EMERGENCY vs DEVELOPMENT.
THE ARCHITECTURAL PROJECT WITHIN DEVELOPMENT COOPERATION

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ABSTRACT

The aim of Panel was to take stock of the role that architecture holds in international cooperation. It is an environment in which construction keeps a central position, investing, every year all over the world, enormous economical resources and intensively increasing the amount of buildings; but to date it seems to not notice the difference existing between the action of building and the one of doing architecture, completely ignoring a research over the issues of sustainability, comfort and shape quality.

The panel drives to pinpoint different possible ways to overcome the categories that have always characterized the cooperation interventions: emergency, transition and development, in order to identify transversal paths in which architectural quality would established the direction to follow. To succeed in this intent, three reflection spheres were proposed to identify fragilities and opportunities that should be the starting point to renew the role of architecture within the international cooperation.

EMERGENCY VS DEVELOPMENT

The steady reduction of the economic resources invested in international cooperation during the last years had gradually faced the shift of efforts exclusively towards "emergency" contexts, neglecting an approach linked to the "development" of the interested areas.

Is it possible to reach a convergence between those two spheres?
How to do "development" with the "emergency" intervention timing?

The paper of Camillo Magni (Politecnico di Milano and Architetti Senza Frontiere, Italy) focuses on the issue of "quality" in architecture, specifically in the Humanitarian Aid field, where quality seems to be considered not essential, but rather a "surplus" if compared with more urgent needs. Most of the cooperation's projects take place in emergency situation, nevertheless in extremely poor conditions. The paper is meant to reflect on aspects influencing quality in architecture in a development cooperation scenario and on how a different design approach may affect the final result.

The paper of Elisa Salvaneschi and Marco Morandotti (University of Pavia, Italy), titled "Sustainability of post-disaster reconstruction processes: a proposal of methodology for the assessment", presents the results of a PhD research carried out in the University of Pavia Civil Engineering and Architecture Department.

The research starts from the assumption that although both literature and the humanitarian field recognize two dimensions - emergency response and development processes – in aid interventions in the Global South, this distinction is appropriate for the first phase of post-disaster emergency, but not for the processes of reconstruction.

In the Authors' viewpoint the processes of reconstruction are the connection point between the processes of emergence and the development within the cooperation.

The paper introduces a method that could allow to evaluate the actual appropriateness, sustainability and development of the emergency response and development processes, through a comparison between indicators linked to the pre-disaster housing stock and to the reconstruction. The cross between the parameters of the housing system and those relating to the environmental, social and economic systems, makes it possible to include the interactions between external factors and the project into the process.

THE ARCHITECTURAL PROJECT IN COOPERATION, FUNDING PROSEDURES

Procedures linked to architectural projects' funding often follow unexpected practices.

Either they are financed before the fulfilment of the design phase, without knowing what is actually going to be built, or the design phase is not considered as a propaedeutic and necessary moment for the realization, acknowledging as payable only the Project Manager, who should then start building without having in hand an Executive Project.

This Panel aims to tackle and to improve the procedures heading for the acknowledgement of the *project* value as

an essential moment also in emergency contexts.

Humanitarian emergency is an area where design does not seem to play a role. The aim of the paper presented by Riccardo Vannucci (FAREstudio, Italy) is to analyse if and under which circumstances such a condition can be reversed, in the perspective of affirming appropriate shelter as a human right, and consequently design as one of the tool that can contribute to such appropriateness. The Author's viewpoint, after several experiences in the international cooperation for development, is the conviction that discipline and profession require a thorough, responsible consideration about principles and practices that counteract the current trend to reduce design, and architecture in a peculiar way, to a commodity.

The proposed strategy is therefore to get involved with radical environments such as refugee camps and to actively experience conditions and strategies for a responsible presence. The result is inevitably contradictory and stresses once again the relevance of external factors, mainly procurement strategies, over technical ones, whereas the most important contribution by the profession, and discipline, is an appropriate balance between typological and technological innovation.

APPROACHES TO THE ARCHITECTURAL PROJECT

With a great simplification effort there could be defined two main approaches to the architectural project in the international cooperation sphere:

- vernacular which aims to the recover and development of local materials and techniques with a low technological content;
- prefabricated which aims to a quick solution of the issue, delivering on the site elements already-made elsewhere.

This Panel aims to highlight the points of strength and of weakness of both those approaches through excellence practices.

The paper of Roberto Pennacchio, Roberta Nicchia et alt. (Archintorno, Italy) describes the strengths and weaknesses of the "vernacular" vs. "prefabricated" approach through the analysis of the three experiences carried out by Archintorno in Mexico in a developing cooperation framework.

Archintorno is a no-profit organization promoting development cooperation projects with indigenous communities in the Mexican State of Oaxaca since 2005. These initiatives involve academia, local authorities, CBOs and professionals (in and outside Italy) and are based on the Design-Build Studio format, that foresees the direct involvement of university students in the design and building process.

The paper argues about the impact of a building project on the local community in terms of economic, socio-cultural aspects, as well as its effects on the environment and promotes a "vernacular-oriented" approach which is, in the Authors' opinion, more consistent with the local context.

ARCHITECTURE QUALITY OF COOPERATION PROJECTS

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ABSTRACT

Most of the cooperation's projects happen in emergency situation and extremely poor conditions, both aspects that influence characteristics of quality in architecture. Many think that quality is an expendable "surplus" compare to more immediate needs. This theoretical contribution is meant to be a reflection about aspects that influence quality characters of an architectural project in a scenario of cooperation and about how (subject) influence the final result.

ARE QUALITY ASPECTS NECESSARY FOR INTERNATIONAL COOPERATION PROJECTS?

This question puts the attention on the subject of the quality as a supplementary aspect. As if to say: quality is an important characteristic but not equally essential, and cooperation projects in emergency environment need to focus on the needful and developing essentials. It is obvious that the quality moves to the background.

This common thought is spread and supported by many. I would like to discuss some theories to show the misjudgment of the position and support that quality is an innate and necessary aspect of every process.

Emergency and quality can coexist together. There are many examples in which it is possible to find this process. As architects we can easily refer to the origin of the Modern Movement (Modernist architecture) that choose the theme of the public housing as the most fertile field to experiment new expressive languages, constructive processes and distribution to reinvent the house. Thus it offered appropriate answers to the lack of dwellings that afflicted Europe during the industrial development. The need of houses became the perfect occasion to experiment new housing codes and new quality forms. This also happened during the post-war reconstruction era and in many other emergency occasions.

If we agree on this prerequisite, the issue puts two others questions: who produces quality and how can we reach it? Giancarlo de Carlo, in a short paper published on Domus in 2004 [1], claimed that there are three main actors involved in a construction process: the architect, the builders and the client. None of those three is the only subject in charge of taking care of the quality aspects. On the other hand it is possible to reach the quality when a thin tension, meant to realize a correct, appropriate and real building, is established among the three actors. Quality is a far aim to converge on and it can be reached only through the effort of whoever involved. The architect by himself is not able to do it as well as the builders or the client by their own would fail. This assumption of De Carlo is, in my opinion, right and correct and it clarify which are the subject called to realize high quality project.

It has left to point out the most relevant aspect: how to reach the quality in a project. (Unfortunately) architecture is not a gastronomic dish that can define a recipe, identify ingredients and a sequence of actions in order to achieve a good result. Recipes in architecture are not possible because we do not operate in terms of deterministic processes where a sequence of actions defines the achievement of an aim. Nevertheless it is possible to identify conditions in which it is easier to operate in a *status of quality*.

The first one is that quality is the common goal recognized by all the subjects involved where it is necessary to overtake that short-sighted vision that considers emergency as an alien environment from quality reflections. This is the most significant aspect: to put the architectonic quality as a main target into cooperation projects. If this prerequisite, namely this common and shared effort, does not exist, it would be very difficult to achieve the status of quality. This is the most significant aspect, the others are consequences.

Gino Strada, talking about politics in the NGO Emergency, talks about "*the right to beauty*". Beauty and esthetic quality of spaces have to be a right for everybody and they have have to be offered as expression of democracy and equality. As beauty is offered to western countries citizens, it is necessary to offer it also to those citizens who live in contexts where we operate, even though this means emergency and poverty conditions. When respecting this configuration, we can say that we are operating in an egalitarian condition.

Therefore architecture quality becomes a tool to show a different approach to cooperation.

French president Francois Mitterand, in the occasion of the opening of big public building, claimed that architecture is the society image. Bruno Zevi as well reported it on the third edition of "*Storia dell'architettura italiana*" (Italian architecture history [2]) to denounce the parallelism between strong quality limits and the cultural fall of the whole Country. As an analogy we could say that an architectural project represents in physical form the quality of the cooperation project itself as well as the quality of the subjects involved, the payees and the development processes

stimulated. Quality resides in this relation: a well done architectural form corresponds to a positive process of local development.

A last note: among all the tools that are able to stimulate this approach, I want you to pay attention on economic aspects too. The actors that control the budgets in development cooperation initiatives have more strength (and responsibility) on the projects' result. For this reason national, regional and European calls for funding for cooperation projects should have specific evaluation parameters of quality about architectural aspects, asking to include professional figures as architects (if there is a intervention of construction). If the funding authorities, both public and private, include in the result of the call also the quality evaluation of the architectural projects, operators would be relentlessly obliged to dedicate more efforts to those aspects. As if to say it would be preferred to see again what already happened in between 1990 and 2000 when the new sensitiveness on environmental sustainability has been mainstreamed throughout all institutions. For these reasons it is necessary to interact with the funding authorities in order to spread a greater sensitiveness addressing architectonic quality.

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A METHODOLOGICAL PROPOSAL FOR THE ASSESSMENT
OF THE SUSTAINABILITY OF POST-DISASTER RECONSTRUCTION PROCESSES

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ABSTRACT

Literature and several cooperation experiences are used to divide the interventions in the Global South context into two categories: emergency response and development processes. If this division is appropriate for the first phase of post-disaster emergency, it is not so evident for the processes of reconstruction. In recent years we have observed an increase in disasters: they are considered natural but they actually reveal anthropic causes. These phenomena have shown how this clear division is not recognizable: when does the emergency phase end? When does the situation of temporary nature end, one which necessarily follows an event that involves "a serious rupture of the normal functions of a community or society, which causes an impact and loss of life, material and economic spread, to which the affected communities' capabilities with their own resources are unable to manage"(UNSDRR)? The answer is not obvious and leads back to the dimension of reconstruction, i.e. the moment when a new process of development starts. We can therefore conclude that the processes of reconstruction are the connection point between the processes of emergence and the development within the cooperation.
Starting from these considerations, the PhD research presented here focuses on the study of a proposal for a methodology that would allow to evaluate the actual appropriateness, sustainability and development of these processes, thanks to a comparison between the indicators linked to the pre-disaster housing stock and those linked to the reconstruction ones. This comparison analyses in detail the dimensions of the home, from the physical and spatial to the social perception, allowing the assessment of the effective delta positive or negative in housing conditions. The cross between the parameters of the housing system and those relating to the environmental, social and economic systems, makes it possible to include into the process the interactions between external factors and the element of the project, which are inevitably affected.

RECONSTRUCTION: BETWEEN EMERGENCY AND DEVELOPMENT

This paper presents the results of PhD research carried out at the University of Pavia, in the Civil Engineering and Architecture Department. This work tried to investigate systematically the post emergency dwelling in developing countries in order to identify a possible methodology of intervention. Not only can this methodology regard technical and building features but it also defines the quality of life and dwelling.

This field of research – reconstruction dwelling in post-natural disaster in developing countries - was chosen on the basis of some reflections.

