 2019). Another perspective regards resilience as the "final objective of the system", with sustainability as a contributing factor to resilience (Marchese et al., 2018). This relationship implies that increasing the sustainability of a system makes that system more resilient, but increasing the system's resilience does not necessarily make that system more sustainable (Marchese et al., 2018). However, there are substantial conflicts between the two concepts. Sustainable development at many times maximizes efficiency, in the meantime reducing redundancy. Redundancy, a reserve of flexible fall-back positions and diversity of actions that can be used to meet the exigencies of novel disturbances (Holling, 1973), is one of the hallmarks of a resilience system (Tarhan et al., 2016). So if greater efficiency means less resilience, conversely, greater resilience means less efficiency (Goerner et al., 2009), and less sustainability. Another viewpoint states that resilience and sustainability have separate objectives that lack a hierarchical structure, complementing or competing with each other (Marchese et al., 2018). Global and local policy processes often use vague or narrow definitions of the concepts of urban sustainability and urban resilience, leading to profound confusion and vagueness, which slow down the needed urban transformation processes (Elmqvist et al., 2019). Problems often emerge in the combination in urban planning of both sustainability and resilience building.

While resilience is becoming a planning and managing priority for cities is on a quick rise with governments, planners, architects, social scientists, ecologists, and engineers taking up the resilience agenda (Tarhan et al., 2016), it needs to be linked to sustainability so that the resilience planning could help move towards a desired, sustainable future.

PARA strategies and resilience diagnosis framework

Initially, Protect-Accommodate-Retreat-Avoid (PARA) strategies were proposed as a practical approach for comprehensive flood risk reduction (Doberstein et al., 2018): *Protect* – ensuring the

land being protected from the sea so that existing land uses can continue (Czms, 1990), engineering structures have so far proven to be the most common sea level rise response (Harman et al., 2013), either hard (e.g., sea walls, levees, surge barriers, water pumps, overflow chambers) or soft (e.g., nourished beaches, dunes, restored wetlands, mangroves) (Bello, 2016). *Accommodate* implies that people continue to use the land at risk (hazard-prone areas) with reduced sensitivity or exposure or both to sea-level rise (Harman et al., 2013). Natural system effects are allowed to occur, and impacts on humans are minimized by adjusting human use of the coastal zones via flood-resilience measures (Nicholls, 2011). *Retreat* means no effort to protect the land from the sea – the coastal zone is abandoned and seeks refuge behind natural ecological defenses (Abel et al., 2011). In extreme cases, an entire area may be abandoned (Czms, 1990) – *avoid*. Ideally, the avoid approach should be implemented before significant disasters, but in reality, the new or strengthened avoid approaches are often implemented after the disaster (Doberstein et al., 2018). In this research, PARA strategies are used to present sea-level-rise adaptation.

For cities, climate change impacts are acknowledged as a few out of a multitude of potential disturbances and can be discerned into sudden shocks and disasters (e.g., extreme weather events, heat stress) and gradual, disturbing trends (i.e., sea-level rise) (Walker et al., 2004; Wardekker et al., 2010). Thus, both resilience-building and climate-adaptation, though with different intensities, look at climate change-related impacts and seek ways to mitigate and moderate these impacts (Wilk, 2016). Therefore, the implementation of PARA strategies also contributes to enhancing urban resilience.

By measuring the level of each PARA strategy fulfilling resilience principles, a diagnosis makes resilience sufficiently operational for local actors to explore policy options (Wardekker et al., 2010) for sea-level-rise adaptation. Resilience principles were first proposed as strategies of risk reduction and principles of ecological stability for cities: homeostasis, high flux, omnivory, flatness, buffering, and redundancy (Wildavsky, 1988), which theoretically supported resilience-thinking in urban planning. Then resilience principles started to be indicative guidelines. The 100 Resilient Cities (100Rc)³ propose the City Resilience Framework, identifying seven characteristics that urban resilience-building needs to follow: reflective, resourceful, inclusive, integrated, robust, redundant, flexible. In 2016, under severe climate change, an urban climate resilience framework (Wilk, 2016) was established. This framework thereby advanced conceptual clarity of resilience in the context of climate change and assessed the practicality of resilience principles to improve their functionality for policy-makers (Wilk, 2016). Based on the work done by (Wilk, 2016), this research furtherly

³ Pioneered by The Rockefeller Foundation in 2013. Cities in 100RC network are provided with the resources to establish a Chief Resilience Officer and to draft a Resilience Strategy.

develops this framework (Table 2) with 4 phases (planning and preparation; absorb; quick response; adaptation) and 11 principles (anticipation and foresight; planning ahead; homeostasis, compartmentalization; robustness and buffering; omnivory; redundancy; flatness; high flux; flexibility; learning and reflectivity) as a holistic evaluation tool. Each principle has several indicators.

Phase	Principle	Definition	Indicators
Phase 1. Planning and preparation	Anticipation and foresight	They originate from the human capacity to anticipate disturbances, imagine different futures and thus, consider possible outcomes and to implement preparatory interventions. It should create relevant knowledge about the disturbances, and the knowledge should be shared with the wider population to create awareness.	Amount of research/reports Knowledge exchange Projections, forecasts, and scenarios Connection with stakeholders Public awareness Monitoring system Mapping of critical functions in flood-prone areas Water storage, drainage and infiltration capacity
	Planning ahead	This aims at strengthening a city's coping responses before a disaster occurs. It enhances the chances of absorbing impacts and quicker recovery.	Emergency plan Response management Platforms for risk communication or/and knowledge generation Resources for planning Training/educational measures Involvement of stakeholders Networks for exchange practice Preparation of business Early warning system
	Homeostasis	Homeostasis refers to multiple feedback loops within the coastal system that counteract disturbances (dampening feedback) and stabilize the system.	Water management/governance Integration of sea-level-rise adaption in policies, regulations, laws, and spatial planning Flexible budget mechanisms Insurability of flood loss Use of technology
	Compartmentalization	Mechanisms to locally contain flood impacts and prevent cascading effects on a modular network structure.	Compartmentalization of engineering protection (e.g., dike rings, polders, temporary dams.) Transportation networks Exchange among actors across institutional boundaries (e.g., policy officials, municipality representatives, project coordinators.) Public disclosure

Phase 2. Absorb	Robustness and buffering	The inherent strength of a city, referred to as robustness and buffering mechanisms based on over-dimensioning systems, determines whether a city can endure, cope with a hazard, and maintain function during adverse circumstances.	Scale and robustness of flood protection (e.g., storm barriers, dams, dikes, water storage capacity) Assessment and improvement of flood-protective infrastructure Pre-emptive planning practices Flood-sensitive building Existence of the buffer zone
	Omnivory	The capacity to recover is increased by diversification of resources and means that may be mobilized in the event of a shock.	Diversification of power generation and transportation network Cultural and spatial diversity Multi-functional spaces and buildings Multi-skilled planning teams
	Redundancy	Redundancy describes the presence of multiple elements or replication of components or pathways in order to have multiple instances available that perform the same function. These can fully substitute each other and therefore prevent system failure in case one component fails.	Technological (e.g., power grid, infrastructure, transportation) redundancy Social networks that offer different problem-solving options The accountability Strategic creation of system's redundancy
Phase 3. Quick response	Flatness	The hierarchical levels relative to the base should not be top heavy because overly hierarchical systems with no local formal competence to act are too inflexible and too slow (1) to cope with surprise and (2) to implement non-standard highly local responses rapidly.	Citizen/community empowerment Social cohesion Public participation Social cohesion The ability of populations to self-respond to disturbances The autonomy of municipal authorities to authorize plans and to legislate policy Financial independence of governing bodies Procedures for taking actions
	High flux	High flux represents a fast rate of movement of resources through the system that ensures a fast mobilization of these resources to respond to threats and changes quickly. This mechanism addresses rapidity by seeking ways and implementing conditions to maximize promptness in response.	Easy-to-modify land uses Fixed protocols (in calamity, continuation, recovery plans) about quick mobilization Pre-event arrangements of financial resources Governmental reimbursement for hazard-related expenditures The monetary resources and skills for citizens to shift livelihoods
Phase 4. Adaptation	Flexibility	Uncertainty requires flexible planning, spontaneous responses, and adopting flexible elements that are apt for several scenarios to come. Flexibility can be perceived as a design principle for	Room for change in structure and processes in institutions Anticipatory physical, structural elbowroom for future adjustments, extensions or

	adaptation measures according to reversibility and avoiding limitations on the range of possible future measures.	retrofitting in spatial means Regulations that allow strategy change and amendments A long-term planning horizon
Learning and reflectivity	Under uncertainty, learning is the driver for strategic adjustments and for new strategies to cope with change. Reflectivity refers to organizations and individuals' capacity and willingness to apply new knowledge, adopt a novel, alternative strategies in response to changing circumstances.	Experimental and innovative projects Support for pilot initiatives Active figureheads and advocates History of climate adaptation Lessons learned from previous experience Employing of “no regret” No one-fits-all solution

Table 2. Urban sea-level-rise resilience framework, created based on Wilk, 2016.

Methodology

A central assumption underlying this study is the crucial relevance of flood mitigation and water-related risk management strategies for the city's resilience building to potential sea-level-rise impacts. The study collects quantitative and qualitative data in relevant policy documents and in semi-structured, in-depth interviews (Annex 1). Two case cities, Rotterdam in The Netherlands and Yokohama in Japan, are chosen.

Two key theoretical frameworks, the Protect-Accommodate-Retreat-Avoid (PARA) framework and urban resilience diagnosis, are applied in this study. As presented in the second section, the PARA builds a complete structure that acknowledges the progressive strategies for a coastal city to mitigate the risks of rising sea levels. Every associated policy and program in a given place and time is described and conceptualized in the framework. According to the data collected, the urban resilience diagnosis then rates multiple parameters of eleven principles in four phases, assigning values with a five-point Likert scale: “--” to indicate weak resilience and “++” to indicate strong resilience (Annex 2). It sheds light on a comprehensive evaluation of the effectiveness of a city's resilience-building to sea-level-rise. A visualization with radar charts of the overall resilience quality creates a glance into whether the resilience principles are fulfilled, neutral, or flawed. Moreover, it allows for a comparison between the two cases.

To ensure that all types of stakeholders with diverse perspectives are taken into account, a total of eleven individuals, representing eight different organizations, are selected as the subjects of the study and interviewed as key informants (Annex 1). Organizations involved in the study include municipal and city level government entities, enterprises, civil society organizations, research institutions and consultancies; only individuals with sufficient experience in their position within the respective organization are addressed.

By organizing the analysis along two dimensions with two cases, the study elaborates that delta cities have developed common strategies to defend against sea-level rise, which follows a general pattern, a PARA framework. The study also allows discovering that cities have different advantages and disadvantages while building their resilience, which are rooted in different governance, social, and cultural contexts. At last, the study furtherly discusses the relationships between a city's resilience-building and its long-term sustainable development.

Results

Case study Rotterdam

PARA strategy

“God created the world, but the Dutch created Holland”. The Netherlands has hundreds of years’ experience of fighting against water. At present, the sea level on the Dutch coast is rising by 20 cm every century, and the speed is accelerating (Suiker, 2018). Highly embedded with resilience thinking, the PARA strategies city of Rotterdam adopts balance out the specific solutions, making the city overall protected against the sea.

Protect	Hard engineering projects: Storm surge barrier-dam-dike system (The Maseslant storm surge barrier ⁴ , 50-kilometer dikes ⁵ inland, reinforcement of existing dikes.) Pump water out (900 pumping stations (Brears, 2018), e.g., Kinderdijk Windmills) Attenuation and collection of stormwater runoff (permeable pavement in pedestrian pathways, water-squares, bioswales, private “rain gardens” and “façade gardens”) Soft engineering structure: Water square ⁶ (e.g., Museumpark ⁷ , the water square in Benthemplein ⁸) Urban river ecological restoration (River Schie, River Rotte)
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⁴ The Maseslant storm surge barrier is the largest hydraulic engineering work in the Netherlands and works automatically. When a water level that equals +3m NAP or above is forecasted, the two huge curved gates close the New Waterway. In this way Zuid-Holland is protected against high tides.

⁵ Netherlands' dike network extends for over 22,000 kilometers, while the Dutch coastline measures a mere 880 kilometers.

⁶ A water square is composed of a collection basin where rainwater is collected and retained. The water square is dry for most of the time and is then used as any other public space in the city.

⁷ A park which accommodates 1,150 cars, and also houses a reservoir with a capacity of 10,000 m³ when there is heavy rainfall. As soon as the sewer system threatens to overflow, the hatch of the underground water reservoir is opened, the reservoir fills up with 10 million liters of water. When the downpour ends, the water in the reservoir is pumped into the sewer.

⁸ The square functions as a green space and provides opportunities for activities such as skate-boarding. When it rains heavily the square functions as a water storage reservoir.