First of all the anthropic components in the occurrence of the disaster, called "natural": "it's appropriate to consider disaster not as natural but as a function of development. A disaster is recognisable as consequence of there being insufficient development of a means to avoiding a human crisis, or as an aspect of development itself having been the cause of crisis." [1] Collins' words are among the most meaningful in terms of disaster: there are no natural disasters: there are potentially dangerous natural events (called hazards) and if they occur in a context that presents anthropic vulnerable features, they become disasters. Therefore if we consider natural disasters a result of anthropic vulnerability, we can understand the importance of reducing the degree of exposure to the risk of housing. Also, if we consider that many natural hazards repeat themselves over time in a cyclic way, [2] the importance of the reconstruction processes appears obvious.

Secondly, the increase in the number of natural disasters and the number of victims, in particular in developing countries: several studies show that the number and frequency of natural disasters have increased in the last decade; this is caused by factors such as the increase of global population and the exploitation of resources. It's also possible to underline that most natural disasters occur in developing countries. The reason is once again due to these communities' higher vulnerability to phenomena such as earthquakes, tsunamis or floods: this is a result of an inadequate knowledge of these phenomena, a lack of sustainable planning by governments and a lack of quality control of the construction. It is to be noted that in these contexts almost all houses are self-made with traditional techniques that, although in several cases respond very well in terms of comfort, are not suitable to resist in cases of exceptional phenomena.

Thirdly, in the process management and participation, the problem of reconstruction is due to two issues: on the

one hand the quantitative dimension and logistics, on the other hand the qualitative dimension which implies the need to rebuild not only a series of building objects, but also a human and social dimension of the space. It is therefore necessary to lead an evaluation in three areas: context analysis to establish the opportunities and risks of the place taking into consideration the impact of the disaster, pre-existing socio-economic conflict, political situation and the actors involved, in order to effectively coordinate the actions and to determine the potential and limitations related to housing, both in terms of materials and construction techniques and in terms of the social and cultural patterns. The approach of reconstruction is a fundamental issue for the success or failure of the process: this statement is even more poignant if we take into account the construction methods used in the Global South, where 80% of houses are self-constructed in formal market (but mostly informal). It is understandable that a process of reconstruction involving external actors may be difficult to understand and accept by part of the communities. Shilderman's considerations [4] are remarkable in that he defines the approaches to reconstruction between donor, organizations and beneficiaries as gradual transition from actions completely fixed (donors decide and donors provide) and interventions managed from below (users decide and users provide). The changing in the construction model is linked with another critical issue connected to housing. In contexts where the house has a symbolic and very strong cultural tradition linked to the social community, the model in which the same construction is carried out by the inhabitants in a process of self-construction changes in the reconstruction phase. This situation may generate a new vulnerability: on the one hand it reduces the environmental vulnerability of the building, on the other hand it creates a social disadvantage that can lead in extreme cases to the abandonment of the rebuilt housing units.
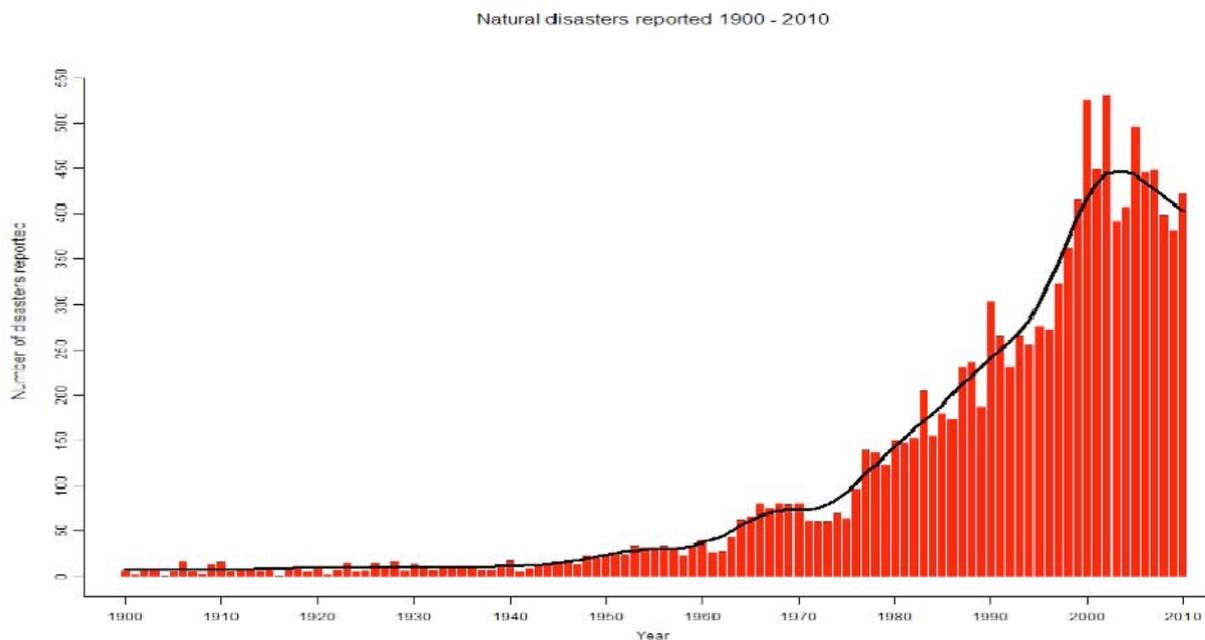

Fig. 1 - Graphic of disaster and development link [3].

Fourth, on emergency versus development: when a natural disaster happens it is usual to divide the following period into 3 phases[1] - emergency, transitional and reconstruction - each one characterized by very different needs. This diversity together with the frequent dilation over time, sometimes even years, increases the complexity of the process of reconstruction. It is evident that if the affected communities live in emergency shelters for years, without regular economic activities, suppressed by the presence of the delivery of humanitarian aid, the return to a non-emergency dwelling can be very difficult. The statement "reconstruction is an opportunity to plan for the future and preserve the past"[5] expresses the need to conceive of the overlap between the different phases in order to immediately pursue a plan for long-term reconstruction.

Finally, in terms of sense of belonging and vulnerability reduction, the disaster highlights the vulnerability of a community to an environmental risk. The reconstruction process should not therefore recreate the same conditions of risk. While in theory it seems easily to make effective choices, in practice it is extremely complicated, particularly in those cases when the reduction of vulnerability means to alter the social mechanisms or cultural relations between the

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[1] The division was established in three phases during the International Conference on Disaster Area Housing held in Istanbul in 1977. With reference to the definitions given in that occasion it is considered:
- emergency - immediate impact with the effects of the disaster and its housing problems in terms of shelter and refuge;
- transitional - rehabilitation between emergency and permanent reconstruction identified in a period ranging from a few months to years during which every effort is addressed to provide a minimum of environmental conditions for human activities and to build temporary housing needed until the end of permanent buildings;
- reconstruction - complex of legislative, economic, financial, production and constructive processes aimed to prepare the conditions for performing the operations to return to normal life.

settlement and the territory. In fact, the communities develop a strong sense of belonging to the place where they are settled. This space, defined by SM Low spatializing culture [6] - the link between man-place [7]- is destroyed by disaster and it isn't possible to rebuild it through a process exclusively focused on the reduction of physical vulnerability.

For these reasons it is crucial to supply a methodology for the design of post-emergency housing that could support the various organizations belonging to the sector.
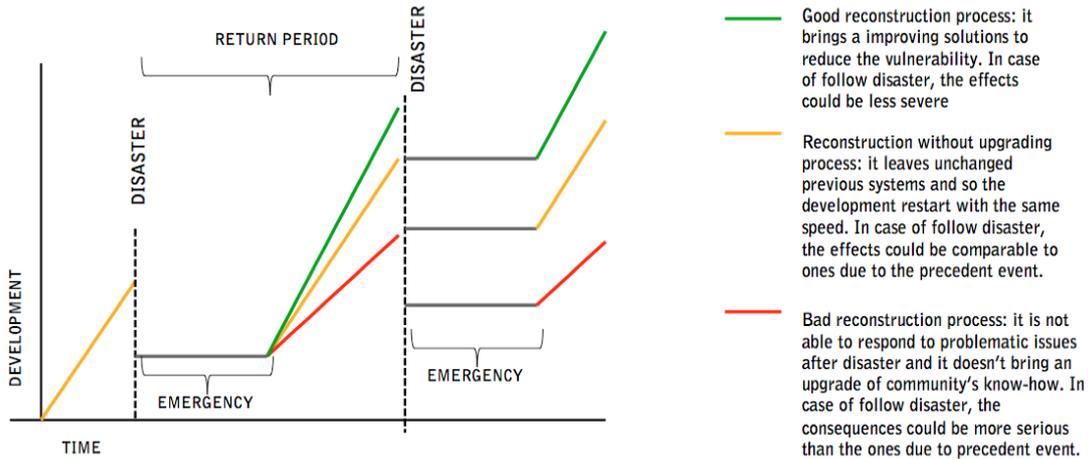

Fig. 2 - Qualitative graphic of possible scenarios post disasters.

RESEARCH AIM

The result gained through the evaluation is an assessment of the quality of the reconstruction of houses. The judgment is not absolute but compared with the pre-existing condition. This result is achieved through a comparative evaluation between the pre-existing housing system and the system established in the reconstruction process, by filling in tables of indicators to which a weight and a score comparable have been assigned. The score is determined by overcoming or less of a defined threshold, or by a satisfaction of a minimum level or by direct comparison with the value attributed to an indicator in the pre-disaster system. Furthermore, the evaluation of parameters related to the context, through a matrix of interaction, allows to establish that the different indicators suffer from the environmental ones. The research result is an assessment tool called ReHAsTool where, by inserting values for the different indicators, users obtain an assessment of the reconstruction project.

ReHAsTool frame

The Tool is divided into charts that are progressively filled in by the user and it automatically gives the scores back for each parameter, according to formulas set in the development of the methodology.

It's possible to identify 5 phases that correspond to 5 charts.

Phase 0| Description: in this phase we collect general information about the case to be evaluated, in order to contextualize the intervention and to have useful data in the hypothetical formation of a database.

Input: location, disaster information, number of people involved and extent of damage to housing structures, description of the intervention program, the organizations involved, timing of delivery and costs.

Output: insertion of case studies into the database using an identification code; if a disaster or location already exist in the designed database, there is a recovery of data relating to Environment.
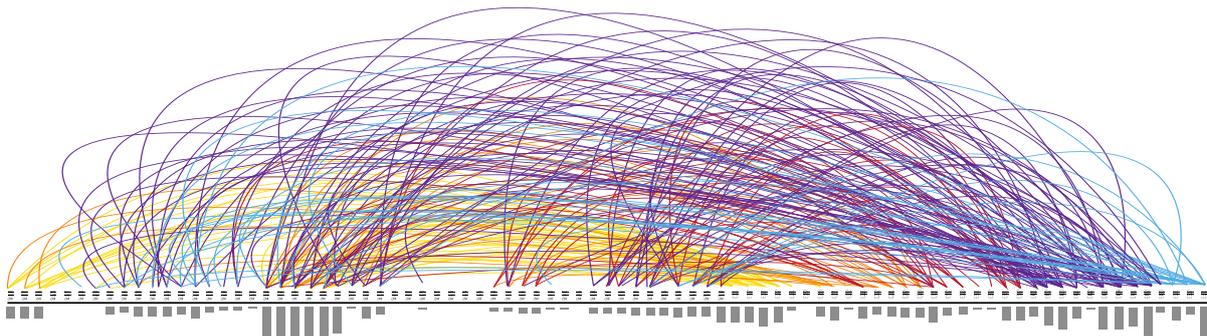

Fig. 3 - Graphic connections and weights of indicators in ReHAsTool method. *Source:* Authors.