Accommodate	Recreational dikes (e.g., multi-functional terraced dike ⁹ , dikes integrated into cycling routes, dike warehouse, Dakpark ¹⁰) Adaptative floating constructions (e.g., Floating Pavilion ¹¹ ; Floating farm ¹² ; BlueCity ¹³ , Floating community in Rotte River) Create early warning and monitoring system (responsible departments: The Royal Netherlands Meteorological Institute ¹⁴ , Rijkswaterstaat ¹⁵ , Water board ¹⁶ , Rijnmond rain radar ¹⁷) Improvement of the drainage system
Retreat	Land-use restrictions in outer-dike areas ¹⁸ (Construction work is only allowed if the same elevation is raised to maintain the height of ground)
Avoid	Land-use restrictions in outer-dike areas Urban design to avoid pluvial flooding in inner-dike areas (e.g., Green Roof ¹⁹ , permeable pavements, the transformation of Zoho district ²⁰ , Blue corridor ²¹)

Table 3. Detailed PARA strategies in Rotterdam

Being on the frontline of sea-level rise, the PARA strategies in Rotterdam follow comprehensive and systematic protection: a “storm surge barrier-dam-dike” system as hard engineering solutions and multi-use water squares as soft engineering solutions. The idea of “accommodate” and “avoid” is performed in urban design as Rotterdam “let water in”, employing storing rainwater, enhancing drainage capacity, and creating floating buildings according to the city’s geographical conditions, etc.; many innovations emerge with various ways of Rotterdam’s adaptation efforts. However, as

⁹ With wide terraces on both sides that can be used for road construction, landscaping and even building construction, enabling it to generate revenue and add value to the districts (Brears, 2018).

¹⁰ With 1000 m long and 80 m wide, as an elevated park on a former railway yard, the Dakpark plans to build a new shopping center, and the largest green roof in Rotterdam.

¹¹ The Floating pavilion consists of three interlinked spheres, the largest of which has a radius of 12 meters. The floor space of the pavilion island is over 46 to 24 meters.

¹² Launched by a Dutch property company, Beladon, Floating farm has built the offshore facility in the middle of Rotterdam's Merwehaven harbour and is farming 40 Meuse-Rhine-Issel cows milked by robots.

¹³ Bluecity is situated in former subtropical 12,000-square-meters swimming oasis Tropicana, and functions as an incubator for circular entrepreneurs.

¹⁴ Also called KNMI, the Dutch national weather service. It forecasted an increase of sea level rise of 35 to 85 cm in the period until 2100 in The Netherlands.

¹⁵ An agency for public infrastructure works and water management. Annual average sea level for The Netherlands is determined on the basis of the measurements from Rijkswaterstaat’s six main stations.

¹⁶ There are 21 regional water authorities – water boards in the Netherlands. Water boards work on water safety, water quality and water quantity, as well as improving dike conditions. Municipality Rotterdam is managed by 4 water boards: Delfland, Schieland & Krimpenerwaard, Rivierenland, Hollandse Delta.

¹⁷ Installed in Rotterdam in 2015, the radar was installed on the roof of one of the tallest buildings in city center.

¹⁸ The outer-dike areas are not protected by dikes and are directly affected by sea level rise. While the inner part is well-protected by dikes and therefore is less vulnerable. Most of inner-dike Rotterdam is below sea level.

¹⁹ Between 2008 and 2014, Rotterdam provided a subsidy scheme (up to EUR 30 per m²) to promote the creation of green roofs. It led to 150,000 m² of green roofs developed.

²⁰ The Zomerhofkwartier (Zoho) district was built after World War II, mainly to accommodate businesses and schools. A new concept of “slow urbanism” was promoted in 2014 in this district.

²¹ As a 10-year plan from 2012, it aimed at a green-blue link between the Zuiderpark in Rotterdam, the future landscape park Buijtenland in Rhoon and the Zuidpolder in Barendrecht. It will act as a water storage facility.

densely populated and urbanized, there is a lack of “retreat” plans, especially for the unprotected outer-dike areas, which prepare for the worst case.

Urban resilience diagnosis

Rotterdam Resilience Strategy was formally published in 2016, ambitiously targeting technological innovation, democracy, and preparing for climate change in 2030. Regarding the current situation, below is the assessment of the city’s resilience building (Figure 2) for it. The evaluation is based on data collected through document review and information gained during interviews with key stakeholders in Rotterdam (Annex 1).

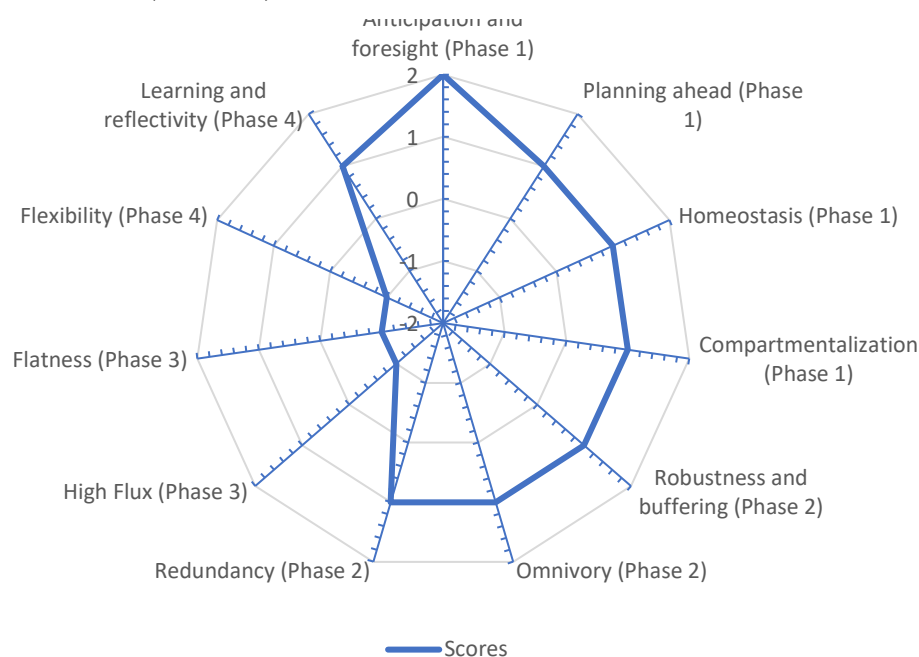


Figure 2. Diagnostic diagram of resilience-building to sea-level rise in Rotterdam. Resilience principles cover 4 focal directions with 11 principles (see also Table 2): Phase 1) planning and preparation, Phase 2) absorb, Phase 3) quick response, Phase 4) adaptation. The scale ranges (Annex 2) from -- (-2; very weak currently, very negative impact of plans) to ++ (+2; very strong currently, very positive impact). The diagnosis model is created based on (Wilk, 2016) and (Wardekker et al., 2017).

Concerning its strength, weaknesses, opportunities, and threats, firstly, Rotterdam has a long history of living on a seacoast; after the 1953 North Sea flood²², overall precautions are updated with multi-layer dikes and a national monitoring system. Therefore, the city is strong in Phase 1) planning and preparation, especially in “anticipation and foresight”: various technologies are utilized, the city is intensively involved in knowledge exchange (e.g., 100Rc). With 41 m² of green space per resident²³

²² A flood caused by a heavy storm that occurred on the night of 31 January and morning 1 February 1953, large areas of the Netherlands were flooded and 1,835 people were killed.

²³ Source: land use statistics 1996, Rotterdam Urban Vision. The number in Rotterdam is higher than Amsterdam, Utrecht, Den Haag.

and continuous ecological restoration, Rotterdam receives a high score in “planning ahead”. High diversity and solidness of flood defense systems lead to relatively high levels of “robustness”, “homeostasis”, and “compartmentalization”. The Delta Fund²⁴ also provides financial resources for flood risk. These can positively mitigate the potential consequences of sea-level rise. However, there are either emergency response or buffer zones created for sea-level rise yet.

Secondly, Rotterdam is a mega port city, with 50% of residents are non-Dutch origin (estimated 2009), contributing to its cultural diversity. The city is also promoting cycling routes, diverse new energy use such as wind (e.g., the Haliade-X 12 MW²⁵), solar and biomass, as well as the energy-neutral built environment. Gaining high credibility, water governance in Rotterdam involves multi-level actors (water board, Rijkswaterstaat, municipal government, Resilience Office) and redundant solutions (Water Act, Resilience Strategy, Climate Proof, Delta program, etc.). Therefore, the city receives a high score in “redundancy” and “omnivory”, in Phase 2) absorb, efficiently preventing the “system failure”. However, the inefficient bureaucracy limits the room for institutional reform, and to break such path dependency is very difficult, which reduces efficiency in cross-departmental collaborations. “Normally, no one would like to take the leading position in joint operations, and the project will always be dragged and even left unsolved in the end” (Interview, Annex 1). An example can be seen from the current function of the function of Rotterdam Resilience Office. Although releasing the Resilience Strategy, the Office still has no real authority to initiate new plans, which has drawn criticism like “founding this office is nothing but a city branding strategy” (Interview, Annex 1). Therefore, the scores for “high flux” and “flatness” in Phase 3) quick response are low, it reveals a lack of governance capacity of maximizing promptness in response.

Lastly, as being protected by dikes for hundreds of years, Rotterdam's local population has not treated sea-level rise as an urgent threat; the corresponding public participation is quite low. Spatially, to create anticipatory physical, structural elbowroom for future adjustments or extensions is also impossible in the densely developed outer-dike area. Therefore, the level of “flexibility” in phase 4) adaptation is low, which means the ability of self-sufficiency, self-regulation, and self-organization, is still doubtful. On the other hand, due to Rotterdam’s business-friendly climate, private sectors actively invent new adaptative ideas; the pilot project floating farm has set an example. This, along with water squares and multi-functional dikes, show a higher score in “learning and reflectivity” in Phase 4) adaptation.

²⁴ Supplied from Central Government. In the period 2019-2032, a sum of approx. 17.5 billion euros will be available in the Delta Fund, which brings the average annual budget to nearly 1.3 billion euros. However, only a small percentage of it is non-allocated, which is relatively flexible.

²⁵ The most powerful offshore wind turbine in the world, Rotterdam Port is chosen as the test location in 2019.

Sustainability analysis

In Rotterdam, most of the PARA strategies are implemented with no regrets and in the long term. High technology is also actively applied. Concerning the relationships between resilience and sustainability, in Rotterdam, resilience-building creates added value for sustainability: the PARA strategies impact sustainable development from three “pillars” (economic, social, and environmental perspectives). Many examples can be seen: The recreational dikes, water squares, green banks, and green roofs increase green spaces in the city; Bluecity is an incubator for circular economy; The floating constructions offer pilot lessons towards the city’s transformation to a creative and knowledge-based economy; New Zoho district improves the life quality of vulnerable groups.

Moreover, the economic and environmental considerations are particular components integrated into Rotterdam’s resilience-building, as the high motivation from private sectors and the target of stimulating ecological values are planted in the first place in many adaptative initiatives. In contrast, public awareness of sea-level rise is still limited. Because of insufficient local participation and empowerment in this specific issue, the PARA strategies may not be socially sustainable.

However, while facilitating both resilience and sustainability, Rotterdam Resilience Office does not have a precise answer (Interview, Annex 1) about how to balance or integrate one into another. The resilience strategy is criticized as “nothing but a big umbrella covering everything already existing (Interview, Annex 1)”. This vagueness and the limited connectivity across governments result in overlapping in implementations of the city’s resilience building and sustainable development. Under the rise of sea levels, these difficulties in institutional change will possibly be an obstacle for the transition of resilience from “just a buzzword to an operational paradigm for system management” (Linkov et al., 2014).

Case study Yokohama

PARA strategy

Tokyo Bay is an area notoriously prone to massive natural disasters like storm surge, typhoon, tsunami, earthquake. Yokohama, a central commercial hub of the Greater Tokyo Area, is currently relying on 150 km coastal dikes and 157 km river dikes in Tokyo Bay (Ruiz Fuentes, 2014). Yokohama is now facing significant challenges like an accelerated aging population, a declining economy, and energy-transition necessity after the 2011 Great East Japan Earthquake²⁶. Therefore, the PARA strategies are prepared for extensive potential natural disasters (Table 4).

²⁶ Happened on 11 March 2011, it was the most powerful earthquake recorded in Japan and resulted in the Fukushima Daiichi nuclear disaster. Since then, nuclear power plants started to be shut down in Japan.

Protect	Harding engineering projects: Flood gate-dam-super levee ²⁷ system (see also Annex 3) Floodways River channelization Attenuation and collection of stormwater runoff (permeable pavement in pedestrian pathways and parks, 22 stormwater storage pipelines with 1,059,000 m ³ capacity, 9 stormwater reservoirs with 245,000 m ³ capacity, rainwater tanks, detention basins, installation of infiltration inlets ²⁸) Soft engineering structure: Multipurpose retarding basin (the Kirigaoka Regulating Reservoir ²⁹ , Yokohama International Sports Stadium ³⁰)
Accommodate	Renewal of dikes to super levees Create an early warning and monitoring system (responsible departments: Japan Meteorological Agency ³¹ , City of Yokohama ³²) Erect emergency shelters (113 evacuation sites ³³) Improvement of the drainage system
Retreat	Set set-back waterfront zones (Waterfront Axis ³⁴ , Kanazawa waterfront city ³⁵) Re-purpose land use in Minato Mirai ³⁶ (creation of pedestrian spaces) Kanazawa land reclamation ³⁷
Avoid	The urban design of green spaces (10 major locations, 461.5ha, and 160 sites ³⁸ ; e.g., Green Axis ³⁹ ; Improve parks; Design pedestrian network in Minato Mirai)

Table 4. Detailed PARA strategies in Yokohama

The PARA strategies in Yokohama form robust protection against the sea. The idea of urban design is “to keep water out”, with continuous updates of the expensive super levees. Inside the city, efforts are made to strengthen ecological functions such as building multipurpose retarding basins,

²⁷ A “super levee” is a thick embankment created by applying a layer of fill material over a conventional embankment. This dike has a very gentle inner slope on which urban rehabilitation is possible. Super levees are designed to prevent catastrophic flood damage and thus are very costly.

²⁸ Residents are recommended to install infiltration inlets on their own properties and the costs are partially subsidized by the City of Yokohama (Interview, Annex 1)

²⁹ The reservoir is used as a tennis court in normal time.

³⁰ It is designed to regulate the amount of water flowing into the river during a flood and can hold a maximum of 3.9 million liters of flood water. The elevation of the basin is lower than the surrounding area.

³¹ Responsible for monitoring national sea levels since the 1980s. It is also in charge with emergency warnings, disseminated through administrative organs and wide variety of media.

³² Responsible for issuing emergency warnings if heavy rain, storm, storm surge, high waves, snowstorm, heavy snow, earthquakes, tsunami and volcanic eruptions on a scale is observed. It also provides shelter lists.

³³ Source: <https://translate-en.city.yokohama.lg.jp/kurashi/bousai-kyukyu-bohan/bousai-saigai/map/koiki/hinan/20150225175223.html>

³⁴ In 2010, the Urban Waterfront Area Inner Harbor Project proposed to develop a ring-shaped urban structure around the Bay of Yokohama, a Waterfront Axis, which used to be dominated by heavy industries and factories in the 1960s. It aimed to preserve and form coastwise greeneries.

³⁵ Kanazawa Ward is located in the southeast corner of the city of Yokohama, bordered to the east by Tokyo Bay.

³⁶ A seaside urban area in central Yokohama, the Master Plan-based Development for the Minato Mirai 21 District targeted to forming a pedestrian network.

³⁷ Starting in 1971, Kanazawa Land Reclamation Project primarily aimed at creating a site for relocating factories. The site selected for the relocation is situated approximately 15km from the center of Yokohama.

³⁸ As of September 2018, source: https://www.city.yokohama.lg.jp/business/bunyabetsu/kenchiku/toshikeikaku/yoko/sankou/history.files/0005_20190411.pdf

³⁹ An organic connection that travels from inland to the sea.

improving rainwater infiltration, creating green connections. Located in the world’s most densely populated metropolis, Yokohama is making maximum use of every piece of the land proceeding with flood control and urban improvement simultaneously (Takeuchi, 2002): along with reclamation of land, the super levees make the land traditionally used for embankments alone be available for use as parks, green spaces, roads, as well as for emergency evacuation sites. Another added value in Yokohama’s PARA strategies is “retreat”: thanks to enormous lessons learned from multi-scale natural disasters, notably the earthquake, Yokohama has thorough planning for evacuation. However, Given the city's dense urbanization, the waterfront areas have been precisely identified and not ready to be abandoned.

Urban resilience diagnosis

Urban resilience building in Yokohama focuses on disaster-resilience like earthquakes, tsunami, typhoons, fire, and floods, of which the consequences involve considerable uncertainty; thus, these measures also have a high potential to withstand perturbations caused by sea-level rise. Below is the assessment of the city’s resilience building (Figure 3) for it. The evaluation is based on data collected through document review and information gained during interviews with key stakeholders in Yokohama (Annex 1).

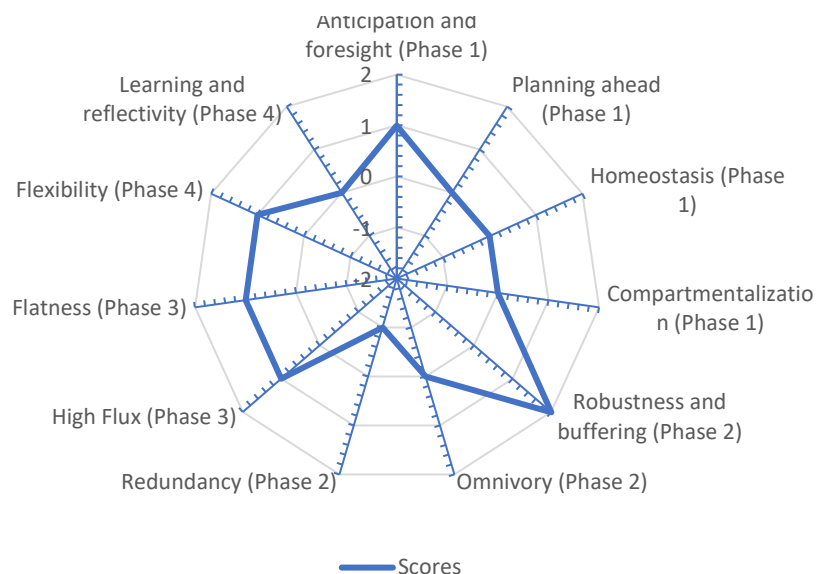


Figure 3. Diagnostic diagram of resilience-building to sea-level rise in Yokohama. Resilience principles cover 4 focal directions with 11 principles (see also Table 2): Phase 1) planning and preparation, Phase 2) absorb, Phase 3) quick response, Phase 4) adaptation. The scale ranges (Annex 2) from -- (-2; very weak currently, very negative impact of plans) to ++ (+2; very strong currently, very positive impact). The diagnosis model is created based on (Wilk, 2016) and (Wardekker et al., 2017).

Concerning its strengths, weaknesses, opportunities, and threats, firstly, Yokohama is influential in engineering “robustness and buffering” in phase 1) planning and preparation, with super levees as an excellent example. “What this fragile island spends on fighting against natural disasters is enormous; “to defend” or “to protect” is in the blood of Japanese culture (Interview, Annex 1)”. Whereas relying too much on the single protection of super levees, as well as a lack of diversity in corresponding governance functions and roles, low scores are captured in “redundancy” and “omnivory” in phase 2) absorb. A similar trend happens to “learning and flexibility” in phase 4) adaptation; counting on past experiences limits innovations of new adaptative ideas from private sectors.

The nation-wide sea-level-rise rate projection and the Climate Change Adaptation Platform⁴⁰ offer research results on climate change impacts. Japanese has a complete monitoring system regarding all types of natural disasters, well connected to citizens, and well-rooted in the education system. These elements result in a better performance in “anticipation and foresight”. However, the City of Yokohama has not taken a sea-level rise in prioritized urban planning and is not extensively involved in global knowledge networks, the stage for “planning ahead”, “homeostasis”, and “compartmentalization” stays “business as usual” (Interview, Annex 1).

With rich experience in disaster recovery, Japanese institution gains high scores in “high flux”, “flatness” in phase 3) quick response and “flexibility” in phase 4) adaptation. The General Director for Disaster Management⁴¹ is mandated to plan necessary disaster management policies and overall coordination and collaboration (Suzuki and Kaneko, 2013). All Japanese government ministries are more or less in charge of disaster management, and they have the power to issue specific disaster-related legislation and laws. By providing evacuation advisories for different types of disasters, Yokohama is supposed also to quickly respond to sea-level rise.

Sustainability analysis

In Yokohama, PARA strategies are implemented in three pillars: economic, social, and environmental aspects, in the long term and with high cost, thus, with no regret. The public awareness of sea-level rise is still limited. “There was a certain period when the issue of sea level attracted the public attention, but that was in the context of Tsunami and earthquake after 2011 Great East Japan Earthquake, not of climate change (Interview, Annex 1).”

⁴⁰ A-PLAT: <http://a-plat.nies.go.jp/webgis/index.html>

⁴¹ The position of Minister of State for Disaster Management was established in 2011 in Japan.

About the relationship between resilience and sustainability, the *Middle plan for the period of 2018-2021* tends to combine sustainability and resilience, with the same goals and achieving methods. However, the implementations of these two seem to be separated. Like all Japanese cities, Yokohama has a deep sense of crisis. Current resilience-building continues the traditional idea of coping with disasters, such as 10-meter super levees. Moreover, sustainable development seeks new solutions for urban challenges, such as renewable energy (e.g., Zero Carbon Yokohama) and creative industries. There is a lack of paradigm shift towards the perspective of adaptation, making it difficult to comprehend how to integrate resilience into sustainable development, as well as how to invent new solutions. Just as Climate Change Policy Headquarters stated: “The Adaptation Strategy is still on paper” (Interview, Annex 1).

An added value in Yokohama is citizen power: Initially, Yokohama launched *Area Development Project*, which supported residents’ own community development efforts in 1992. Stepping in the 21st century, the establishment of the *Ordinance for the Promotion of Civic Activities* in 2000 and *Ordinance for the Promotion of Community Planning* in 2005 forward the community development. “There is a high level of civil power that has solved various issues so far (Interview, Annex 1)”. Therefore, more opportunities should be discovered from bottom-up pathways.

Comparison and conclusion

Comparison between Rotterdam and Yokohama

Rotterdam and Yokohama are two delta cities, representing humans encroaching the sea for hundred years and nowadays being in the frontline of sea-level-rise threats. Both cities have explored their PARA strategies to defend coastlines and adopt adaptation ideas. Regarding “protect”, Rotterdam and Yokohama have applied similar approaches of flood control throughout the centuries, which is remarkable due to the differences in geographical location and meteorological conditions (Stalenberg et al., 2008): There are massive flood-defense constructions in hard-engineering aspects and a combination of urban functions and flood protection for soft engineering strategies. One difference is that the Japanese appear to continue advancing on the sea, but the Dutch start to adopt the idea of “let water in”. However, the unprotected outer-dike areas in the two cities are both the most vulnerable; development continues by raising the entire coastal land. As for “accommodate” solutions, trying to utilize the land efficiently, Rotterdam and Yokohama recreate their dikes (multi-functional dikes and super levees). However, the land-use requirements remain unchanged in floodplains, and there are no types of insurance for properties yet, either in Rotterdam or in Yokohama. Both assume their defense is unbreakable. Nevertheless,

each city has its advantages: Rotterdam breeds many innovative adaptive designs such as floating infrastructure, and Yokohama has a better-prepared emergency evacuation system. Concerning “retreat” and “avoid” solutions, though Rotterdam and Yokohama try to increase greenery and blue corridors, there is no thorough evacuation plan for large-scale areas.

Rotterdam and Yokohama commence resilience-building intensively. In Rotterdam there is Rotterdam Resilience Strategy, and in Yokohama resilience building is addressed out in several official plans. Below (Figure 4) compares their resilience diagnosis: Firstly, Rotterdam is actively taking measures in phase 1) planning and preparation. In phase 2) absorb, with expensive super levees that are likely unfeasible for other cities, Yokohama has better performance in “robustness and buffering”. In comparison, Rotterdam has more diverse and “redundant” solutions. As for the phase 3) quick response and phase 4) adaptation, because massive damage caused by natural phenomena of extraordinary magnitude frequently occurred in Japan, Yokohama has a higher level of “high flux”, “flatness”, and “flexibility”, referring to a fast mobilization of resources and a flexible structure be operational under fast-changing conditions. On the other hand, Rotterdam shows strong “learning and reflectivity” abilities by offering a favorable innovation environment.