Phase 1| Environment: in this phase data are collected relating to the environmental parameters that will be used to cross the data relating to the housing system. The parameters characterize indicators divided into five categories included in clusters (Vulnerability, Environment, Resources, Development, Society) that describe the context of the intervention in the environmental, social, and economic areas.

Input: enter the requested data in the chart; if a context already exists in the database, there is a recovery of data on the environmental, social and economic areas.

Output: a score is assigned to each parameter, ranging from zero to one; in case of data recovery, user checks the correctness of the information.

Phase 2| Pre-disaster housing features: at this stage data are collected relating to the parameters identified in the pre-existing housing system. At this stage the main features of traditional local dwelling are outlined, from the point of view of technology, materials, settlements and culture. They will be used in comparison with the reconstruction system.

Input: enter the requested data in the chart; if context already exists in the database, there is a recovery of data on housing.

Output: a score (variable between zero and one) is assigned to each parameter; in the case of recovery in data, the user controls the accuracy of information; the scores obtained are crossed in the matrix to the scores assigned to the parameters of the environment in order to determine the positive or negative influence of the environmental conditions on the parameters of the pre-existing system.

Phase 3| Post-disaster housing system: in this phase data relating to identified parameters of housing system are collected. In this phase the characters and factors describing the housing reconstruction project emerge.

Input: enter the requested data in the chart;

Output: a score (variable between zero and one) is assigned to each parameter and the scores thus obtained are crossed in the matrix to the scores assigned to the parameters of the environment in order to determine the positive or negative influence of the environmental conditions on the parameters of the system.
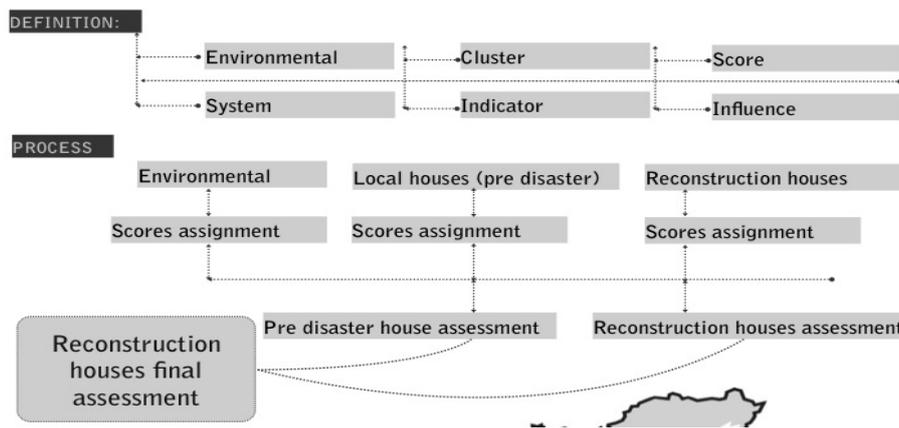

Fig. 4 - Conceptual scheme of assessment process.

Fig. 5 - Extract of ReHAsTool.

Phase 4| Assessment: the final stage of the procedure focuses on the comparison between scores on the traditional housing system and the reconstruction one, through a matrix of intersection. The scores awarded in zero or one allow for a direct comparison-and-objective assessment: if the score obtained from the reconstruction parameter is higher than the score in the traditional system, the assessment is positive, and the program returns " + +" as result; if the scores of the parameter are equal in both the pre- and post-disaster housing condition, the program returns "+"as result, if the

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score relating to the pre-existing condition is higher than that concerning the reconstruction, the program returns "-".
Input: automatic insertion of the final scores of pre- and post-disaster.
Output: overall assessment is obtained by counting positive and negative scores; the process is judged positive if the number of positive scores is higher than the negative ones; a partial assessment is possible if the user analyses the parameters judged negative.

INDICATORS FEATURES

The methodology is based on the evaluation of a set of indicators divided into clusters - vulnerability, environment, and settlement, building, quality space, development - and categories. Each cluster refers to a specific area in order to have a comprehensive and detailed overview of all the aspects that are considered significant. In the definition of individual indicators the following selection criteria were considered (Bell, Morse, 1999)[8]:

- relevance: relevance to the scope of the system to be described and consistency with the environment to which the indicator refer;
- representativeness: ability to represent clearly and effectively the problems that affect the system to which the indicator refers;
- availability: availability of data for the calculation of simple indicators must be understood in an objective and unique way;
- comparability: indicators should be compared with those related to the same field;
- objectivity must be able to be evaluated with agreed criteria and objective.

Case studies[2]

To test the validity of the tool and its real applicability, we applied the method of assessment to two different cases of housing reconstruction in Sri Lanka. The case of Sri Lanka can be considered exemplary and suitable for the purposes of this study because it occurred a sufficient amount of time ago so that we can assess the a-posteriori processes of reconstruction, on projects that have already been made and therefore can also show all the difficulties encountered in the construction process. Moreover, the 2004 tsunami can be considered one of the most significant media event in recent years: the magnitude of the effects of the wave, the vastness of the areas involved and the possibility to have news and real-time footage involved the public and opened a reflection on the power of the media to direct information; that exposure acted as a second-order effect, although a wider dissemination of information about rebuilding provided an easier retrieval of data (both environmental and economic) at the level of reconstruction projects.

Within the same context, two different reconstruction housing units are considered, made by two different stakeholders in the same geographical area, in order to compare not only the single housing project with the traditional pre-existing model, but also two different design solutions for the reconstruction, thus highlighting the different approaches and their criticality.

Both projects for post-tsunami housing units were built, the first in the district of Kalutara and the second in the district of Galle. The two districts are part of the south western region of Sri Lanka that has similar characteristics, both in terms of geography and of social and economic aspects; this aspect allowed for the comparison between the evaluations of the two reconstruction projects, carried out under similar conditions.

The data used for the evaluation of the projects were taken from publications and reports by the Department of Statistics of the Government of Sri Lanka; some data were then calculated on the basis of information obtained from these sources, because it wasn't possible to collect direct experimental data.

OUTCOME OF THE ASSESSMENT

The outcome of the assessment was positive in both cases: this result was certainly influenced by the positive scores of environmental parameters. In recent years Sri Lanka has pursued a development policy that have earned a positive trend for a reduction in poverty, unemployment and illiteracy, and special attention was given to environmental protection; in addition to this a promotion of use of renewable and sustainable resources has been improved, as well as a system for the mitigation of environmental risks.

These data confirmed the weight and importance of the environment, in all its complexity, in the processes of reconstruction.

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[2] It is to be noted that the data used for the evaluation are taken from indirect sources, because we didn't have the possibility to go on site to direct the collection of information. We think, however, that the data are reliable and that in order to test the operation of the instrument there is a significant loss of value in the results obtained.

Specific analysis of the results of the assessments of the two projects

House, Kalutara district

The housing unit made for the reconstruction is better than the traditional buildings for what concerns the vulnerability of static construction. Compared to traditional houses, the project saw an increase in population density and does not propose the same typological model of traditional houses; the morphology of the patio home, in addition to socio-cultural aspects, shows advantages in terms of thermal comfort, allowing ventilation and cooling of the rooms of the house. These aspects, in the type designed for the reconstruction, have not been considered. In fact the settlement model and the choice of materials used reduce the internal comfort, especially for what concerns ventilation and cooling, which is especially important in hot humid areas as Sri Lanka. Furthermore, the typological solution does not allow for a growth of starting unit and the outside space cannot act as a pivot of domestic activities as happens in the solution to central patio of traditional housing. The project was penalized by the use of non-local materials, data that also influence the scores for the indicators related to industries and local materials. The reconstruction project resulted in a significant improvement due to the involvement and training of the local community in the construction phase; it should be noted, however, that the high cost of the housing unit, compared to an indicative value of the possible cost of a traditional house, turns out to be eight times more.
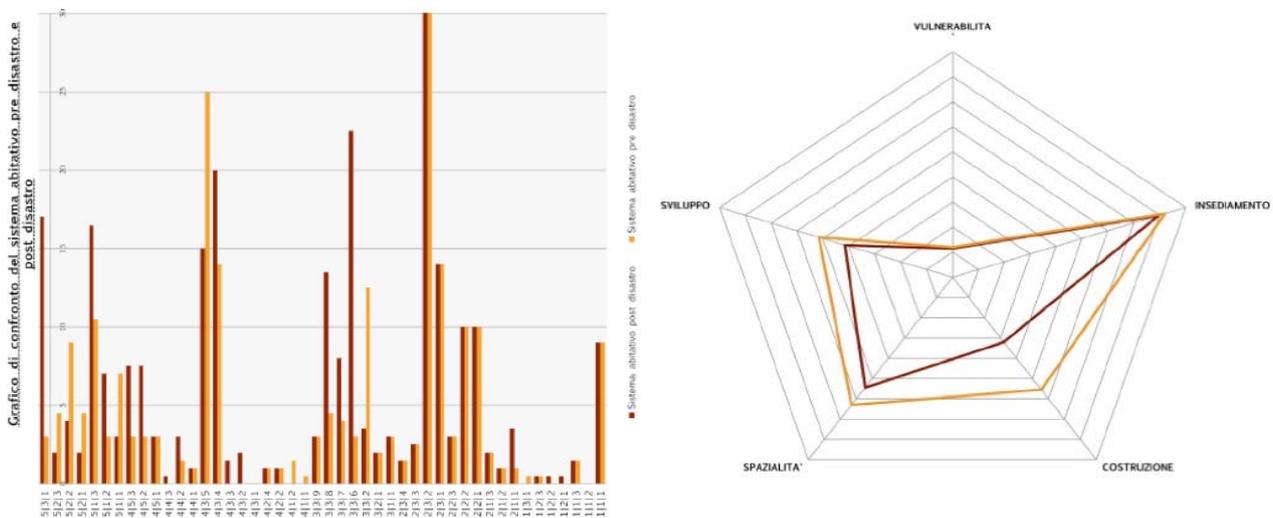

Fig. 6, 7 - Bar and radar graphics result by assessment of I case study.

House, Galle district

Architectural barriers, due to the presence of access steps; the solution of having a floor up from the ground, however, due to the choice to reduce the effects of environmental risks, facilitates the drainage in the case of floods. The field of the settlement is certainly the most affected by environmental parameters, as already mentioned, these parameters result broadly positive. Besides, the assessment of the construction cluster is positive, resulting in an improvement over traditional solutions as regards the presence of foundations. The housing unit built in the reconstruction has a very positive assessment, both as regards the aspects of comfort and those of internal space; this allows to establish that in this case the reconstruction process should significantly improve the qualitative standard of dwelling. It is highlighted that the lack of use of local materials is worsening compared to traditional buildings, it should be noted that the choice of this design rose from the desire to create a structure that could increase its resistance in the event of flooding.

Comparison of the two projects

Carrying out two assessments of the projects reported, we wanted to compare the results obtained in both cases. Whereas the data of environmental indicators were similar in terms of geographical location, environmental, social, political and economic factors, the two projects are equal for most of the indicators scores, even if it can be seen that the project carried out in the district of Galle looks better in the aspects of:

-   mitigation: the project in Galle was designed in order to build a housing unit that would make it less vulnerable to major environmental hazards in the area; for this purpose a structure of four bearing blocks was studied, which in case of flooding would not constitute an obstacle to the flow of water. In addition the house is built on a raised platform, solution that promotes drainage of the ground.
-   Recognisability to morphological character: the solution implemented in the district of Galle is the closest to

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the typological traditional plant, in which the central area is the hub for domestic activities; in the reconstruction project this space is covered unlike to what happens in traditional housing, but it is permeable to air and light thanks to curtain walls in panels made of intertwined vegetable fibres; more private rooms are arranged in the structural cores, so that they also have a spatial distribution function in addition to their static and mitigation one.

- Interior comfort: the walls in vegetable fibres in the district of Galle allow for increased ventilation and cooling compared to a closer solution designed in a project in the Kitaluwa district. In addition, the first solution also has positive implications regarding the indicators relating to the use of local and recyclable materials that in the second case study turn out to be negative.

Finally, the analysis of the results of the two cases shows that at the same environmental conditions, the design solutions could reach the quality objectives housing to a different extent.
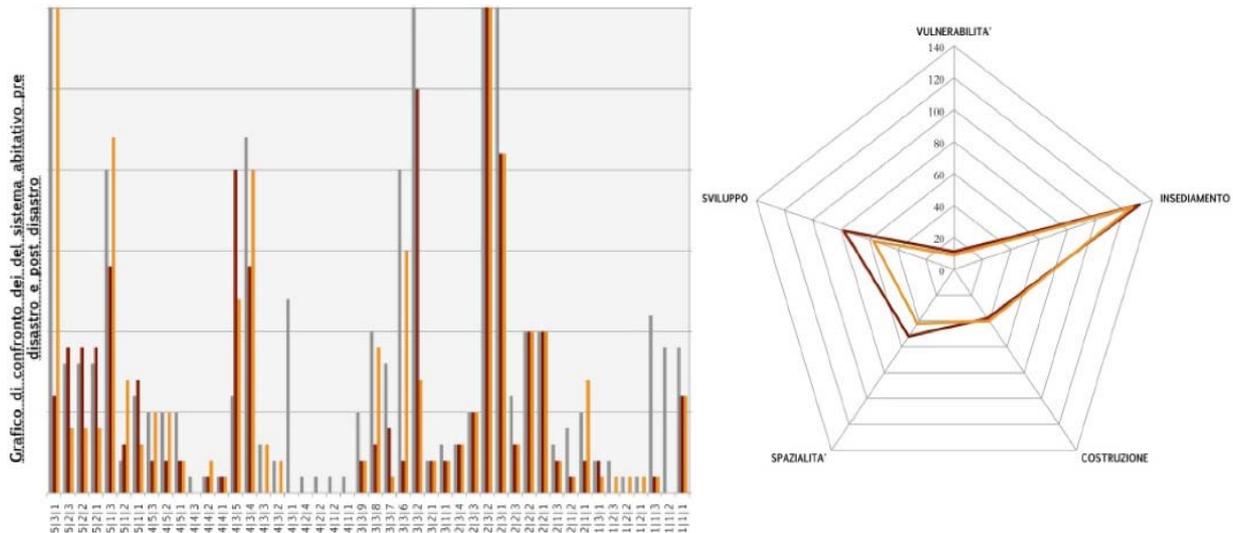

Fig. 8, 9 - Bar and radar graphics result by assessment of II case study.

CONCLUSIONS

The research focused on the development of a proposed assessment strategy of the home in the process of reconstruction, which could take into consideration the complexity of this field. In this sense, the methodology is structured on the comparison of a significant set of indicators, whose values are reported both in parameters of housing conditions before disaster, and post-disaster reconstruction project.
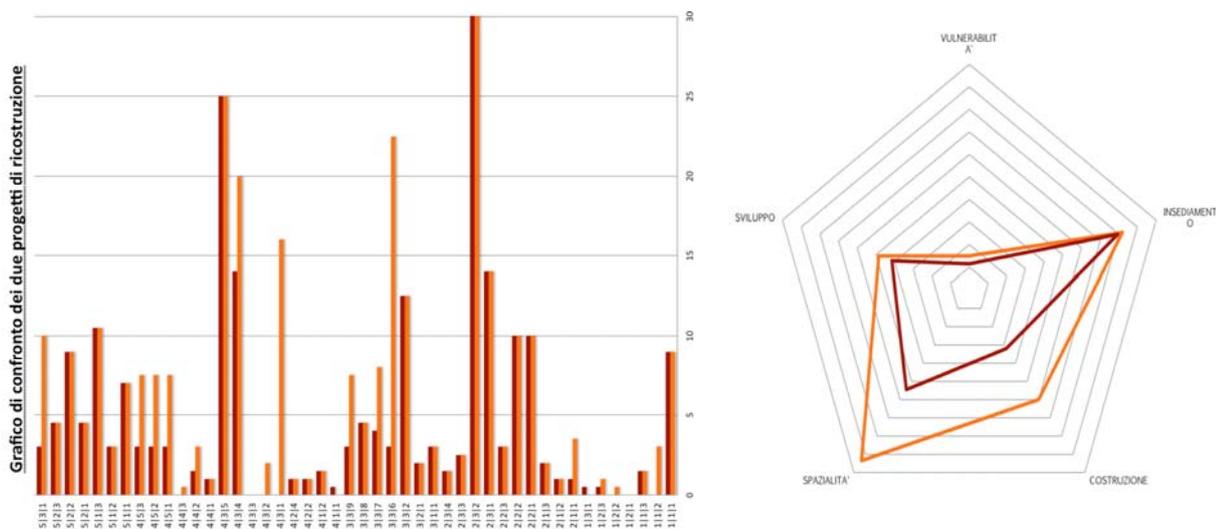

Fig. 10, 11 - Bar and radar graphics result by comparison of two case study.

During the design of the ReHAsTool methodology, we tried to establish a set of relevant and effective indicators and judging criteria as objective as possible; it is clear that in this process it is easy to find the risk of attributing a

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subjective character both to the choice of the indicators and to that of the criteria. In this sense, that a comparison and interaction with other subjects from different disciplines would be appropriate and useful, in order to enhance the accuracy of indicators and decrease the subjective interference within the design of the instrument.

The results obtained at the end of the PhD research were:

-   critical and theoretical basis on the several topic linked with the reconstruction processes;
-   the design of an assessment tool, ReHAsTool, tested with two case studies related to housing reconstruction projects in Sri Lanka.

The critical aspects of the work are:

-   subjectivity in the choice of indicators and evaluation criteria;
-   the application of the assessment to case studies involving a single context;
-   lack of access to direct experimental data for evaluation.

A possible development can be identified in:

-   evaluation of further case studies;
-   use by stakeholders of the tool in the design of post-disaster housing units in order to test the validity and usefulness in the case of application with experimental data;
-   implementation of the indicators through questionnaires proposed to the communities affected by the post-disaster reconstruction processes in order to check and change indicators also according to the perception of the beneficiaries;
-   extrapolation of statistical data and general principles on the processes of post disaster housing;
-   development of an open source, upgrading database of projects and assessments.

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DEVELOPING EMERGENCY

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ABSTRACT

After several experiences in the international cooperation for development, FAREstudio is carrying on an attempt to extend its action to humanitarian emergency, an area where design does not seem to play a role. The aim is to verify if and under which circumstances such a condition can be reversed, in the perspective to affirm appropriate shelter as a human right, and consequently design as one of the tool that can contribute to such appropriateness. Our interest stems from the conviction that discipline and profession require a thorough, responsible consideration about principles and practices that counteract the current trend to reduce design, and architecture in a peculiar way, to a commodity. The strategy is therefore to get involved with radical environments such as refugee camps and to actively experience conditions and strategies for a responsible presence. The result is inevitably contradictory and stresses once again the relevance of external factors, mainly procurement strategies, over technical ones, whereas the most important contribution by the profession, and discipline, is an appropriate balance between typological and technological innovation.

DEVELOPMENT, EMERGENCY AND CONSTRUCTION

In the last years FAREstudio, architectural design firm based in Rome, has been involved in various projects, mainly located in Africa, related to the domain of international (cooperation for) development. The concept of development is quite controversial but hereafter it will be intended as generically as possible. Nevertheless, or because of that, the substance is that under the name of 'development aid' there is a flow of material and immaterial resources from western, affluent economies (countries) toward poor economies (countries). Construction (production of buildings) is often part of this flow, whereas, depending on circumstances, it represents the main outcome of cooperation itself or the by-product of it, an inevitable step in order to supply other services and/or goods. Despite noteworthy exceptions, the contribution of architects, designers and other building industry professionals to development is still unclear or simply unknown, in general considered not relevant and/or superfluous.

This is not equivalent to say that designers and the like are not hired or employed by UN Agencies, international institutions, NGOs: in general terms, however, the impression is that construction is regarded as a sort of annoying and uncomfortable obligation the donors tolerate in order to carry on their 'main' activity, either reduce poverty, or carry on communities empowerment, fight gender discrimination, etc. Basically more a cost than an investment. A sensation confirmed by the discrepancy between involved resources and discussion about results, an issue to be included within the overall debate concerning aid effectiveness.

Whereas the initial action of FAREstudio in the realm of development has occurred nearly by accident, recently the attention has widened to include humanitarian emergency, an even less documented field of action as far as architects, designers etc. are concerned. Humanitarian aid, that takes place in the case of emergencies due to natural or man-made disasters, is conventionally distinguished from development aid.

WHY

The reasons why the office is working in the development and emergency, the two extremes of international cooperation, include:

- there is a tendency to marginalize architects, to reduce their social, cultural, economic relevance: how to resist and react to exclusion? Various are the symptoms, and the reasons, of such phenomenon: fragmentation and/or lack of competences, self-referentialism, virtualization, narcissism, dependence;
- architects control a very limited portion of built environment, and this portion is possibly decreasing: to operate (or do not) in condition of (relative) scarcity and for (apparently) social objectives can be regarded as a strategy to restate a position that after post-modern has become nearly redundant and unnecessary;
- in other words, to observe the world from regions where apparently architecture has no place constitutes an effective way to reflect on the sense and future of the discipline (or the lack/inadequacy of it);
- in fact, particularly humanitarian emergencies and poverty, quite often combined, constitute a condition where essential issues related to social, economic, political, cultural responsibilities of those in charge of

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construction, shape and management of built and natural environments, are exposed in their full range of interpretations and implications.

In very simple terms, it is important, literally vital, to investigate how a function for architects (values, sense, recognition) can be defined and possibly fostered. If the ability to play a significant role has to be expanded rather than reduced those domains where architects normally are not present must be explored, and in case 'colonized': the circumstance that most human settlements reflects prevailing conditions against demand – that is, availability of land, materials and other resources - rather than deliberate choices should be regarded as the prevalent condition of human beings, and as such this form an immense, potential field of action. This is what can be defined systematic scarcity, not related to circumstantial conditions, but substantial and endemic. Needless to say, it is a political category.

The framework in which FAREstudio operates does not refer to neutral humanitarian activism, does not stem from the worn out mythology of the architectural hero: the action is oriented, and responds to a set of ethical assumptions but its main aim is very practical, to neutralize the tendency to reduce design to a commodity, for which there is demand, but which is supplied without qualitative differentiation. In this context, independency (that has nothing to do with individualism and solipsism) might be outlined as the main ambition to be pursued. Above all, we are part of a system with its own rules and strategies, interests and finalities.

FROM CURIOSITY TO PRACTICE: CBF AND BEYOND

The involvement with international cooperation started from an opportunity FAREstudio had a few years ago, when we designed and realized a small complex in the outskirts of Ouagadougou, capital city of Burkina Faso (fig.1). The building – The 'Centre pour le bien-être des femmes' (CBF) - has been quite successful and inevitably oriented the office in the search of new opportunities so to investigate the topic in a more systematic way. Soon after the completion of the building, however, we had very clear a fact: the CBF, developed by the Italian NGO AIDOS, as part of its campaign to fight Female Genital Mutilation practices, had been produced under very peculiar, and possibly unrepeatable, circumstances.

Fig. 1 - Centre pour le bien-être des femmes (CBF), Ouagadougou, Burkina Faso (*source:* FAREstudio_2008).