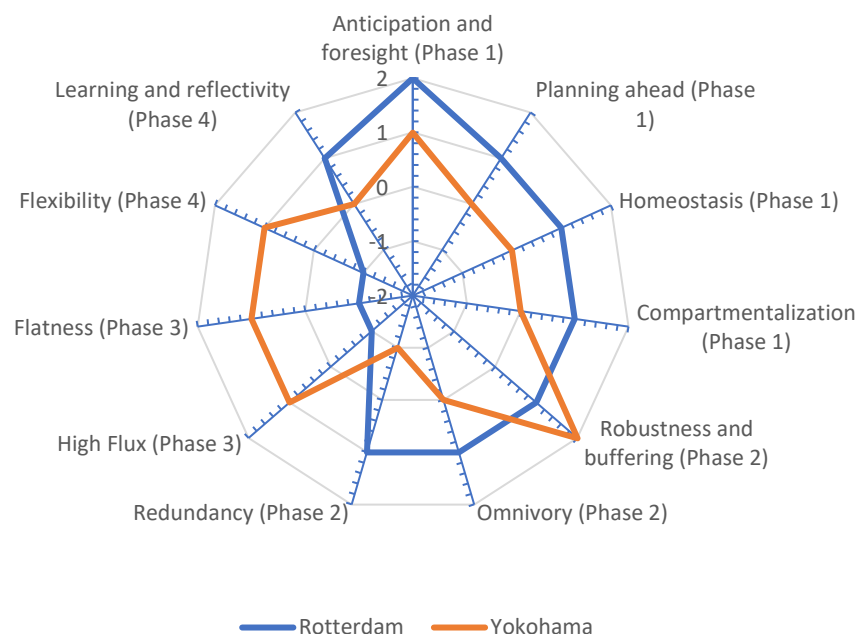


Figure 4. Diagnostic diagram of comparison of resilience-building in Rotterdam and in Yokohama. Resilience principles cover 4 focal directions with 11 principles (see also Table 2): Phase 1) planning and preparation, Phase 2) absorb, Phase 3) quick response, Phase 4) adaptation. The scale ranges (Annex 2) from -- (-2; very weak currently, very negative impact of plans) to ++ (+2; very strong currently, very positive impact). The diagnosis model is created based on (Wilk, 2016) and (Wardekker et al., 2017).

For the relationship between resilience and sustainability, Rotterdam and Yokohama's PARA strategies are both precautions for climate adaptation and have economic, social, and environmental considerations. Thus, the idea of sustainability is embedded in resilience-building. However, one

similarity between the two cities is that the public awareness about sea-level-rise consequences is relatively low since people trust their flood-defense system very much. In the long term, with a reliable citizen power, Yokohama may create more social impacts. On the other hand, in composing an excellent economic environment, Rotterdam may encourage new ideas from private actors.

The research also found a high potential for international cooperation with the arrival of Sdgs. Rotterdam and Yokohama have ever collaborated in the field of resilience building, however, the Resilience Office in Rotterdam and Climate Change Policy Headquarters in Yokohama, two responsible institutions, both indicate similar challenges: 1) Urban resilience-building remains as an "umbrella-kind" idea; 2) The vagueness of the concept "resilience" makes it hard to integrate into renewal policy cycles; 3) The affiliated "resilience" institutions have limited power for issuing and implementing new policies or plans; 4) The connectivity and cross-departmental collaborations for linking resilience and sustainability are very limited. Based on these findings, for local institutions in Rotterdam and Yokohama, the stately institutional change is necessary to break decisively with the past and to respond rapidly to the quickly changing circumstances of sea-level-rise impacts. From an international perspective, the similarities discovered from the two case studies can be generalized and global knowledge-sharing may provide creative solutions to these common challenges, hereby a novel and systemic international cooperation scheme for developing resilience on a large scale is recommended to establish, complying with the globally-shared blueprint – sustainable development.

Conclusion and discussion

The speed of sea-level rise is accelerating, a variety of adaptative strategies emerge worldwide; the PARA framework sheds light on the consummation of the primary practical efforts and affords lessons for delta cities to adapt to sea-level rise systematically. The similar pathways Rotterdam and Yokohama have followed demonstrates the framework's universality and effectiveness. With results in Rotterdam and Yokohama, the study shows that resilience thinking has already fitted in current development strategies and climate policies in both Europe and Asia, and there is an evident willingness to trigger urban transformation by climate adaptation. However, as the concept of resilience is vague, it is difficult to integrate it into the existing development plans, as well as to issue "tangible" or "real" strategies for policymakers. Moreover, different cities have different understandings and implementation manners of resilience-building in which the historical, political, and sociocultural settings play an essential role. Both results from Rotterdam and Yokohama proves that the relationship between sustainability and resilience is very complicated, with inconsistency

between two concepts and additional overlaps and fuzziness in implementations. Local governments have struggled with inefficiency in either defining the boundaries of two approaches or implementing repetitive solutions, which is criticized as a waste of investment.

Thus, the accurate interpretation of resilience and the concretization of sustainability in urban development should be the new emphasis on deploying climate adaptation strategies. On a local scale, various social innovations, climate change education, and broader public participation should be encouraged. On an international scale, integrating resilience-enhancement into achieving The 2030 Agenda for Sustainable Development and the Paris Agreement on Climate Change should be a consensus. New international cooperation for inclusive development for all delta cities with rising sea levels should be established explicitly in terms of 1) capacity building; 2) organizational resources; 3) technology cooperation; 4) policy experience sharing. Such cooperation will offer good opportunities for unifying effort and acting jointly to tackle the global issue of sea-level rise. Under the scheme, the pioneers should maximize their impacts and visibility; Rotterdam and Yokohama are supposed to cooperate and coordinate closely with less-developed regions by providing good practice, technical assistance and knowledge sharing. Further research should fruitfully explore the context-specific resilience-building, the relationship between path dependency and institutional change, etc., concerning inter-and transdisciplinary disciplines and project-based collaborations.

Annex

Annex 1: Interviewees in Rotterdam and Yokohama

Rotterdam, The Netherlands:

Engineer, Floating Farm Rotterdam

Senior advisor in City of Rotterdam, in charge of Rotterdam Climate Initiative

Policy coordinator of Municipality of Rotterdam, in charge of urban development in the BAP Team Next Economy / Sustainable Department

Researcher in the city's Chief Resilience office, in charge of the Resilience program of Rotterdam

Researcher, a supervisor in IHS (Institute for Housing and Urban Studies, Erasmus University

Rotterdam) and works for a political party for animals in Rotterdam

Yokohama, Japan:

Climate Change Policy Headquarters, City of Yokohama

Sewerage Management Division, Kanagawa Prefectural Government

Sewage Management Division, Environmental Planning Bureau, City of Yokohama

Environmental Planning Division, Kanagawa Prefectural Government

Professor, Faculty of Contemporary Society, Kyoto Women's University

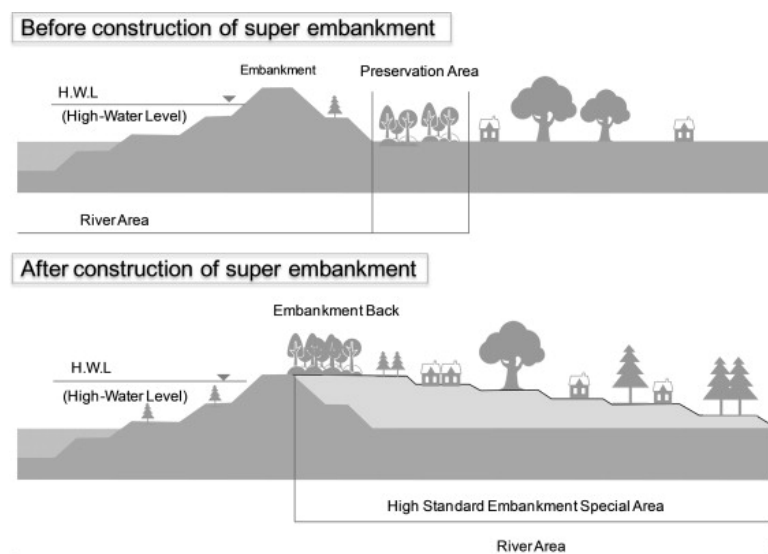
Professor, Research Institute of Sustainable Future Society, Faculty of Civil and Environmental

Engineering, Waseda University

Annex 2: Scoring scales for urban resilience assessment (Wardekker et al., 2017)

--	-	0	+	++
The current situation is very weak regarding the principle.	The current situation is weak regarding the principle.	The current situation is neutral regarding the principle.	The current situation is strong regarding the principle.	The current situation is very strong regarding the principle.
There are key weaknesses in most aspects, no strengths. Opportunities may be missed.	Either overall weak or a mix of weaknesses and strengths that are still largely unfavorable.	A mix of strengths or opportunities and weaknesses, with an overall neutral or unclear effect.	Either overall strong or a mix of weaknesses and strengths that is still largely favorable.	There are key strengths in most aspects, no weaknesses, and possibly valuable opportunities.

Annex 3: Before and after the construction of super levee (Luo et al., 2015)



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Acronyms

Asean	Association of Southeast Asian Nations
Ascc	Asia Smart City Conference
Czms	Coastal Zone Management Sub-group
Ippcc	Intergovernmental Panel on Climate Change
Oecd	Organisation for Economic Co-operation and Development
Para	Protect-Accomodate-Retreat-Avoid
Sdg	Sustainable Development Goals
Sid	Small Island Developing Nations
Un-desa	United Nations Department of Economic and Social Affairs
100Rc	100 Resilient Cities

ANTHROPOLOGICAL RESEARCH APPLIED TO SUSTAINABLE DEVELOPMENT PROJECTS. THE CASE STUDY OF FEMALE DOMESTIC WORKERS IN ETHIOPIA AND TANZANIA

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Abstract

In this paper, I present an ongoing anthropological research applied to sustainable development projects for the promotion of domestic workers' rights in Ethiopia and Tanzania. This research addresses internal gender migration dynamics, with a specific focus on domestic work, using a comparative approach. Domestic workers are active agents in complex social contexts. Giving space to their voices, this work examines the complexity of motives that bring girls to move to perform domestic work, as well as their expectations and ambitions. The aim is to bring a valuable overview of domestic workers experiences, while acknowledging both the gendered context-specific and the structural constraints that they face. The ultimate goal is to identify solutions that might benefit domestic workers in the first place.

Keywords

Domestic work; gender; applied anthropology; development cooperation

Introduction

In this paper, I present an ongoing anthropological research that I have carried out in Ethiopia and Tanzania under the umbrella of the Non-Governmental Organization (NGO) *Comunità Volontari per il Mondo (CVM)*, in partnership with the Italian University of Urbino Carlo Bo, as part of my PhD programme. CVM, based in Italy, is working on a three-year project for the “Creation of Support Networks for Domestic Workers in Africa” (2017-2020) in Ethiopia and Tanzania.

Within this qualitative anthropological research I undertake a comparative analysis of domestic work in Ethiopia and Tanzania, with the aim of identifying recommendations for development policy and interventions that might benefit domestic workers. Significantly, the choice of a two-country study has involved comparing different sets of labour legislation, which in the case of Ethiopia excludes domestic workers from its remit – as in the majority of other countries – while in Tanzania it includes them in the umbrella legislation for all workers but falls short of accounting for many of their needs.

In my study, domestic workers are young women and girls who migrate internally, primarily from rural to urban areas, to work within the households of their employers. While listening to girls and women's narratives, I analyse the complexity and diversity of their life and working experiences. I mainly explore the reasons behind their movements, their trajectories, ambitions and expectations,

the decisions that they take and the strategies employed to face challenges, as well as how they experience their mobility. The intent is to facilitate an inclusive and participatory environment where domestic workers play a key role, and different viewpoints are acknowledged, shared and discussed. This exchange between research and cooperation activities has the potential to increase the impact and efficiency of development projects, shedding light on some critical issues and proposing potential solutions through a collaborative process of co-creation of knowledge. In this regard, applied research should always be employed in consultancy activities to promote a culturally sustainable type of international cooperation (Declich, 2012).

Clearly, the objective of my research has also been to assess the experience of the so called beneficiaries of CVM projects, and in particular domestic workers, when taking part in educational trainings organized by the NGO, their ideas and perceptions, as well as the impact of these activities on their lives. However, regarding research findings, in this specific paper I only address the complex set of motives behind the girls' need to migrate. Indeed, interventions that wish to improve domestic workers' lives cannot be promoted without systematically understanding why it is that girls work and migrate, as well as how they experience their mobility and working conditions, and which alternatives could be applied to meet their needs differently (Howard, 2017).

The structure of this paper is organized as follows: in the first section, I briefly present the NGO and its projects involving domestic workers. In the second section I discuss the terminology that I use and reflect on domestic workers as active agents. The third section briefly presents my methodology, which privileges a life-story approach. In the fourth section, I show some figures and facts on domestic work in Ethiopia and Tanzania. In the fifth section, I illustrate partial research results, specifically in relation to the girls' motives behind migration, expectations and hopes. Lastly, I present my conclusions.

The NGO and its projects involving domestic workers

Both in Ethiopia and Tanzania, the NGO supports the creation of domestic workers' Associations, whose members meet regularly. The involvement, empowerment and capacity building of Associations have the objective to facilitate and strengthen support networks for domestic workers and build local organizations, which aim to enhance and promote domestic workers rights. During their meetings, members of the Associations share their life and work experiences, and develop mutual support strategies, as well as ways to engage with new potential members and strengthen the associations. Members have been enrolled in combined trainings in labour laws, reproductive health, AIDS/HIV risks/prevention, time management in the workplace and work ethics,

communication and professional skills, among others. Specific trainings on domestic workers' rights have also involved employers. The Associations also run Micro-insurance and Income Generating Activities (IGAs) - for example in the handcraft sector - allowing them to sustain their activities. All these activities have been facilitated by the NGO in strong partnership with local leaders and representatives of the community in both countries.