Donors were very discreet, AIDOS is a very dynamic, a-bureaucratic, self-determining entity, connections with local partners very well managed, Burkina Faso is a very safe country: a scenario quite unique, as we would have learnt soon.

That experience offered the opportunity to look into international cooperation for development as an economic realm, an expanding sector that undeniably has the connotation of a market. This fact is inherent to the nearly unanimous attitude of those institutions and organizations that define the policy of procurement: to act in fair, transparent, accountable way but assuming the market as the only possible reference, to the point to presuppose the free, competitive market itself as a goal to be achieved. What is true for the production applies to the services as well, including design. And therefore the access to the market of professional services is regulated by conventional criteria

such as past record, experience, available resources, etc. (with the exception of volunteerism, depending on circumstances more or less skilled). One of the ambiguities of the political economy of generosity (or political stability) that recalls the traditional vagueness of architects as social actors, compressed between building industry and power.

International cooperation for development as part of the broader socially engaged design is getting more and more fashionable, with its own niche-stars, dedicated channel of information and promotion (images more than real facts and figures, and a certain degree of inevitable rhetoric) but regardless of growing exposure and attention, it is quite evident that the few examples of buildings that achieve remarkable architectural quality (recognized as such via their presence in the media) originates in very specific conditions (small scale projects, direct involvement of the architect with the promoter, particular relationship between the architect and a community). Big names of cooperation, those who actually handle the mass of production, are not represented in the atlas of best practices. Possibly this has to do with the reluctance to identify design as a priority, itself a by-product of a general tendency to *realpolitik*: good design is often critical of the existing, and this conflicts with the attitude, understandable, to limit the occasion of clash in areas not deemed essential or even potentially dangerous in terms of cultural confrontation (quite a risk, for construction).

A STRATEGY

A strategy of investigation, based on three major aspects, has therefore been set up in order to lead FAREstudio's action: 1) Design in poor contexts/countries (low-cost design): low-cost design constitutes a valid proposition under all economic circumstances, not necessarily those defining 'poor' countries. But the need for cost-effective and comparatively result-rich strategies is magnified in poor countries. In terms of design theory and practice there are at least three design perspectives worth investigating: a) a perspective centred on 'process'; b) a perspective informed by 'typological innovation'; and c) a perspective defined by 'technological robustness'; 2) Design with international organizations: international organizations form their own market, impose their own priorities and define a specific work environment for design consultants and professionals. The definition of an effective design strategy under the circumstances created by supranational funding bodies and sponsors could benefit from the analysis of the parameters and protocols imposed on designers, the evaluation of their correspondence to broader official policies and missions, and the assessment of the building experiences produced under the various programs. Overall, there is an interest in addressing the specific role of design in cooperation, which remains, in spite or because of its largely humanitarian bent, ambiguous and largely unexplored, particularly now that architectural culture has come to encompass some of its efforts; 3) Design for capacity building: particularly related to the context of developing economies (but possibly worth discussing and applicable to the building sectors of advanced economies), the ability of design to act as a trigger for building local technical capacity in the area of intervention can be a crucial tool for industrial development. Researching and practicing in this context requires touching on several issues that do not often occupy centre stage in architectural design education: 1) the integration of design and manufacture through supply chain analysis, and consideration of their implications on design as practice; 2) the ability of the building industry to support and disseminate design decisions made on specific projects; 3) the elaboration of specific media and codes for knowledge-transfer and sharing; 4) the standardization of technologies, components and assemblies.

Quite an ambitious program for a small scale architectural office, that brought with it two major practical actions: on one side to test the reality of UN Agencies and on the other to experience the most extreme of operational environment, humanitarian emergency.

CENTRAL AFRICAN REPUBLIC: THE FIGHT FOR BUILDING

Among the post-CBF projects, the most interesting is located in Central African Republic, where FAREstudio has been hired by a UN Agency to design a training centre for former child soldiers (fig. 2), part of a program aimed at facilitating sedentarization of people in rural areas. In comparison with what has been done in similar projects already realized (usually a series of isolated buildings scattered here and there in the bush) we decided to go for a single building based on the repetition of the same spatial/constructive module. The aim is to stress the sense of community, despite all the resistance from the paramilitary corps supposed to run the place. The same module is also used for the sanitation block, a separate volume where all function related to water, sanitation, hygiene (WASH) are concentrated.
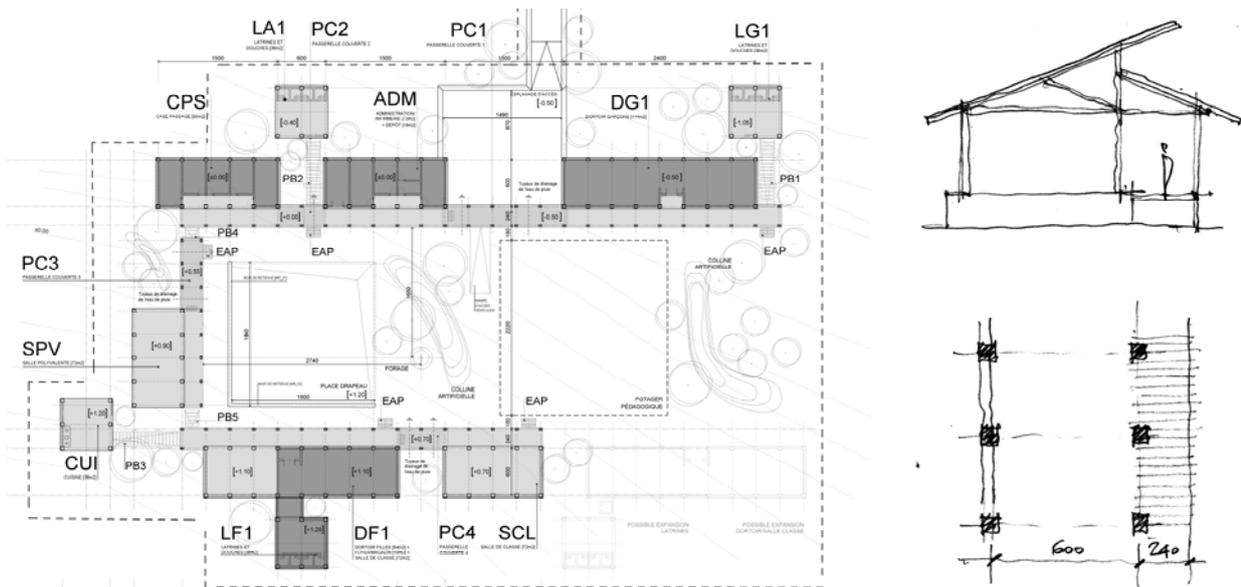
Fig. 2 - Training Centre, Sassara, Central African Republic.

The story of the project is a collection of many of the occurrences that negatively affect international cooperation, at least in our direct knowledge, a culmination of similar conditions already experienced elsewhere. The process of project definition has been long and complex, with systematic difficulty in getting proper feedback from local stakeholders, due to objective complexity of communication. Program was very undefined, data concerning available materials very incomplete and controversial, and formality of procurement procedure very rigid. Unpredictability of economic aspects of the project is an additional issue of its own, largely referable to the perverse combination of underdeveloped market and influence on that market of the international cooperation itself. The explicit adoption of an innovative approach has not always been welcome by the system, in particular locally: building industry, usually quite conservative and rigid, in these circumstances is coupled by the resistance opposed by those in charge for decisions, by definition aligned on unadventurous attitudes. Despite all that, and with the decisive support of the few more open to experiment, the design has finally been completed and the construction has started in a very remote area toward the Chad's border.

Unfortunately, when the political and military situation of the country started to collapse at the beginning of 2013 due to rebels advance toward the capital, the construction site has been abandoned (fig. 3) and till now there are no news of what happened. The area is not reachable and the international organizations are still in a sort of cautious stand-by, after a drastic reduction in staff.

Fig. 3 - Training Centre, Sassara, Central African Republic (*source:* FAREstudio_2012).

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THAT IS NO COUNTRY FOR ARCHITECTS

As anticipated, in the meanwhile the office decided to go radical and get involved also in emergency. By doing that a sort of taboo has been broken (the two domains, development and emergency, are regarded as very different, matters for specialists). In this case FAREstudio's position has been different from what occurred in the past: in fact FAREstudio has been appointed by a UN's Implementing Partner, and therefore committed to the concrete realization of something designed by others, in theory, at least.

The first experience has turned out as the most frustrating. Eight months have been spent in some refugee camps in South Sudan; the office, formally engaged as 'urban expert', should have been in charge of technical support for sanitation, planning implementation, sheltering. However the reality has been dramatically affected by overall unbearable conditions and practically just a minimal part of what planned has been achieved. The availability, and affordability of nearly everything was problematic, and logistic did simply result not possible. The scale and magnitude of disaster was out of control, and not always those in charge are fit and/or ready for the task. In addition, the logic of market does not operate just on goods: it applies to implementation as a service as well, and therefore organizations compete one each other in order to get programs awarded, often underestimating real implications of the situation or taking excessive risks. As a consequence, even if coordination and integration of various subjects is among the priorities of camp management, there is evidence that Implementing Partners with different profiles, diverse ability, dissimilar power, experience a form of Darwinism that is not exactly in line with the ethical considerations that should direct the harmonized action in a refugee camp.

Fig. 4 - Latrine Construction, Nyeel Refugee Camp, South Sudan (*source:* FAREstudio_2013).

FROM TENT TO BOX, AND BACK: BRINGING SHADE ONCE AGAIN

In Jordan, we have been involved with a program of summarization: at the Al Zaatri camp some 25,000 prefabricated shelters have been supplied by various countries of the Gulf. Supplied means donated, but fabrication has been carried on locally. Despite that Jordan industrial system is reasonably developed, production has occurred too rapidly to be properly handled. As a consequence the shelter are in general very poor in terms of quality. The real problem, however, has not to do just with the low quality of the manufacture but with the use of it: the prefabricated shelter is normally adopted for very temporary settlement of particular categories of people (mainly workers) and it is supposed to be provided with A/C and power.

In Al Zaatri environmental conditions are very harsh. The area is arid, hot in summer and cool in winter, with heavy precipitations. The shelter has no A/C equipment and in any case there would not be power to run it. So, as a consequence it should be equipped for summer (summarization), and winter (winterization). A situation quite common for tents, that implies, if not correctly dealt with, unbearable conditions for the refugees, but, even when faced, rarely is effective, and often results in a waste of money. In the case of the summarization, the initial request/suggestion to the Implementing Partners by UN experts responsible for management was for a roofing system. The NGOs were supposed to come out with a proposal (with the idea that the most suitable scheme, if feasible, would have been put in place by the 'winning' NGO with all the related 'commercial' implications) and here is where FARE studio entered the scene. It must be stressed that the process initiated at the beginning of May, with no clear perception of the available budget (and

a similarly patent underestimation of the scale of the operation), the only reference being a winterization project carried on six months earlier, with doubtful effects, by a 'competitor' NGO.

While the roofing option was under scrutiny, the office was more and more unconvinced that roofing would have been the best choice; in FARE studio's perception a veranda would have been much more effective. The main problem of the prefabricated shelter, apart from the mentioned technological limits, is the absolute inconsistency with the reality of a Muslim society: there is no consideration at all of the privacy as unquestionable factor of cultural identity, not only from outside but also within the family itself. Furthermore, camp planning is very rigid, following standard procedures, and because of that, the prevailing layout arrangement is bizarrely resembling a suburban model where the shelter sits in the middle of a 8.00x10.00 meter plot, forming a low density undistinguished fabric. Unfortunately this pattern, combined with the spatial poverty of the shelter, produces an environment that is absolutely alienating, and dramatically distant from the setting the refugees come from (often of rural, traditional background). Therefore there is a constant reconfiguration of the shelter, by widespread use of recycled building materials (for those who can afford them) or also misuse of plastic tents (or leftover of, that strangely are not returned to camp management when the family is assigned a shelter. Another strategy of adaptation is the officially not allowed relocation of the shelter by using gas bottles as wheels so to form clusters, to recreate a more human space.

The veranda would have gone in the same direction, with one third of the cost of the roof. The creation of an outdoor space is essential for the family. The geometry and assortment of the proposed kit would have produced several different configurations, facilitating those operations that the refugees are already carrying autonomously. In any case the two options would have been installed by the refugees themselves, while the NGO would have provided the raw materials and assistance. The main challenge of the project rested on its feasibility. In order to handle the logistic of the project, the selection of materials has been based on availability on local market and ease of assembly; for this reason agricultural fabric, water pipes, exhausted tires, ropes and metal hooks have been used, while a workshop would have been installed at the camp [employing refugees on the base of the cash-for-work principle] so to carry on storing, preliminary manufacture, instruction and distribution of the components.

Both the proposals have been tested through prototypes (fig.5 and 6), and the experience fully documented so to get a comparative picture of used resources and time of installation.
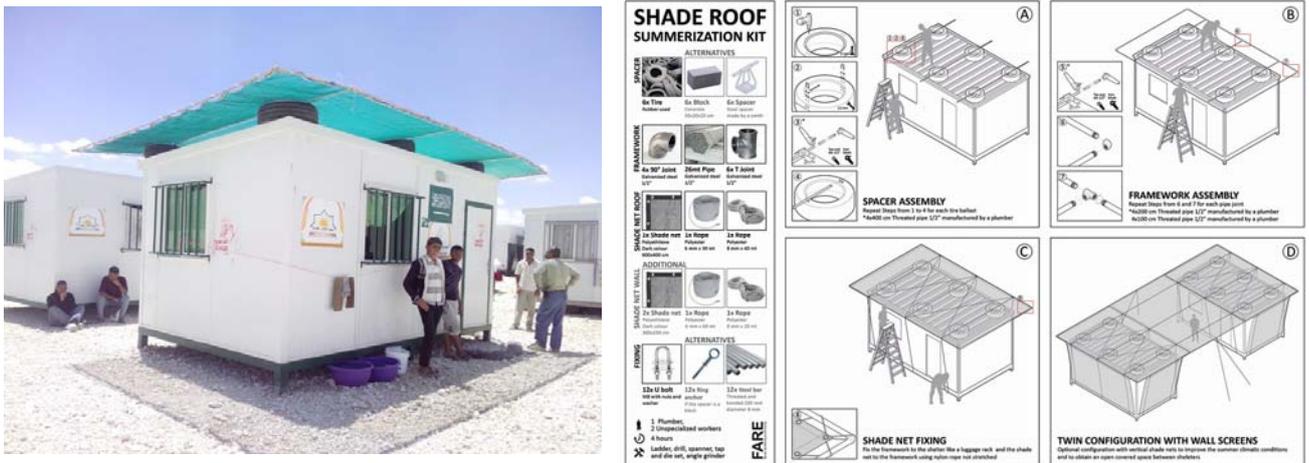

Fig. 5 - Zaatari Refugee Camp, Jordan, Roofing option (*source:* FAREstudio_2013).

Fig. 6 - Zaatari Refugee Camp, Jordan, Veranda option (*source:* FAREstudio_2013).

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For a long period of time the proposal has been discussed with UN Agencies Representative, various experts, other NGOs in the attempt to set a feasible scenario: several NGOs have been asked to join to form a team, where each NGO would have been involved in relation to its peculiar ability (distribution, procurement, presence in the camp). As part of the process, focus groups with refugees have been carried on in order to collect their opinions about the summarization (and they quite clearly preferred the veranda for the same reasons that outlined above).

Unfortunately, at the end both the proposals have been shelved due to lack of time (all started too late in the season) and cost.

The only practical, unsatisfactory result is that the veranda has been utilized by UNICEF to shade external areas in some of the schools of the camp.

MAURITANIA: CASTLE OF SAND?

In Mauritania FAREstudio has been required to implement a 66 classroom program for the MBerra refugee camp. In this case the model, a simple hangar with a steel and timber structural frame mounted on a concrete slab, completed by a corrugated iron roof and PVC as enclosure, had already been defined by Mauritanian authorities, and basically accepted by UNICEF and UNHCR. There were no drawings but simply a very schematic Bill of Quantities for a total estimated cost of 3,300 USD.

The reference was a combination of the typical UNICEF prime intervention tent and the traditional Mauritanian tent (fig.7), both with major limitations: the UNICEF tent performs very badly in windy conditions (absolutely usual in the area), the traditional tent is not intended for didactic purposes.

Moreover, the proposed materials (corrugated iron roof and PVC) quite obviously would have produced a 'building' absolutely not durable and above all unbearable for the users, kids and teachers. In addition, the model would have had a pole in the middle of the space and the incidence of transportation cost (the camp is in a very remote location) is huge: enough arguments to suggest the opportunity for a different approach.

Fig. 7 - MBerra Refugee Camp (*source:* FAREstudio_2013).

The office decided then, in accordance with the UN Implementing Partner it was working with, to propose an alternative based on a very straightforward assumption: since transport is so expensive and sand so available, it has been proposed to use sandbag technique, a definitely labour intensive solution that permits again the application of the cash-for-work principle).

The use of bag filled with sand as masonry, plastered on chicken wire armature, is widely used in varies areas of the world, and it can be regarded as a consolidated technique nowadays, and has been introduced locally as a response to a specific need. The wall is combined with a double layer roof, where the corrugated iron is replaced by pvc truck cover installed on a series of metal trusses based on a typology used in the area (fig. 8).
A tender has been prepared on the base of the proposal, with the clause to produce a prototype in order to optimize production and familiarize the workers with the system. Cost of the building, after tender, turned out as 2,400 USD, an issue that will prove controversial.

Fig. 8 - Classroom, MBerra Refugee Camp (*source:* FAREstudio_2013).

The prototype has been discussed with all those involved, from UN Agencies (UNHCR and UNICEF) to refugee leaders. After initial suspect and some stoppages, the result has been positively considered and officially adopted (fig.9). It is remarkable that the host community and the refugee leaders, once experienced the thermal performance of the prototype, have been enquiring about the possibility to adapt the technique to other building types.

Regarding the cost, pricing is not exactly an easy exercise in such environment, but the real issue raised once the contractor realized that his profit (largely based on transported materials) was dramatically reducing in comparison with the 'conventional' model. At that point a confrontation has started and after some form of resistance not to say sabotage, the contractor has been substantially sided by FAREstudio [it means by the UN Agency Implementing Partner] in a sort of unusual, hybrid Construction Management formula.

The program is currently under construction and by the end of November a first series of 66 hangars should be ready.

Fig. 9 - Classroom, MBerra Refugee Camp (*source:* FAREstudio_2013).

CONCLUSIONS

Generally speaking, and not only in poor countries, current production of built environment based on conventional building industry is very rigid and conservative; in the case of international cooperation major institutions, despite relevant expenditure, regard the respect of local practice as part of an overall strategy of controlled impact on beneficiary communities. In addition, particularly as far as emergency is concerned, there is a vast technical literature, easily available, but its application seems to be difficult, as if something in the passage from theory to practice goes lost. All this defines a very stiff environment, apparently quite reluctant to experiment and innovation. Nevertheless, despite failures and disappointments, FAREstudio has experienced the possibility to force the conventional limits of professional position from the person responsible for implementation to promotion of alternatives based on design, to the point of collecting a few findings that could be interesting to assume as starting points for a further discussion:

- innovation should be pursued as a primary aim, particularly taking into account that building in international cooperation refers often to public buildings or public use of buildings; innovation it is not a simple pursue of newness, it is aimed at relating a project to its context so to ameliorate it;
- innovation, however, must realistically consider the very context in which the project is located (socially, economically, geographically) so to be feasible: under this point of view, typology seems usually more promising than technology as area where locate innovation, and both can find inspiration in traditional production, at least at level of principles rather than forms;
- as a combination of the previous points, the production of prototypes to be easily replicated must be favored, so to maximize investment in design (and quality control); this does not refer to universal solutions, but models with a broad range of applications, that realistically recognizes the issue of inadequacy/scarcity of that specific intellectual and practical resource that we commonly call (quality) design.

Finally the association between research and production is totally useless if not supported by effective communication, so to activate sharing and dissemination. Cultural mediation is an expression of effective communication, a specific contribution architects should bring to the process of shaping a built environment that responds appropriately to needs and aspirations of those who inhabit it.

Obviously FAREstudio's work in the international cooperation is hardly understandable as architecture, and might produce embarrassment and/or scepticism to use it to support ideological considerations; however it is precisely the work for international cooperation that can be used to draw some general indications: it offers [imposes] the chance to reintegrate a process [design and building] that otherwise seems oriented to disintegration. It is a good opportunity for architects to restore their [traditional?] multi-disciplinary approach, an essential attitude in order to achieve real and comprehensive sustainability. In addition it is a unique opportunity for practical action, with exceptional potential for social relevance; last but not least, it is a formidable exercise in realness and concreteness, the opposite to current abstraction and insignificance that affects wide regions of the profession.

VERNACULAR APPROACH TO ARCHITECTURAL DESIGN IN A DEVELOPMENT COOPERATION EXPERIENCE WITH MEXICAN INDIGENOUS COMMUNITIES

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ABSTRACT

Archintorno is a non-profit organization of young architects based in Naples, that has been promoting initiatives of development cooperation with indigenous communities in the Mexican State of Oaxaca since 2005. These initiatives involve universities, associations, local governments, and professionals in and outside Italy and rely on a didactic format, internationally known as Design-Build Studio, that includes the direct involvement of students from the Schools of Architecture and Engineering in designing and creating buildings in the developing contexts.

Our projects aim at using local materials and resources through low-cost, repeatable technologies, that are also consistent with local climate, social, and cultural context. Decisions on how to realize the projects are the result of a careful, shared analysis of lifestyles, housing culture, and local construction techniques. The cultural exchange between students and local populations is another relevant factor playing a major role in these projects. Therefore, in the context of the current debate about different approaches to architectural design in international cooperation, the experience of Archintorno is in close continuity with the local vernacular culture.

This article describes the strengths and weaknesses of the proposed approach through the analysis of the three cooperation experiences of Archintorno in Mexico. The topics discussed cover forms of participation and capacity building, project impact on the local community in terms of economic, socio-cultural, as well as environmental and landscape aspects, in addition to the transposal of technological and architectural innovations and may represent a starting point for discussion within the context of the community operating in this field.

INTRODUCTION

Although the use of prefabricated elements in architectural design in developing contexts of international cooperation is relatively common, differences between a design approach based on the principles of vernacular architecture and another approach based on prefabrication appear to be quite significant. Rudofsky uses the words "anonymous, spontaneous, indigenous, rural" [1] to describe the term "vernacular". According to P. Oliver vernacular architectures are "related to their environments contexts and available resources, they are customarily-owner or community built, utilizing traditional technologies. All forms of vernacular architecture are built to meet specific needs, accommodating the values, economies and ways of life of the cultures that produces them." [2]

Thus, a vernacular design approach relies on: i) the use of local materials and resources; ii) the development of technologies related to the local building tradition, where the technological rate must be consistent with and can be supported and reproduced by the culture and society representing the target of the cooperation project; iii) the participation of local beneficiaries into the process. Despite the figure of the architect denies one of the fundamental conditions of vernacular architecture: "the architecture of the people, and by the people, but not for the people" [3], this approach leads to the development of principles of the vernacular architecture, and tends to establish a direct comparison and a constant collaboration between the professional designer and the recipients, based on the principles of local building culture. Technologies developed in this context by relying on local resources, allow to invest a main part of the financial resources of the cooperation project in the territory and in the development of the local community, but they are also the result of time invested in partnership.