More broadly, CVM projects promote and facilitate coordination between institutions and trade unions with respect to the implementation of actions and policies that protect domestic workers and recognize them as a professional category. In particular, the NGO facilitates the organization of meetings, workshops and social exchange tables involving various representatives of institutions at National, Regional and Local level, Trade Unions and Domestic Workers Associations in Ethiopia and Tanzania. Supported by the involvement of international actors such as the International Labour Organization (ILO) and the International Domestic Workers Federation (IDWF) - which is the only global trade union led by women - the NGO also contributes to the International Campaign for the ratification of the ILO Convention No. 189 "Concerning Decent Work for Domestic Workers" (C189) in both countries. Future projects concern the promotion of women's rights and equal opportunities beyond specific country case studies, aiming at the acknowledgement of domestic workers' contribution at global level. However, the language surrounding this occupation has varied greatly according to cultural and geographical context over time. Thus, some theoretical considerations on the terminology are needed.

Theoretical considerations

The term domestic worker is a broad term, there is no common definition across countries for what constitutes domestic work and opinions about the use of this term diverge also in the International Domestic Workers Federation (IDWF) and in recent discussion about this occupational group at the ILO (Hoerder et al., 2015). When discussing domestic work, there is a range of related terms – such as 'foster child', 'employer', 'employee', and others - whose use and meaning differ in space and time, and should therefore be carefully employed. Here, I mainly address domestic work as part of the migration process from rural and semi-urban areas to the major towns and cities. Specifically, Ethiopian domestic workers working in Ethiopia and Tanzanian domestic workers working in Tanzania.¹ Their main working activities vary from cleaning the house, washing clothes, cooking,

¹ Research material in the last two decades has mainly focused on migration from Africa towards developed countries, while only a few studies have looked at the African continent itself (Declich & Rodet, 2018). Close linkages exist between internal migration within the same country, as well as cross-border mobility within the African continent, and international migration processes (King & Skeldon, 2010). In my study,

to taking care of children and looking after elderly or sick people. They are primarily, though not exclusively, live-in domestic workers, as they reside in their employers' households. The notion of household is equally complicated. In order to grasp its meaning, one must examine the context-specific definitions of this concept while providing detailed social and historical analysis (Declich, 2015). In this paper, I use the term household in a broad sense: as the group of people who are related to the owner of the dwelling and for whom the labourer works, as well as the place where this group resides.

The use of the term “domestic worker” is particularly significant for the ILO - responsible for improving the conditions of *all* workers – as a way to update terms such as “servant” and “maid” (Adelle 2011). The ILO defines ‘employment relationship’ as a relationship between an employer and an employee in which the latter performs work in return for remuneration, and under certain conditions. Studies in East Africa highlight that in the domestic work sector, in order to understand the meaning and implications of employment relationship it is important to explore the recruitment process of a domestic worker. For instance, girls may be recruited “through kinship networks, commonly referred to as *Undugu* in Swahili” (Kiaga & Kanyoka, 2011, p. 13). Thus the relationship employer-employee may become blurred and sometimes be confused with a sort of kinship, or distant kinship. Similarly, several studies point out that in given contexts of the so called Global South, the ILO definition of ‘children in employment’ and ‘child domestic work’ risks to exclude work undertaken in the child’s own household, turning unpaid care and domestic work invisible (Imoh, Bourdillon, & Boyden, 2019). Further studies problematize the formalization and professionalization of paid domestic work in given contexts, while arguing that this institution ends up reproducing the structures of social and cultural inequalities in society (Uhde, 2016).

Although in this article it is not possible to properly reflect on each term that is used, as well as to define and disentangle terms that interact and overlap in complex ways, such considerations have to be kept in mind. In this regard, accurate analysis of the significance and use of specific terms in different contexts, and over time, are vital to challenge the ethnocentrism of dominant policies.

One must also consider that domestic workers are not a homogeneous group, but active agents in complex social contexts responding in various ways to different situations.

some of the women interviewed were on the process of migrating– or had the ambition to do so– to the Middle East, while others already had had a working experience abroad. However, I do not address this issue here

Domestic workers as active agents

Domestic work often hides abuse and makes it possible. Several studies show that domestic workers often experience discrimination and marginalization with regard to pay, working conditions and legal rights, as well as verbal, physical and sexual abuse (Chuang, 2010; ILO & Ramirez-Machado, 2003; Mulugeta, 2012). In my study, many women and girls tend to describe their lives as very isolated, and their freedom of movement as constrained by the will of the people for whom they work. Scholars, however, have highlighted that describing domestic workers only as victims neglects their role as agents (de Regt, 2010; Lan, 2003), namely, girls' resilience and capacities to negotiate their own position. As active agents, domestic workers employ various strategies to improve their situation while dealing with the hardships and challenges inherent to their lives (Grabska, de Regt, & Del Franco, 2019). A complex variety of reasons, desires and expectations are at the origin of their movements and individual responses to different situations. Therefore, it is vital to investigate the particular circumstances these girls face in their own communities that motivate them to start domestic work, such as the forms of social and gender pressures from which they may try to escape, as well as the risks and opportunities they are exposed to (Bujra, 2000; Gankam Tambo, 2014). This might help to problematize the dominant poverty concept underlying migration, while shedding light on the gendered context-specific and the structural constraints in which women's lives are embedded. In both countries the domestic workers who were interviewed emphasize strong gender norms and gender-based inequalities that had affected their lives since childhood. Their gender had an impact on their responsibilities, the type of work they had to do in or outside their home, their relationships with relatives, friends and other members of the community, their opportunities to access education, as well as their ambitions and future plans (Creighton and Omari, 2018). Thus, my study seeks to explore how domestic workers continue to practice agency, to take everyday and strategic decisions despite structural constraints (see Briones 2009).

Before illustrating my methodology and research results, I shall discuss figures on domestic work in Ethiopia and Tanzania and the legal instruments that are relevant in both countries.

Domestic work in Ethiopia and Tanzania: some figures and facts

According to the ILO, Africa is the third largest employer of domestic workers, after Asia and Latin America. "Approximately 5.2 million domestic workers are employed throughout the region, of whom 3.8 million are women and 1.4 million men"(ILO, 2013, p. 33). However, this figure is

widely seen as an underestimate, as in many African Countries the number of domestic workers in official statistics is very limited and they may not be recognized as workers in labour force surveys. In Ethiopia, according to a remote national estimation retrieved from the ILO's Department of Statistics, in 2005 at least 248,600 people were employed as domestic workers in private households, and 91% of them were women. These statistics only refer to domestic workers in cities (Schwenken & Heimeshoff, 2011). In 2015–16, the Population Council undertook a study of migrant, out-of-school girls in six Ethiopian regions. Overall, 4,540 out-of-school female migrants were interviewed. While 1,094 were in domestic work at the time of the survey, 67 percent among migrant girls entered domestic work as their first working experience (Erulkar et al., 2017).

In Ethiopia, domestic workers are excluded from the application of the Labour Proclamation No.1156/2019 (the 2019 labour law). Indeed, they do not have a trade union upholding their rights, they are not allowed to join/form a trade union and they are not considered in official statistics (Gebremedhin, 2016).

Domestic workers under Tanzanian laws are considered jointly with other employees, and although their rights are provided for under the Employment and Labour Relations Act, 2004 and Regulation of Wages and Terms of Employment Order, 2010, no specific provision strictly applies to domestic workers alone. The trade union called Conservation, Hotel, Domestic and Allied Workers Union (CHODAWU) represents, amongst others, domestic workers (ILO, 2016).

A situational analysis of domestic workers conducted by the ILO suggests that at least 883,779 domestic workers in mainland Tanzania, and 203,622 in Zanzibar, are party to an employment relationship by declaring themselves as domestic workers. However, the report states that, if we consider people performing domestic tasks, who are involved in very informal arrangements without necessarily being recognized as workers, this number increases to at least 1,728,228 (seventy-five percent are women). Further surveys suggest that about 53 per cent (5,009,076) of all households in Tanzania employed a domestic worker (weighted results using 2012 Census) (ILO, 2016).

Overall, both in Ethiopia and Tanzania reliable data on domestic work are unavailable. Fundamental research is also lacking, with a few exceptions (Bujra, 2000). The treatment of domestic workers is usually addressed in the context of child protection projects related to child labor, child migration and trafficking, as well as HIV/AIDS girls' education programmes, and rarely the issue is addressed as part of the migration process from rural and semi-urban areas to major towns and cities (Austrian Red Cross, 2016).

Methodology

This ongoing research has been mainly conducted in two towns where CVM has its premises: Debre Markos (Ethiopia) and Morogoro (Tanzania). The main data collection methods have consisted in structured and semi-structured interviews, in-depth interviews and life stories, Focus Group Discussions (FGDs), daily conversations, participation and observation. Overall, I carried out seven months of fieldwork research in Ethiopia, and five months in Tanzania, split in two phases: between June and December 2018, and between August and December 2019.

Domestic workers are not easy to reach, they hardly have time off and a relationship of confidence with them was not easy to build. They usually start their work very early in the morning (around 5:30 a.m.) and end late in the evening (around 9:00 p.m.) after the last meal. Overall, their freedom of movement is restricted, as it often depends on the will of other household members who determine the extent to which they can leave the house when they are not performing working activities outdoors (such as when they shop at the marketplace).

This research would not have been possible without the support of CVM staff, who played a great role in facilitating my contacts. Many interviewees were accessed through CVM domestic workers Associations, yet a snowballing technique was employed to reach also domestic workers who did not know the NGO. Good collaboration with CVM staff, and in particular with translators, has been vital in developing this research and building trust in the community.

My analysis of women's narratives mainly draws on 30 life-stories gathered in Ethiopia and 25 in Tanzania, since this is the basic approach I chose to adopt. All women were interviewed individually with a female interpreter. Tape-recorded life stories were subsequently transcribed from Amharic (Ethiopia) or Swahili (Tanzania) into English. I changed their names in order not to disclose their identities. Whenever in this article I quote domestic workers' words, I specifically draw on tape-recorded life stories which were subsequently transcribed by local translators. Further contextual information on women's lives was gathered while working with the NGO staff, especially during meetings of the Domestic Workers Associations established by the NGO, through FGDs, structured and semi-structured interviews with a total of 83 young women in Ethiopia and 103 in Tanzania.

Most of the Ethiopian women came from villages in the Amhara region, usually less than 100 kilometres away from Debre Markos. In contrast, some of the Tanzanian domestic workers I interviewed in Morogoro originated from different regions of the country, such as Dodoma, Kigoma and Tanga.

At the time of my fieldwork, the majority of the girls who were interviewed (aged between 14 and 30) were working as live-in domestic workers in Debre Markos and Morogoro. Yet their narratives also refer to previous experiences of work in households other than the current one, as well as in other towns or cities. The majority of them were adolescents (between 12 and 17 years of age) when they first started working as domestic workers.

Points of view of employers, intermediaries for recruitment process, relatives and friends, CVM staff, as well as other social actors, were gathered. Observation and participation in the daily life of the community, markets, community gatherings and ceremonies, as well as visits of girls at the workplace (the household) were highly valuable opportunities. Further information has been collected from representatives of various organizations, institutions, local and international NGOs working on issues related to internal migration and workers' rights.

I am aware of the unavoidable intersectional power dynamics between researcher and research participants. As I mentioned in the introduction, it is the responsibility of researchers to facilitate the creation of an inclusive and collaborative environment of co-creation of knowledge, where mutual dialogue and collaboration between researcher, research participants and various stakeholders is valued as a useful tool to refine research questions and identify solutions (GAATW-IDWF, 2019). This might help to minimize, as far as possible, the complex set of power hierarchies that inevitably persist.

Motives behind migration

The great majority of domestic workers interviewed come from families economically depending on agricultural activities in the rural area. They generally move to middle-class and upper-middle-class households in the urban area. Most studies mention poverty as the main driving factor that pushes girls to migrate (Atnafu et al., 2014). In my study poverty, together with the need to support family back home, have been often reported as a major factor, especially during structured interviews. However, through in-depth interviews and life stories, a complex set of reasons come to the fore. Girls may move to escape oppressive gender regimes at home, to pursue their education, to improve their standard of living, to fulfil family needs, to explore new areas and experience a new lifestyle, among other reasons. Focusing on women's life trajectories reveals that the prospect of upward social mobility might take centre stage (see Thorsen 2006). One of the main aspirations to social mobility for a domestic worker might be a relationship with a wealthy person in the urban area who could provide a sort of protection that she is lacking back home. Many domestic workers also hope to find a better job and start a new life in the foreseeable future. The chance to work in

cities might be valued as a road that offers new spaces for action – even if under specific constraints - which would not have been available in their villages of origin.

Both in Ethiopia and Tanzania, societies are markedly hierarchical and have strong gender norms and gender-based inequalities (Boyden et al., 2012; Stark, 2018). In domestic workers' accounts, individual aspirations are often combined with a great sense of responsibility and sacrifice. As some scholars underline (Grabska et al., 2019), migrating for one's own benefit is considered less acceptable in a society where girls are supposed to make sacrifices in the best interest of their families back home. Thus the motivations expressed are often imbued with statements on responsibility they feel towards their families. The ability to support family members who stay behind is almost always part of the women's migratory projects. In other words, domestic workers continuously juggle family demands and individual aspirations.

Moreover, personal decisions are always inspired by others and never taken individually and unilaterally (Grabska, 2016; Huijsmans, 2012).

There were other people in my home village, they said to me “it is better in Morogoro, go and find a job as domestic worker” (...) you will not pay a house rent, you will not have food expenses.” So I talked with my friend and we decided: “let's go together.” (Ratifa, 20 years old, 13/08/19, Tanzania)

Overall, the girls decide to migrate as a result of a dialectic between agency, opportunities and structural constraints, where various factors intersect: the struggle to survive and the pursuit of desires and aspirations.

Family circumstances

Difficult family circumstances can prompt women and girls to become domestic workers in the urban area. Quite a number of girls left their villages for the first time after having lost one or both parents, after family issues such as their parents' divorce, as well as experiences of abuse back home. Below, this girl recounts how her life got worst when her mother married a man who used to abuse her.

As soon as he moved into my house I quit my education. I had to do all household chores and fetch water and work the land. I had heavy workload and I was scared. He used to beat me every time I made a mistake. (Leonia, 18 years old, 16/08/19, Tanzania)

In some cases, both orphans and children born out of wedlock experience marginalization from the community. Some scholars point out that in given contexts, for example in Ethiopia, pregnancies out of wedlock are socially condemned and orphans may be considered as an economic burden on

the community (Grabska, 2016). In the case below, the girl lost both parents. She states that after the death of her father she had no alternatives other than leaving her village.

My father was sick, we went to Addis to heal him with holy water but he died. When I returned to my village people were angry with me. They said that I hadn't had enough faith and this was why my father died. (Mulu, 23 years old, 16/07/18, Ethiopia)

In other words, cultural traditions and ideologies may work at expelling vulnerable young women from rural communities.

Avoiding marriage agreements

Scholars also reveal that young women may decide to break away from their home area to escape from practices such as early marriage, abduction and rape, which are the result of a complex interplay of sociocultural and economic variables like marriage rules, moral values and the land holding system (Shiferaw et al., 2018). In the following life story, a young woman describes her preparation for early marriage when she was a child, as well as how she was engaged in household chores both at her parents' house and at her future husband's household.

I think I was 8 years old... Even the day of my wedding ceremony I had no idea that I was going to be married [...] They came and took me at night. Then my marriage was over and I remained at home with my parents [...] They used to say "let her go back and forth between her husband's family and her parents' house, until she is mature enough to live with her husband." They made me run errands to bring water and do household chores back and forth, so I did what I was told to do. (Yamrot, 26 years old, 17/12/18, Ethiopia)

Yamrot moved to the city at the age of 12 to avoid her marriage agreement, and found a job as a live-in domestic worker, then was a daily labourer at construction sites, finally she moved back to live-in domestic work. In this case, the decision to break away from the home area can be considered as a subversive act against specific patriarchal structures. This does not mean that her migration led to a rupture in family relationships. Rather, her meagre salary contributed to partly covering the school costs of her younger brothers. Yet, in her account, working in the city – albeit under exploitative circumstances - gave her the opportunity to also invest in other personal ambitions. She was able to attend at least two years of secondary education, but she dropped out of school after having failed the final National exam. When I met her, she hoped to find a more stable job and be hired at the Debre Markos University as a cook in the canteen.

Restrictions of movements and isolation

Domestic workers often spoke about their restricted mobility in their place of origin. They were not allowed to leave the house freely because their parents, and other influential adults, were afraid they would start premarital relationships. In talking about their life in the rural area, several women stressed the fact that daily activities were confined to specific tasks such as fetching water, livestock and agricultural tasks, while boys were given more freedom to take rest, socialize with peers and go anywhere during their free time. In a few cases, I found that girls migrated because they got pregnant after having had premarital relations. They left the newborn to their community back home and then moved to an urban area in order to escape stigmatization and marginalization from their community, as well as to find means to support their child. The majority of domestic workers that were interviewed, however, did not have children, and were not married. They claimed that marriage was an important aspect of their future projects, but they tended to give prominence to other personal ambitions, such as the desire to pursue their education and find a more qualified job before marriage.

The restricted mobility that women had experienced in their villages of origin and from which they had tried to escape recurred in different forms in the urban context. In their narratives, girls tend to describe their lives as very isolated and their freedom of movement as confined to the employers, who determine the extent in which they can go out and meet other people.

In Dar es salaam I was in someone's house so I wasn't free...I had to stay inside until she (the employer) came back or decided to take me out, but I wasn't totally free, no freedom of movement if I wanted to visit someone... The movement was just around the shop and it wasn't everyday because she (the employer) was always angry and everything took place inside the house. (Edina, 23 years old, 17/09/19, Tanzania)

The term 'freedom' is another complex concept with various facets revealing different meanings in domestic workers' accounts. As I have already mentioned, the aspirations of girls who move from rural to urban areas may include the will to improve their standard of living by entering a house with a higher life standard, while somehow searching for a sort of protection that they cannot receive back home.

Educational opportunities

The lack of educational opportunities in the rural area is another push factor women mentioned as reason to migrate to the urban area. According to domestic workers' accounts, on the one hand the double workload of livestock activities and household chores in their villages of origin made it

difficult for them to attend school. On the other hand, they were taken out of school by their parents who wanted to prevent the risk of them starting sexual relationships. However, in other cases, the migration of girls was supported and the decision taken by their parents who asserted that they wanted them to start or continue their education. Clearly, this could be a way to convince the girls to go.

My father told me: ‘Education is important. Move to the city, but I will kill you if something happens there.’ I have an uncle in Addis. I went to Addis to help my aunt while she was pregnant, and then I moved to another house. (Alemeit, 22 years old, 15/11/18, Ethiopia)

As I will illustrate, in many cases promises made to girls were broken, domestic workers seem to have been cheated by influential adults who convinced them to go work in town to pursue their education, while they could not fulfil many of their ambitions and ended up working in very exploitative circumstances. There are also cases where the decision to leave the village was taken by adults regardless of whether it was also the girls’ will. Yet most of the time, girls report that even in this case, they had high expectations about their life in the town. They had hoped to become financially independent, to improve their own lives and those of their relatives back home, to continue their education and then to move from domestic work to another job. However, at the time of my fieldwork, almost all domestic workers were disappointed by the ways in which their lives had turned out after migration. Their aspirations and hopes for a fast and easy change were regularly frustrated by harsh working conditions, and promises about school were very often broken.

My parents took me to my cousins’ house, they said “you will go to school”, but instead they only made me work, I just performed household chores for three years... Three years without any sign that I might be sent to school (Magret, 22/08/19, Tanzania)

Unclear relations

In most cases, girls started working for someone who offered them accommodation and education in exchange for household chores, hence the first working experience of girls in the urban area was often without any salary. Girls who were recruited through kinship networks were sometimes exploited, because the relationship between them and their employers was not clear. In the following narrative, a young woman (Ketema) moved to Addis Abeba when her ‘distant’ paternal relative connected her to a household in the city. Differently from what she expected, she ended up working as a domestic worker and she was never paid.

My relative said to me "you will find a job in your field of studies", but when I went there I was made to work as a house servant... When I asked the employer "what about my salary", she (employer) said to me "your relative will give it to you" [...] When I said to her "now you will give me my salary", she replied "what salary are you taking about, have you been working in my house?" (Ketema, 28 years old, 19/12/18, Ethiopia)

In this case, it was not easy to understand which kind of blood connection linked Ketema with the man that she – as well as her mother and sister - called ‘distant relative’: “we have a distant blood relation with him”, “You know, my father has a lot of relatives...”. However, Ketema also reported that he was somehow connected to her paternal uncle’s family. In my study, many women mentioned uncles and cousins as those who recruited them or provided accommodation upon arrival in the city. Despite the use of kinship terminology, in several situations these people were not related by blood. Anyway Ketema, her mother and sister, they all claimed that they had been cheated by him. Ketema argued that her parents were not aware of the exploitative working conditions she endured in Addis Abeba, she explained that she was not given the chance to communicate with them. In turn, Ketema’s mother and sister argued that they were given wrong information about Ketema’s conditions, and so they thought that she was fine. I wanted to encounter other people, for example Ketema's father, but he never showed up. I could not verify whether anyone made an agreement with the man who sent Ketema to Addis or knew his plans. Relations between the parties involved were not clear. But one must consider that studies - in revealing different approaches for girls’ placement - demonstrate that within extended family ties, girls may be offloaded on a third party, even pawning them to settle a debt. In some cases an extended family member may obtain pecuniary gain as an agent, transferring the girl from her natal rural home to a well-off urban household (Bryceson 2019).

Satisfaction, regrets and hopes

What emerges from the domestic workers’ accounts in relation to their lives in the city is a combination of mixed feelings and emotions, which is a part of their self-representation that allows us to learn how alternative selfhoods are negotiated (Gardner, 2002). In the following quotation, a young woman regrets having left her home village, while at the same time stating that moving to the urban area was the best decision she had ever taken.

But now I sometimes feel bad for the fact that I didn't get married and built a family there....and other times I say to myself "it is good that my sister got me out of the rural area". If I had lived in the rural environment until now, I would have known nothing"...I would have spent my life digging like my mother...but still other times I say "I wish I stayed in the rural home and never came to Debre Markos". At the same

time I comfort myself saying "it is good that I came". It is when I am able to pay for the recharge of my mobile card and so on that I tell myself "it was good that I came to Debre Markos". (Yamrot, 26 years old, 17/12/18, Ethiopia)

In order to underline her point, she showed me a mobile phone that she had bought a few months before our meeting. Girls' agency comes to the fore when they talk about ambitions, regrets, setbacks, achievements, and the strategies they continuously mobilize to negotiate their own position, face challenges and improve their lives. Domestic workers often felt trapped in a present they did not want to inhabit, they felt the uncertainty and the unpredictability of their future, while waiting for an alternative future which was hardly possible. Yet their daily time continued to flow, shaped by survival strategies and hopes for the future. As Cathrine Brun (2015) puts it: "People use hope to cope with an uncertain future; they take on hopeful waiting in the positive anticipation that it will help them to stay afloat" (Brun, 2015, p. 33). During their life course, domestic workers changed their hopes, expectations and plans. They built alternative strategies to reach alternative futures.

Conclusions

In this paper, I have shown that the situations of domestic workers largely differ and are not easily depicted in only one dominant portrayal. Poverty is not the only factor that pushes girls to leave their place of origin. Girls may move voluntarily to escape restrictive gender norms at home, to access education, to explore urban areas, and so on. Sometimes the girls seem to have been cheated by their relatives, who convinced them to move in order to work in other people's houses hinging upon their wish to study while they sent them to work in conditions of exploitation, so that the girls did not fulfil the ambitions which in the first place motivated them to comply with the requests of their relatives. For some girls the arrangements in the town/city are made by controlling adults, with or without their acceptance. For others, taking up domestic work is a strategy to obtain support and protection that is lacking back home, with the possibility of either acquiring benefits or being exploited once they reached the place of destination. However, decisions are made within situations of severe constraints. In most cases, girls' expectations about life in urban areas turn quickly into disappointments, colliding with the reality of harsh working conditions, low pay (if any) and various forms of abuse. Despite of this, girls still value the urban area as an opportunity to change their lives and continuously mobilize strategies to face challenges. Ultimately, domestic work itself can offer risks as well as benefits and hopes to girls in deprived circumstances.

As this is the trend, girls most likely will continue entering this kind of job opportunities because they are considered an alternative to their lives, which do not appear sufficiently interesting. However, they can be made aware about ways to opt out from abusive conditions and given information on the danger of being involved in enslaving jobs, as well as on the role of various types of agents transferring girls to urban households. It would be important to investigate the (unclear) relations between the parties involved in the recruitment process of domestic workers - both within extended family ties, based on networking of rural and urban branches of the extended family, and non- familial relations.

To achieve this objective, it is necessary to involve various researchers interviewing not only domestic workers and their employers, but also several members of their families, living in cities as well as in the rural areas of origin. This would allow to better grasp the complexity of different approaches to domestic workers' placement, the role played by other household members, and the risks to which many women and girls are exposed.