Although not excluding to start from the context analysis and its needs, a design approach based on prefabrication focuses on industrial materials prefabricated elsewhere and transported to the project site, on a fast and easy assembly, on modularity and the serial nature of the elements production and of assembly operations. Serial production allows to reduce manufacturing costs through industrial processes, while increasing those of materials transport; the speed of assembly allows to reduce the time of construction by lowering labor costs and that of the staff in field mission, but limits also significantly investment in the area and participation of local people in the process. In the absence of local producers of the resources used and without an external intervention, the use of materials not locally available makes

difficult to replicate used technologies locally, so that this approach seems to be more suitable to an emergency context than to development processes in marginal contexts.

Based on a strong credo that an approach to design linked to the development of vernacular technologies through the use of local resources may be the right way to ensure sustainability, both in economic and cultural terms [2], the association Archintorno has worked to the implementation of cooperation projects with rural indigenous communities of the Mexican State of Oaxaca from 2005. Indigenous communities of Oaxaca are deeply surrounded by nature and often marginalized due to difficult access for the mountain nature. Due to this isolation from urban contexts, they maintained a traditional socio-political organization of the community, and mainly saved traditional forms of life-style and of settlement. [4]

Despite these indigenous roots still being very strong, the community suffered a deep and quick transformation over the years. Communities are excluded from production processes of urban areas, country policies, and from the processes of society renewal and the processes of cultural and socio-economic contamination, associated to the migration phenomena directed towards the main cities of the same Country and to the United States, are now evident. [5]

These processes supported the diffusion of new lifestyles and aspirations of "modernity" among the people, that are now also evident from the building environment; industrial prefabricated materials and related construction techniques gradually complimented local natural materials and vernacular forms of settlement as an emancipation signs in most of the wealthy families (fig 1).

Archintorno's projects focus on a didactic model called Design – Build Studio where students are responsible for implementing architectural projects from design to construction, [6], by recovering principles of local vernacular architectural tradition, that is revisited through a contemporary approach appropriate to the climate, and by using available resources [7], so that the local community exerts a central role in the whole process. With the support of the local non-governmental organization (NGO) CAMPO a.c., we developed three projects in Mexico, through processes strongly linked to the local vernacular tradition: a community center in Santacruz Tepetotutla in 2006 [4] (fig. 2), a community center San Pedro Tlatepusco in 2010 (fig. 3), and Micro-Regional Centre of Technological Innovation in the Liberal Pensamiento 2012 [7] (fig. 4). This allowed us to analyze different aspects of architectural design related to this type of approach and their implications on the whole cooperation project, and at the same time left questions open about the forms of participation, the socio-economic impacts on the community and the transposal of technologies proposed in a territorial development perspective.

A DESIGN BUILD STUDIO METHODOLOGY

Although based on Design-Build Studio model, the methodology developed by the Archintorno, was gradually enhanced by including additional phases and revised according to the considerations produced by the direct experiences themselves. This methodology consists of five main activities:

- a preliminary, on-field investigation;
- design workshops;
- construction workshops;
- a household survey aimed at understanding local lifestyles and housing cultures;
- exhibitions, publications and video-documentary about the project.

Particularly in the second step, Faculties of Architecture and Engineering providing the participating students have been involved in the development of the didactic process through the years: the TU of Berlin, who's "Mexiko Proyekt" was our inspiring model and the Faculty of Architecture of "Federico II" University of Naples in 2006 and 2010, the CRD-PVS of Polytechnic of Turin and the taller Max Cetto of UNAM of Mexico City in 2012. The whole process relies on inclusive and shared strategies allowing a continuous debate among the actors involved in the same project at different levels. The process starts up with a preliminary survey, aimed at collecting all the useful elements for the development of the project and at promoting a very primary exchange of expectations, ideas and arrangements with the community. Since our work mainly focuses on community building, all the inhabitants of the village, or at least part of them, are involved in the project.

The following visit to the village allows us to introduce Archintorno to the local community and to establish cooperative agreements among the actors involved in the project, thus each partner may be able to give its contribution according to its own skills and resources, and to share and define the architectural program with the community too. Beside this aspect, the survey focuses on local materials and resources, construction technologies, building types, habitat and lifestyle, geographic, climatic and socio-economic information in the village.

During the design workshop, students starts their work analyzing the data collected: they study all aspects of vernacular architecture, and examine issues detected in construction techniques in order to find adequate technological solutions. Students work on several project proposals and submit them to the community that chooses the most appropriate one. The chosen project is discussed in assembly with the community and it can be integrated with its suggestions and proposals. Once architectural design is revisited, workshop focuses on structural details of the project

and on quantifying construction materials and costs. Once executive planning is completed, we are ready to begin construction.

| **Fig. 1** - Vernacular and industrial materials. | **Fig. 2** - The Community Center in Santacruz. | **Fig. 3** - The Community Center in S. Pedro in Pensamiento Liberal settlement. |

The Community hosts students for the period of works (2-3 months). We share work and everyday life in that months and it is an important experience that allow us to empower our relation with the communities [4].

On building site, we contract a local mason and carpenter with the didactic role to guide the students in all construction process. They have the key role to share their knowledge on local vernacular construction techniques with students, and at the same time they have the opportunity to get closer to the new techniques proposed in design. The result is a learning by doing process where every labors, students and inhabitants can share their work experience, learning by the others at the same time.

For our last project in Pensamiento Liberal Mexicano, we decided to complement the preliminary investigation with a household survey, to deeply understand the habitat transformation dynamics. A semi-structured interview with the households was made to better determine the people lifestyle and the relation with the use of spaces in the house. The choice of the research themes reflects the holistic hypothesis, according to which all the different aspects of the life of the individuals influence the architecture of the housing compound and of the territory [3], [7].

Students interview the local inhabitants with a set of pre-defined questions, open questions and make a graphic and photographic documentation of the housing compound. These activities allow us an intimate contact with people, and constitutes an important data base to document their culture and for following projects of the association in that area.

As the very last step, together with the students, we provide a set of documentation tools (videos, publishing, exhibitions) to promote the whole experience. These tools are also a further chance to think back to all the projects activities, to detect the weak aspects of the common work and to reflect upon possible improvements.

VERNACULAR DESIGN APPROACH ASPECTS IN ARCHINTORNO EXPERIENCE

Habitat, and life style analysis

Human beings is the product of a cultural process that took place over the time and in different places; communities (from the small village to the great countries) through its institutions, are guarantors of this historical continuity that allows to preserve a system of values and a collective identity; this give rise to habits, lifestyles, and generally all human activities leading to social structures and its relationship with the physical environment. For this reason intervening in marginalized communities to lay the foundations for new forms of self-development, is an extremely delicate operation that may often create deep fractures in the social cohesion of the community. This task requires a holistic approach in the cooperation project which provides continuity with the economic and social processes of the place. Our local partner, the NGO CAMPO that works for over 30 years for the self-determination of indigenous communities in the region of Oaxaca is our primary guarantor of this. However, the role of Archintorno cannot be solved in the simple execution of a request of the community filtered through the work of the NGO involved. At each step of the process, from the preparation of the project until the implementation stage there is the attempt to understand the socio-cultural implications of each action. The vernacular approach, compared to the prefabricated one, allows to have the flexibility to adapt to the contributions that result from an ever deeper knowledge of the place and its dynamics, throughout the process.

Since the beginning, during the investigation, our approach is based on two basic assumptions: the communion of intent with the community and the knowledge of the socio-cultural and climatic dynamics of the place. Both elements play a fundamental role in the design of the building, helping to define the factors to guide students in the project proposals and the executive planning. Agreements made with the community through the confrontation with local institutions has in fact the dual aim of engaging, through a choice collectively shared, the entire community in the process, and, at the same time, understanding the real resources available to the community to ponder design choices

and technology solutions. In these terms, for example, in San Pedro Tlatepusco, wood was not only a local resource to be used but also the impervious way to reach the chapensis pine cutting area, the local people strain of loading wood on their shoulders to carry them downstream and finally the work to convert it in construction elements with a rudimentary equipment. Accordingly, the technological choices must achieve a balance between the pieces size and quantity to be used, always trying to understand and imagine how each action will be put into practice in that context. Knowing the context, thus, becomes an important factor to start the design process.

The investigation is based on two related factors: observation and listening; observation of the physical and architectonical characteristics of environment and the understanding of the social and cultural dynamics of the community through people's tales: in a design logic strongly linked to the territory, to detect the various technological changes in local architectures without knowing the related manufacturing processes and their implications in the economy of the community, is not enough.

In the same way to measure the composition and shape of the spaces without understanding the different socio-economic and environmental factors involved (fig. 5) is not enough. For example, the dislocation of different function of the house in the open-aired compound detected by the observation of the place, in the case of the project in Santa Cruz, led naively to the idea of connecting the two floors trough an external path.

Following a specific request of the community we modified the project adding an internal staircase offering the users a covered connection to the second floor. In that case greater attention was paid to socio-economic factors of the observed articulation of spaces, partially underestimating climatic aspects. Participation of community, made possible to find appropriate design and technological solution that could satisfy both aspects.

Technical and knowledge interchange through the participation process

One of the principles on which all three projects were developed lies in the aim of creating a common path between the actors involved in each stage of the process. So the value of the construction phase does not reside only in the construction of a physical space, but also in the creation of a exchanging processes which foster this dialogue through the networking of experiences and skills: the construction phase has an educational value not only for the participating students, but also for the community members involved. The whole process is the result of expertise exchange among architects, local workers and students during the period of construction, through the involvement of some members of the community as actors of the construction process; this interaction is significantly facilitated by the use of local resources and the development of techniques arising from the local culture, previously studied. This allows us to confront each other on the basis of a common vocabulary that establishes a form of communication among the actors involved. So the heritage of this operation becomes, a linguistic enrichment that can produce new forms of local architectural expression, new skills and the awareness of their resources' potential.

An example that clarifies this approach is related to the process by which the wooden structure (present in all three projects) was designed, considering the related implications in the later step of the construction. Starting confronting with the community, we defined the basic size of wooden pieces to compose the whole structure, according to the material local production processes; these elements are then assembled in the final design in order to enhance both structural and environmental performances, considering at the same time, construction processes that local workforce could manage.

Fig. 4 - Micro-Regional Innovation Center in compound in Pensamiento.

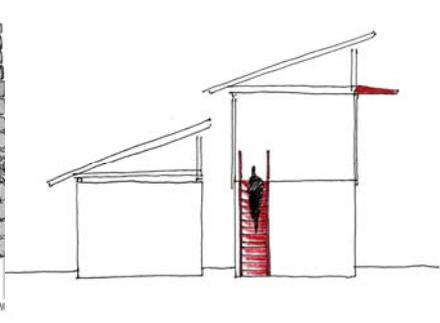**Fig. 5** - Investigation sketch of a Santacruz Tepetotutla project.

Fig. 6 - Sketches of implementation made in Pensamiento Liberal Mexicano.

In this way, during the construction step there is the concrete possibility to perform a knowledge exchange: the local labor force, able to interact immediately in the building process, can pass down to the students their technical knowledge about the manufacturing of elements and the basic assembly operations; at the same time it is easy to introduce and discuss with them new technological solutions, leading to an enrichment of local know-how. A community resource, in primitive forms becomes the easiest vehicle of communication.