Anthropological research has the potential and the responsibility to shed light on critical issues, as well as to contribute to the identification of solutions which might increase the effectiveness of sustainable development projects on domestic work. In this regard, accurate analysis of the significance and use of specific terms in space and time are vital to challenge the ethnocentricity of dominant policies. An effective collaboration between researcher, research participants and various stakeholders is vital to create an inclusive environment of knowledge co-creation, to identify solutions, as well as to minimize some of the power hierarchies inherent to both the NGO projects and the research process. Lastly, interventions that wish to improve domestic workers' lives cannot be promoted without systematically addressing the complex set of motivations behind girls' need to work and migrate, as well as how they experience their mobility and work conditions, and what alternatives they may enact to satisfy their needs.

Having said that, researchers should do their best to share the results of their work with the broader public, beyond academia. That is, they should explain complex concepts and arguments by making their language more accessible to everyone. In this way, they might have a key role in disseminating new ideas that shape and enrich public debates.

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**IN QUEST OF HEALTH: RESPONDING WITH BASIC MODERN
MEDICINE FACILITIES TO HETEROGENEOUS NEEDS.
A QUANTITATIVE SURVEY BASED ON ANTHROPOLOGICAL PERSPECTIVES**

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Abstract

This essay discusses the way in which a quest for health was expressed by resorting to primary health care services set up in the Middle Juba region of Somalia before the civil war started in 1990. The hypothesis concerning this study are grounded in direct and participant observation of the operations of the health service facilities as well as the social dynamics surrounding such operations carried out during one year of project and on interviews with traditional healers as well as observation of traditional healing treatments. The call for care and attention expressed in the services represented a wide concept of well-being but the expectations conveyed by resorting to the health facilities sometimes did not coincide with the services offered. Those specific needs and expectations which were not met by the existing health services have been the main inspiration and focus of this entire survey.

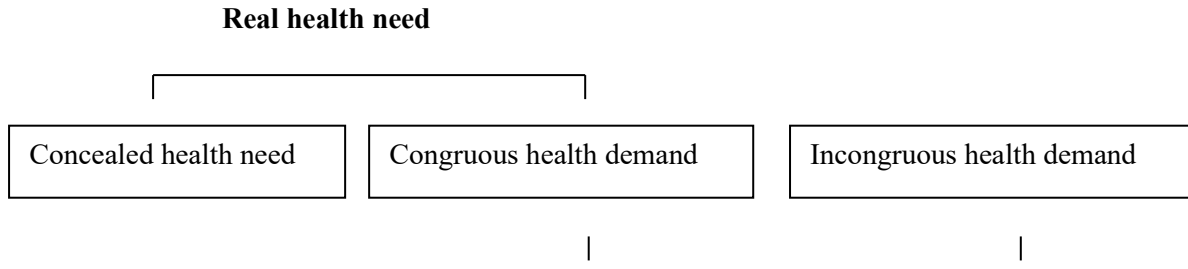
Questo saggio descrive le modalità con le quali veniva espressa la domanda di salute tramite il ricorso alcuni servizi di salute primaria di base messi in piedi nella regione del Medio Giuba in Somalia prima della guerra civile del 1990. Le ipotesi sulle quali si basa questo studio sono fondate su osservazione diretta e partecipante delle operazioni dei servizi di salute e delle dinamiche sociali relative a tali operazioni portate avanti durante un anno di progetto e su interviste con curatori tradizionali e osservazione delle cure tradizionali. La richiesta di cura e attenzione espressa nei servizi rappresentava un ampio concetto di benessere e le aspettative dichiarate nel ricorrere ai servizi a volte non coincidevano con i servizi offerti. Quegli specifici bisogni e le relative aspettative che non erano incontrati dai servizi sanitari esistenti sono stati la maggiore ispirazione e l'interesse centrale di questa survey.

Introduction

This essay discusses the way in which a quest for health was expressed by resorting to primary health care services set up in the Middle Juba region of Somalia before the civil war started in 1990. The hypothesis concerning this study are grounded in direct and participant observation of the operations of the health service facilities as well as the social dynamics surrounding such operations carried out during one year of project and on interviews with traditional healers as well as

observation of traditional healing treatments.¹ Later the issues have been studied by administering a questionnaire to those who resorted to the out-patient of the modern medicine facilities. A number of different needs for care and attention pertaining to a wider concept of well-being were expressed through a resort to the facilities and some expectations in this regard did not coincide with the services offered. The existence of these multiple needs expressed, and the expectations articulated through resorting to the health facilities but not met have been the main inspiration and focus of this entire survey.

Two conceptual premises underlie this study: first, in every human community a demand for health exists and it is managed at the local level; second, national Primary Health Care (PHC) structures induce a new type of health demand through the introduction and use of “modern”, if only basic, medical technologies.² In other words, the encounter of the different systems of coping with health problems fosters the development of new tastes³ and inclinations toward the resolution of such troubles. In order to be able to take into account in the analysis two different structures of answering to similar and yet different “social demands” of health it has been applied the framework of the relations between health demand and health need proposed by Akin et al.⁴ as outlined in fig. 1.



¹ The survey was planned out of reflections made during one year of participant observations while working in the facilities of the PHC project of Mareerey and studying for a university degree. The very fact of carrying out part-time an anthropological study at university level allowed for reflections that went beyond the simple functioning of the project and that projected the application of certain critical thinking to better understand the anthropological encounter which was happening within the health development project. The weekends plus other working days of the four months during which the survey was organized and carried out were used to also visit and interview traditional healers, film some of the communal traditional treatments including jinni possession spirits celebrations and talk with people about healing practices,

² Thanks to: Teresa D’Arca medical doctor for continuous collaboration concerning the medical aspects of the data analysis; Chiara Venier for suggestions kindly given while preparing the questionnaire; Francesca Patrizi for patient help during codification and *input* of quantitative data; the workers of the PHC of the Middle Juba region and the Jilib district for their cooperation. The survey has been carried out under the auspices of NGO CISP (Comitato Internazionale per lo Sviluppo dei Popoli) in the Primary Health Care facilities set up by the NGO in coordination with the Somali Ministry of Health in the village of Mareerey along the Juba River. Opinions expressed in the study, however, are only responsibility of the author.

³ P. Bourdieu, 1983, *Distinzione*, Il Mulino, Bologna.

⁴ J.S. Akin, D.K. Guilkey, C.C. Griffin, B.M. Popkin, 1985, *The Demand for Primary Health Services in the Third World*, Rowan and Allanheld, Totowa.

Health demand

Fig. 1. Relation between health demand and health need.

It has been defined a “congruous” health demand a demand of health concerning requirements that modern health systems can meet and treat adequately (for instance, by prescribing efficacious treatments); “incongruous” health demand has been considered one that is expressed with resorting to medical centers yet it is linked to pseudo-health desires or to needs which cannot be regarded specifically as of a medical kind. “Concealed” health needs are those that do not reach the level of awareness in the population and tend to lay unexpressed although they could be satisfied by modern health services. These concepts are relative to the viewpoint taken by those who use them, therefore, depend by the observation point. However, they are instrumental to reveal differences in the way “traditional” and “modern” healing systems deal with the problem of “being ill” and highlight those aspects where the two systems overlap.

In this study it has been assumed also that when importing a modern medical system to deal with health needs in a society, some desires for being treated found expression as health demand in the modern medicine facilities while the preventive aspect of the modern medicine, which is a very important aspect of it, tend to lay behind as a concealed health need. Some health needs, on the other hand, tend to keep being considered as pertaining to the traditional structure of healing, according to local healing categories, and are expressed in health demand within the traditional structure. Moreover, a number of needs that a modern medicine framework would still define as non related with health tend to express themselves through health demand in the facilities offered.⁵

Objectives and methodology

The initial questions concerning the survey were: (a) the extent of liking of the health service facilities offered within the project; (b) the right use of the preventive and curative services; (c) the “congruence” of the health demand expressed with resorting to the services as regards the health needs.

The complexity of the issues at stake might have required a research design entailing an articulated demographic study. However, considering the resources available, it has been opted for choosing a set of indicators constructed according to a simpler procedure.

⁵ An Italian larger version of this article was first published in a collection of articles concerning public health in southern Somalia *Salute per tutti? Esperienze e valutazioni da un'area rurale della Somalia*, (Branca F. and D'Arca R. eds.), Franco Angeli, Milano, 1992.

To explore the first question it has been chosen to interview the “new resorts”, that is, those who had never had access to the second level health structures of the project, and to verify whether the resort to the out-patient was their first choice to solve a specific health problem. In case they had applied to another system of treatment before resorting it was verified which preference they had given. At least two other systems of treatment were functioning in the district of Jilib: the traditional healers and the commercial private chemists. The assumption was that by choosing those who resorted to the out-patient for the first time as a group to be inquired it would have been possible to highlight the most genuine expectations of the population towards the public health services, because those who had previously resorted to them had already a clearer idea of what they could expect from the health operators.

Concerning the other two questions, it was decided to assess the use of the PHC peripheral network and to estimate the weight of the incongruous “demand” of health (i.e. the health demand that overestimate or assesses in unexpected manner the real health needs) as compared to the congruous one.

It was not possible to select a statistically representative sample because for organizational reasons it would have been very difficult to obtain the data from this remote basic health service structure. Notwithstanding, three fourth of those who accessed to the facilities of the health center in September 1987 as new resorts of all ages were interviewed. For the majority of the children under eight years of age the accompanying adult was interviewed.

A questionnaire written in English and translated in Somali language was administered to this sample of 287 people. The form was finally formulated after a pre-testing on 22 users. The team for the survey was composed by myself and two interviewers who both spoke Italian, southern Somali languages, kiswahili and kizigula. The interviewers had been instructed during the pre-test phase on the aims of the study and the modalities of administering the questionnaires.

The form was divided in 5 different parts: (a) demographic and socioeconomic data; (b) data on the symptoms of the illness as described by the sick person; (c) data on the reasons for resorting to the out-patient; (d) data on the resorts to other kind of healing structures and results of such resort; (e) results of medical examination. Finally, a judgment on the congruence of the resort to the health facilities was expressed subjectively by a medical doctor of the team after the examination of the patient.

Description of the sample studied

In the sample of the new users⁶ interviewed there was a majority of women who were the 53% as opposed to a 47% of males. As reported in table 1 it can be noted a prevalent affluence of males among the children. Amid the users under five years of age a 60,7% are boys and only 39,3% are girls; more or less the same percentages is maintained in the age range between 6 and 15 years where the males are the 53,7% and the women are the 46,3%.

	<i>Females</i>	<i>%</i>	<i>Males</i>	<i>%</i>	<i>Total</i>	<i>%</i>
≤ 5 years	24	15,8	37	27,4	61	21,3
6-15 years	19	12,5	22	16,3	41	14,3
16-25 years	44	29,0	27	20,0	71	24,7
26-45 years	47	30,9	27	20,0	74	25,8
> 45 years	18	11,8	22	16,3	40	13,9
Total	152	53	135	47	287	100,0

Table 1. Age of the users by sex

The flow of users can also be described by cultural background. Groups of people from a nomadic pastoral background resorted to the out-patient four times more than the others. Although there were no demographic data available to assess statistically the ethnic composition of the area, nevertheless it can be said that this disproportion reflected the demographic composition of the district where agriculturalists planted their farms along the river, some pastoral families settled temporarily close to the agriculturalists' villages and several thousands of people of a pastoral background had been resettled in the villages nearby Mareerey after the drought of 1972 from northern areas of the country.

Analyzing data concerning the villages of provenance of the users (table 2), it can be seen as the bigger number of users, 224 (78%), came from villages located within a radius of 20 km of distance from the out-patient.

<i>Villages</i>	<i>Distance</i>			<i>Total</i>	<i>%</i>
	<i>≤ 5 km</i>	<i>6-20 km</i>	<i>> 20 km</i>		
Not included in the project's facilities	--	14	63	77	26,8

⁶ To simplify the reading of the text from now onwards the “new users” included in the sample will be pointed out generically as “users”.

Included in the project's facilities (from 1985)	28	--	--	28	9,8
Included n the project's facilities (from 1987)	85	97	--	182	63,4
Total	113	111	63	287	100,0
%	39,3	38,7	22,0	---	---

Table 2. Villages of provenance of the users

It is still high the percentage of those (22%) who attended the health structures of the project coming from longer than 20 km of distance. This entailed for the patients walking longer than four hours on foot and, therefore, dedicating at least the entire day to the issue. This high percentage may be explained partly by the fact that the data are referred to the new users, highlighting in the meanwhile the lack other health structures in the area. The 9,8% of the total users came from villages involved in the activities of the health service facilities since 1985, while the 63,4% of the uses lived in villages interested by the project only from 1987. Approximately one third of the users, the 26,8%, finally, comes from villages uninterested by the activities of the project, and out of these, more than 80% from villages located more than 20 km away from the health centre.

The most common occupation among the users was agriculture with 46%; the 16,5% had a salaried job, while the 12,5% used to work as occasional laborers. The 30% of the interviewed had more than one occupation and almost all the women worked, behind carrying out the usual domestic activities. A 70% of all users interviewed were illiterate.

Analysis of the results

One of the most relevant data for analysis is that 67,2% of the users resorted to the out-patient after having tried to recover by using another treatment: out of these, the 14,6% had applied to traditional healing, the 38% to the private commercial chemists and the 14,6% had resorted to both, traditional and modern private systems. Thus, the 29,2% of the users asserted to have turned to traditional healing before resorting to the out-patient, as shown in table 3.

	<i>Frequency</i>	<i>%</i>
None	94	32,8
Traditional	42	14,6

Private modern	109	38,0
Mixed	42	14,6
Total	287	100,0

Table 3. Healing strategies before resorting to the out-patient

Even taking into consideration the fact that a certain number of resorts to traditional healing might have not been declared to the interviewers for cultural reasons concerning the perceived conflict with Muslim beliefs⁷, the high percentage of resorts to the private modern medicine (38,0%) is an element to be analyzed attentively. Since in the radius of 50 kilometers from the out-patient did not exist polyvalent structure for public health assistance one must infer that the interviewed had resorted to private commercial chemists functioning in the area or to any other person considered knowledgeable in the use of “western” medicaments. In the private commercial chemists, nurses or other practitioners without certified skills used to sell medicines on the basis of a depiction the patients made of their illnesses. It goes without saying that a number of their diagnosis might not have been accurate and their treatments not really appropriate to the patient. Doubts might also rise on the expiration date of certain medicines sold in such shops as most people living in the surroundings were illiterate and would not be able to verify. Moreover, some people in the district had had occasion to collaborate with foreign medical doctors in the past decades in connection with missions or aid projects and, thereafter, learned how to practice injections; these individuals were considered particularly knowledgeable and able to suggest treatments to be injected, including penicillin. There was much trust in the power of modern treatments such as *kaniin*, namely pills, and overall injections, even though nothing was known about the reasons why these treatments may work or not. In this respect the answers given to the question concerning the kind of modern treatment they received before the resort to the out-patient are particularly relevant. “*Kaniin addei*”, i. e. white pills, “*kaniin guddud*”, i. e. red pills, “*kapsul*”, i.e. capsule, pill, and “I do not know” were the most frequent answers given to the question.

It can be said that it was widespread a system of medicine we could call “para-modern” and “commercial” basically constituted by private shops either specialized in selling medicines or that sold medicines together with other items. Considering the poor diagnosis made in such contexts this system did not have the positive impact on the health status of the population as it could have a modern system under certain conditions. Yet, it was similarly attractive for patients and had

⁷ In Muslim countries often traditional healing practices are discriminated against as contrary to the religion (I.M. Lewis, *Islam in Tropical Africa*, Oxford U.P., 1966) and are, therefore, aspects sometimes concealed in public contexts.

analogous characteristics as an institution and in terms of social control. It created power roles for people who were believed to hold a specialist knowledge and maintained their power role through the access to distribution of medicines. Yet, large layers of the population placed their hopes for health in such system reinforced by its powerful capacity to heal, if temporarily, sharp pain. The users which had resorted to traditional medicine before visiting the out-patient were 66,7% women and 33,3% men. In addition, the percentage of children under 5 years of age who resorted to traditional medicine was more than double (33,3%) in comparison with the percentage of children treated through modern systems (15,6%). On the basis of these data it would seem that women, who are those taking care of the children under five years of age, tended to use frequently traditional healing also in a context in which other forms of medicine of a modern kind was accessible in their villages.

Table 4 shows the asserted results of different healing strategies undertaken before the resort to the health center of the PHC program. The number of total occurrences in this case is 193, having been excluded those who had declared not to have undertaken other treatments before resorting to the centre.

From the data emerged, the percentage of declared recovery – it is of no relevance whether they were real or presumed recovery – seems quite low (14%).

Treatment	Recovered	Non recovered	Partly recovered	Total	%
Traditional	6	19	17	42	21,8
Modern	13	45	51	109	56,4
Mixed	8	19	15	42	21,4
Total	27	83	83	193	100,0
%	14,0	43,0	43,0	100,0	

Table 4. Results obtained from healing strategy preceding the resort to the out-patient

The 86% of the 193 users that had resorted to other treatments before visiting the out-patient, were not satisfied with them. Among those who asserted to have recovered, the majority was among those who used a “mixed” healing strategy (8 out of 42, therefore a 19%). Concerning those “partly recovered” the higher percentage goes to those who had used modern medicine.

As one can notice from table 5 the individuals who mostly used a different kind of treatment before resorting to the district health centre were those ranging from 16 to 45 years of age, those in productive age. The second were the children under 5 years of age and the elders. The percentage of those older than 5 years and adolescents who did undertake other treatments before resorting to the health centre is decisively smaller and does overcome the 51% of the entire group.

	None	%	Trad.	%	Mod.	%	Mixed	%	Total	%
≤ 5 years	23	24,5	14	66,7	17	6,4	7	16,7	61	21,3
6-15 years	21	22,3	3	14,3	14	12,8	3	7,1	41	14,3
16-25 years	18	19,2	10	47,6	28	25,7	15	35,7	71	24,7
26-45 years	24	25,5	11	52,4	29	26,6	10	23,8	74	25,8
> 45 years	8	8,5	4	19,0	21	19,3	7	16,7	40	13,9
Total	94	32,8	42	14,6	109	38,0	42	14,6	287	100,0

Table 5. Healing strategies preceding the visit to the out-patient by age class

Concerning the choice of different healing strategies, the modern one appear the most applied one by users between 16 and 45 years of age while for the children until 5 the treatment pre out-patient visit was most often oriented towards a traditional kind (66,7%).

The occupation of the users is another variable that discriminate between treatments applied before visiting the out-patient. The 52,6% of the users who practiced agriculture had resorted to traditional healings before arriving to the out-patient unlike those who had a pastoral background of which only 24,8% had had contacts with healing strategies of a traditional kind. A similar percentage of both groups (54,8% for the pastoralists and 52,6% for the agriculturalists) had resorted to modern medicine before visiting the out-patient. Only 19,3% of the agriculturalists had visited the out-patient without having previously used other treatments in comparison with the 36,1% of the livestock breeder. The tendency towards using traditional healing seems related to the cultural characteristics of the population. On the other hand, as the majority of the livestock breeders followed-up in the out-patient were part of a group of resettled populations, a number of other factors linked to this status might have intervened to foster their attitude towards traditional healing. For instance the familiarity with modern treatments provided to the resettled population before and during the resettlement process. Moreover, with the process of resettlement ideas about traditional healing as well as availability of traditional healers and of herbal treatments might have undertaken modifications.

Finally, by examining the relation among interviewed and village Community Health Workers (CHW), it became evident that only 72 users had passed through the filter of the CHW of their village before visiting the district health centre. Although this should have been the rule as envisaged by the national health system, only in 25,1% of the occurrences the CHW had been able to be the first level filter of the health demand expressed. By excluding all those who came from

villages where no CHW were operating, still a group of 87 users residents in areas where CHW were working had not visited them before resorting to the district centre. It is quite a high proportion, representing the 54,7% of all those among the interviewed who potentially had access to CHW.

This result must be integrated with the question concerning acquaintance with the CHW operating in the villages. To all users was requested if they knew the CHW of their village. The 34,5% pointed out at the exact name of the CHW, the 20,9% did not know the name, while the remaining 44,6% asserted to know nothing about the CHW and the services they offered (table 6). However, the 35,4% of those who knew the name of the CHW had not consulted them before visiting the out-patient. In general, it became evident that the filter of CHW network was not sufficiently known and attended by the users of the out-patient despite the efforts of continuous communication with the local authorities.

Concerning the health demand expressed through visiting the health centre according to data presented in table 7 the 85,4% of the new users showed that this was pertinent; nevertheless, the 14,6% of the users perceived symptoms which did not correspond with those recognized by the staff of the out-patient. Within this last category, however, only 2,1% of the users expressed a demand in relation with a need not recognized as health need by the staff.

Congruence	Seriousness			Total	%
	Non serious	Serious	Very serious		
Congruous	13	118	108	239	85,4
Incongruous	6	19	16	41	14,6
Total	19	137	124	280 ^{a)}	100,0

^{a)} Of the 7 missing cases has not been possible to estimate the congruence of the resort in relation with the seriousness of their illness

Table 7. Congruence of the resort to the out-patient in relation with seriousness of illness.

Those who arrived to the district out-patient in the worst health condition were the children under 6 years of age: they constituted the 50% of the very serious cases and the 37,9% of the serious. The majority of the non serious cases was instead accumulated in the age class between 16 and 25 years of age with a 42,1% on the total.

For incongruence of the resort it has been defined a concept stemmed from observations made during the initial activities of the health centre. It has been considered “incongruous” the case of users who resorted to the health centre for the treatment of conditions that could not be treated through a medical intervention. It has been considered “incongruous” also the case of individuals

who visited the centre complaining of not very serious symptoms but that turned up to be seriously ill people after the doctor's medical examination; these patients did not perceive the illness that serious before visiting the out-patient. This concept, obviously, is only instrumental to highlight crucial aspects of the encounter between a traditional and a modern system of answering to health needs. At the beginning of the survey it was hypothesized that a large part of the incongruous cases were likely to be of women, linking the diffusion of the idea of "presumed" illness to a general concept of marginality of the women in the society. Contrarily to what expected, however, the majority of the cases that were proved "incongruous", the 58,1%, were males, while 41,9% were female. This result is even more relevant when considering that the women were the 53% of the users studied.

Conclusions

On the basis of the data presented above some interpretations can be put forward. A large sector of the population resorted to the network of the PHC only as a second choice. Motivations for this are not completely clear: may be the services were insufficient, may be there was not a sufficient involvement of the population in the organization of the PHC in the area, may be it was difficult to find transportation to reach the health centre facilities and, for this reason, people only visited the centre after having attempted to recover otherwise. For those who resorted first to traditional healing and thereafter to the commercial chemists, the PHC facilities were the last hope to find a treatment. The high rate of dissatisfaction after the other treatments seems to have brought them to visit the out-patient. It is not clear whether the PHC project could offer solutions in consideration of the evident scarcity of structures in relation with the size of the population. It would be interesting in the future to assess the satisfaction that new users obtained from resorting to the PHC centre. It is worrying that CHW were not consulted nor were particularly functional as filters before visiting the out-patient; there may be a number of reasons for this and new considerations may be put forward as to their role in PHC networks, to what extent they may really work as brokers of the PHC medical system in peripheral areas and in which context.

As regards the congruence of the health needs it can be concluded that there was not as much an over-estimation of the need as an underestimation of them, especially considering the existence of concealed needs.

Those who had resorted only to traditional healing before visiting the health centre are those who showed a lower rate of "incongruence" in the resort. These constitute the 7,5%, compared to the 16,1% of those who did not treat themselves, the 17,8% of those who had resorted to modern

medicine and the 14,3% of those who had tried both. It is not easy to interpret this data. Yet, if it is true that the incongruent cases can also be symptom of social discomfort, those who resorted to traditional medicine before reaching the out-patient are those who maintained a more clear and less conflictive structure of answering to health needs. In fact, they did not resort to the medical system we identified as “para-modern” or “commercial”. Such system constitutes a surrogate of the modern system, it is often perceived by the local people of the same kind as the national PHC system but does not held the same guarantee of standard nor does it offer the same assurance of treating illnesses. Rather, it also entails a misuse of modern treatments such as anti-biotic and anti-malaria pills which, in a long term, fosters reproduction of population of enduring bacteria or parasites.

Epilogue

Finally, an important reflection that goes beyond the practical and applied results in terms of the project’s activities evaluation of the survey mentioned above concerns the positionality of the researcher in this survey. The research questions pursued by the survey were produced by one year long anthropological participant observation carried out by me as an anthropologist while working in the facilities of the PHC project. The hypothesis of this study stemmed from practicing an anthropological perspective in the attempt to compare the local point of view (*emic*) on cultural practices concerning health and wellbeing with the foreign point (*etic*) of view about health care, treatment and prevention of diseases. Thus, the tools used, the design of the questionnaire with open and closed questions was prepared according to this pre-comprehension. It was this perspective, and no other technical/medical approaches or humanitarian desires to supply health services in an area without basic facilities, which allowed disclosing and interpreting the dissonance between the multiplicity of needs expressed by the users of the health facilities and the services that the facilities could actually provide. Usually, health care services are set up according to a somehow universal standard model which, for this specific project, followed guidelines envisaged in the Alma Ata conference with the hashtag health for all towards the year 2000. The ways the model is embodied in different socio-economic conditions varies greatly, but overall, does not necessarily overlap with different philosophies and cosmologies of wellbeing held by the people the model encounter. The recognition of the importance of these philosophies and cosmologies for achieving a real relation of healing is crucial but not always obvious. This was also reflected by internal discussions within the project technical team in which not all shared the idea that carrying out social research to highlight more effective lines of activity and strategy was important.