This form of collaboration also takes place through the community involvement in design choices: in fact the development of the project proposal always goes through a comparison with the community that in many cases led to substantial changes in the project. It is the case of the addition of the aforementioned internal staircase as well as the implementation of the roof overhang in order to better protect the rear façade in the project for SantaCruz (fig. 6), or the

spatial changes which took place in the project for Pensamiento Liberal. In this second case, after a meeting with representatives of the cooperative, the need to protect one side of the building particularly exposed to rain and wind, led to the displacement of the external staircase and the redefinition of the interior spaces and of the access paths of the original proposal.

This process of mutual exchange, is particularly useful also in the construction phase in order to design a dynamic process able of dealing with unexpected accidents that we often encountered in marginalized contexts such as those of the villages: many detailed solutions are in fact the result of economic technological and logistics constraints often overcome thanks to the local actor knowledge or arising out of the interpretation of habits and local techniques experienced in everyday life (fig. 7). That is why we could recover archaic technologies deemed by the locals, initially not taken into account; developed within a different technological system, they can be part of the collective knowledge asset again.

Technological Improvement: construction costs, modularity, reproducibility, maintainability

The design approach followed by Archintorno, which starts from the reinterpretation of vernacular techniques through the use of local materials and resources, allows to work on technologies reproducible by local people, trying to get good performance of climatic comfort, reducing at the same time construction costs particularly related to the transport of materials and energy costs related to construction. This kind of approach also aims to the not negligible goal, to develop compatible low-cost technologies and in continuity with the tradition and expertise of local people, so as to tend to a self-development model, enabling the community the complete process management, maintainability and repeatability of the technologies used, once exhausted our presence on site, and allows us to invest large part of the project resources within the community.

In our experience, it was not always possible to carry out such a linear process, often the circumstances have led to trade-offs in an effort to better use the available resources in a climate of full participation with the community. The trend of rural communities to prefer the use of industrial materials, often seen as synonymous of advanced technology and progress, also has in some cases affected our choices. For the project of the Community Center in Santacruz Tepetotutla for example, the village asked for a an entirely concrete structure, also to take advantage of the foundation and vertical structures already carried out in the previous years and of the materials already purchased, despite the aim of the association was an architecture in full harmony with the local environment, making the most of local materials. We came to a compromise and obtained the upper floor to be made entirely of wood, taking advantage of local knowledge in manufacturing the material, so we proposed a wood structure revisiting local vernacular constructive principles, but offering greater rigidity and a better control of heat transmission from the roof.

Construction costs – Still in Santacruz, wood of community property, was made available to the project for free, and the expedient was repeated in the other two projects, the attempt to promote the use of such an important local resource, has enabled us also to invest in the local labor to cut wood and technological solutions for the improvement of thermal comfort of the building. Despite this, the rather consistent use of industrial materials affected the costs related to the transport of materials, although coming from the nearby city of Oaxaca, resulting in a significant portion of the total budget of the project. In our last experience in Pensamiento Liberal, instead, it was possible to use almost entirely local materials such as wood, stone, earth, reducing the use of cement and other industrial materials to the minimum. Materials used for construction, were extracted directly from the village territory, minimizing transport distances, and then transferred in the yard area using community property means, greatly reducing costs and also allowing us to distribute most of the funds inside the community itself.

Modularity - In this approach, modularity recognizable both in the individual designed building elements size, as in the size of the structures, meets the need to make the most of available resources. So the wooden structures are always designed with elements according with the cuts to be performed and transportable by the community and with the resources available on site, the size and frequency of the structures are designed according to the size of the available elements that will be used to complete it, as triplay, wood boards, etc. (fig. 8, fig. 9). The load-bearing earth wall structure size of Micro-Regional Centre of Technological Innovation of Pensamiento Liberal was modulated on those of the formwork provided by the supporting local NGO. So the project becomes a non-stop adaptation process, in which choices are revised several times until all resources are used to the best.

Reproducibility - Although the reproducibility of proposed technologies is one of the strengths of the vernacular approach to design in developing contexts, it could be a not so trivial target to be achieved; the involvement of local residents and craftsmen in the construction process, the use of local materials and technologies developed on vernacular architecture principles, is enough to determine the reproducibility of the building? Actually construction methods and processes, as the economic component play a key role in this case. For the earthen load-bearing walls in the Pensamiento Liberal project we choose to use the technique of mechanized Pisé (fig. 10) , using a compressor and pneumatic pistons (fig. 11) to speed up compaction and taking advantage of the abundant workforce of students for the preparation of earth. But as far as the large number of students employed in the construction can be replaced by the villagers themselves, the use of mechanical means, out of the reach of communities and the impact of fuel costs for their functioning, make the process quite hard to replicate. The structures of the wooden roof, proposed in all the three projects, as far as offering innovative technological solutions than those normally used in the local context, employ a quantity of timber that remain sustainable in cooperation project context with the whole community, but that it becomes

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economically hardly accessible for individual locals who want to propose them for their homes.

Maintainability - Despite the many questions raised on the actual reproducibility of the process, the attention paid in the design phase to the use of local materials associated with the sporadic use of elements prefabricated in the surroundings, as well as the involvement of local labor in the construction process, offers the community the ability to manage the maintenance of the property, ensuring its survival over time.

Time of construction: social impact and resources management

Obviously this kind of design approach requires to spend a relatively long time on field in the construction phase, comparing it with a design approach relying on prefabrication. This is partly because of its educational nature, in part because the production chain of the materials used for construction is fully dealt with in place, in part, for the long and difficult management processes of local resources by the authorities of the community and its marginality degree. Before they are put in place, materials are extracted, cut on the territory belonging to the village and then manufactured on the building site through processes often not mechanized, by students and local inhabitants who develop a relationship apprentice - teacher in both phases. This process not only creates a natural daily slowdown in site work, but can cause not negligible unexpected situations. In San Pedro Tlatepusco, because of the particular marginality of the village, the wood needed for the construction was cut at high altitude, left to dry there and gradually brought to the site by the locals on their shoulders, through paths made impervious by the weather. This situation has strongly influenced the development of the construction site and more than once we risked to have to stop it, due to lack of material. A long execution time, can have a significant impact on the territory and a high cost of management for the host community mainly because of the persistence of a large group of students on site. But at the same time allow a stimulant meeting of cultures, as previously described. During the 2-3 months of construction, the community is sometimes forced to change in part at their own daily life and work pace and is called to a considerable financial effort to provide for the maintenance of the guests. The choice of the ways in which these processes shall take place affect as much on the quality of integration between students and local residents, as the possibility for the community to continue to carry out part of their daily activities during the period of construction.

In San Pedro Tlatepusco, families turned hosting small groups of students for daily meals, so as not to impact too much on their family life rhythm; this solution however allows less control on the quality of food and wasn't replicated in the other two projects, also for communities choice. In Pensamiento Liberal, the women of the cooperative have turned in a single common kitchen providing meals to all students for the entire duration of the project, spending almost their entire day in this task. The attention with which these issues are examined at the moment to arrange with the community, as well as the manner and timing of the management of local resources through the authorities of the village are crucial for the success of the project.

Fig. 7 - Detailed solution of windows in Santacruz Tepetotutla project.

Fig. 8 - The modular wooden structure in Pensamiento.

Fig. 9 - Wooden roof structure module based on Tejamanil dimension.

Fig. 10 - Mechanized process of compaction of rammed earth walls in Pensamiento Liberal.

Fig. 11 - Compaction with pneumatic piston.

It's a complex but necessary task of cooperation, discussed at the moment to make arrangements with the community, which helps address the design foreseeing times and tools for implementation of the different phases of construction. In the case of Pensamiento Liberal, the cooperative had several difficulties in obtaining permits for cutting wood needed for the project by the competent Community authorities, so that the wood hadn't time enough to dry out completely and his manufacturing was very difficult. This generated a delay that led us to ask the community one more week to finish the work; the proposal was accepted with great difficulty since sowing time was approaching and the locals needed to work the field to obtain food for the following months.

CONCLUSIONS

In most indigenous villages of Mexico, vernacular settlement patterns and architectures evolved over centuries and still represent the majority of the built environment. Nevertheless they are disappearing fast, since housing typologies inspired by Western models and industrial materials started to be introduced within the communities. This phenomenon happens not only because of the spontaneous action of the socio-economic "elites", that even in these small communities do exist (generally local traders), for whom concrete prefabricated houses are more "modern", "safe" and represent their aspiration to an "urban" lifestyle. The adoption of "industrial" pre-packaged housing typologies is also often promoted by the Mexican government and international NGOs operating in these villages, without taking care of the relation of the proposed constructions to the characteristics of the place and of the community that lives it, with the result of producing a growing homologation of the living environments. Therefore, it is possible to observe a growing trend of substitution of vernacular settlement patterns with "modern" and "industrial" housing typologies, inspired by Western cultural models, with the risk of providing settlement solutions that are inadequate to local contexts and to loose vernacular traditions, which are a precious world heritage of urban diversity, material cultures and skills.

The above presented analysis of the Design-Build Studios carried on by Archintorno, in collaboration with Italian and Mexican universities and local NGOs, in three indigenous villages of the Mexican state of Oaxaca, allows us to propose some conclusions in relation to appropriate approach to be adopted when dealing with architectural design and construction within development cooperation programs.

In spite of the previously analyzed weaknesses of the proposed approach, the valorization of the vernacular housing and building traditions represents for us, as international architects invited by local communities to contribute to give shape to their built environment, the best way to interact with local material cultures and to avoid the risk of proposing housing models originally developed for Western, industrialized countries and passively inferred to southern, tropical, rural contexts.

It is not excluded that a design approach based on prefabricated materials, in these contexts, can pay attention to local indigenous dwelling types and patterns and in some cases, not only in other regions of the southern hemisphere, this kind of technology has been shown to meet local thermal comfort needs. But the use of prefabricated materials produced in Western countries, through these technologies, generates costs, including environmental, associated with the transport of materials unsustainable both globally and for the communities. Furthermore, technologies used are impossible to reproduce and maintain over time for the communities themselves.

On the contrary, vernacular settlements are regional and cultural. Furthermore, the widespread use of local, natural building materials (earth, wood, straw, stones etc.) and building technologies is affordable even by local subsistence economies and enhances cultural heritage and traditional abilities of local manpower. Moreover natural material demonstrated to be very appropriate from an environmental point of view and in relation to their "lifecycle assessment", but also in relation to their performances in terms of climate control and to the provision of indoor comfort in tropical countries.

Enhancing vernacular tradition offers the opportunity to experiment with housing typologies, building technologies and construction processes that are more appropriate to local housing culture and endogenous resources. But also in the forms of design inspired by vernacular architecture, the use of prefabricated materials, even if reduced, today it is often rather widespread. So what's the line? it is possible to think in a hybrid approach that, while starting from the vernacular architecture principles, paying attention to local housing needs and climatic conditions, and making extensive use of local natural materials, can also take advantage of prefabricated elements, on condition that they are produced or producible in the region? May be possible in this way, to ensure reproducibility, maintainability of the building and, at the same time, create the basis for a real participation of the community in the productive processes and development of the society, without recourse to materials, technologies and models designed and coming from the so-called first world countries?

The suggestion that comes out from our experience is to find inspiration in the vernacular tradition in order to avoid the indiscriminate proposition of Western housing and construction models. The proposed strategy is to reinterpret the vernacular tradition by culturally appropriate means, focusing on the introduction of culturally and economically compatible changes. This strategy can only be possible if it is based on the full involvement of the local communities at each step of the decision-making process.

NOMENCLATURE

NGO	Non-Governmental Organization
CAMPO a.c.	Centro de Apoyo al Movimiento Popular Oaxaqueño, asociacion civil
TU Berlin	Technische Universität Berlin
UNAM	Universidad Nacional Autonoma de México
CRD-PVS	Centro di Ricerca e Documentazione Paesi in Via di Sviluppo

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