

ORGANISATIONAL DESIGN, PERFORMANCE AND EVALUATION OF POST-DISASTER RECONSTRUCTION PROJECTS

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Abstract

This paper is based on a study that hypothesizes that the performance of low-cost post-disaster housing reconstruction projects in developing countries is improved by increasing one, two or all of the following variables: (i) multiplicity of choice offered to residents; (ii) users' responsibility in decision making; (iii) the articulation of local and external resources through an intermediate organization. Drawing from the lessons learned from the reconstruction project developed by the Coffee Growers' Organisations (CGOs) after the 1999 earthquake in Colombia, this study evaluates each of the aforementioned variables. This paper deals in particular with the third of these variables. In the form of a "first-part article" a complementary paper (Lizarralde, 2002) examines the first two aspects.

In order to articulate all the so called 'soft' and 'hard' aspects of reconstruction, an appropriate -usually complex- organisational design is required. This study examines the relation between organisational design and performance of reconstruction projects. Looking for the cause-effect relationship between organisational design and performance, this research confronts the underdeveloped field of the evaluation of post-disaster housing projects. This paper, then, proposes a method that has been specially adapted for the evaluation of reconstruction. This method attempts to solve the difficulties usually found in the evaluation of projects by bridging the gaps between: (i) evaluation of the system vs. evaluation of results and (ii) evaluation through qualitative methods vs. evaluation through quantitative methods.

In order to respond to the extreme damages caused by the 1999 earthquake, the CGOs articulated local and external resources by working as an intermediary between the local community, external organizations and the government. This approach permitted the delivery of various outputs that took into account the needs of local residents, including housing, infrastructure, education, technical assistance, public services, and others. An examination

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of this project serves to illustrate the method of evaluation proposed here and draws important lessons for the improvement of reconstruction projects.

Reconstruction; post-disaster housing; project evaluation; organizational design; building performance; developing countries; disaster management.

INTRODUCTION

The number of people affected by disasters grows at the annual rate of 6% since 1960 and this is mostly affecting large urbanized regions in developing countries (DIRDN, 1996). In parallel, research shows that reconstruction strategies need to be immediately improved (Lizarralde, 2002). However, these improvements do not seem to be easy to achieve. The design of reconstruction strategies is a complex process where a number of variables need to be assessed. Aspects directly related with the building industry, such as building technology, architectural design and technology transfer need to be taken into consideration (the “hard factors of reconstruction” after Lizarralde and Davidson, 2001). However, other aspects that appear invisible in the final project prove to be indispensable: education, information, tax incentives, financing, etc. (the “the soft factors of reconstruction”).

To articulate all these different factors, a careful organisational design is required. Research in project management shows that procurement has a direct influence on the general performance of the building process (Mohsini and Davidson, 1991, 1992, 1995; Abdel Meguid, 1997; Katsanis, 1998). In the case of post-disaster housing, we will see that organizational design also has a direct impact on performance, notably by increasing users’ access to resources and on their level of participation in decision-making. To illustrate the relationship between organizational design and performance of reconstruction projects it is obviously necessary to measure the performance of the project, therefore to evaluate it. I suggest here a method of evaluation and I use the case study of the reconstruction project developed by the Colombian Coffee Growers’ Organisations (CGOs) after the 1999 earthquake to illustrate it. Before explaining the Colombian case study let us see the method of evaluation proposed.

EVALUATION OF RECONSTRUCTION PROJECTS

One of the potentially most important methods to achieve improvements in reconstruction strategies is the post-project evaluation of projects (Davis, 1980), provided the information it generates is put in good use. However, existing approaches to the evaluation of projects are controversial among scholars and practitioners. According to Appasamy (1983), this controversy exists in the field of the evaluation of urban projects at two different levels: 1. The evaluation of the system vs. the evaluation of results, and 2. The evaluation based on qualitative methods vs. the evaluation based on quantitative methods. To reinterpret Appasamy, we can say that two aspects need to be clarified: *What to evaluate? and How to evaluate?*

Before answering these questions let me clarify first the type of evaluation I am concerned with. The method of evaluation I propose is:

- a. To be done when the project is finished and not to be done by the institution(s) that created it. For future reference, and following the term used by Zaouali (1994), we call it an “ex-post evaluation”.
- b. The evaluation of reconstruction *projects*, not the evaluation of reconstruction *programs*. According to Davidson (1998), a project is “a unique operation that has a start, a finish and a limited duration and a defined objective”.
- c. Not an evaluation of an institution. Even though this method of evaluation examines the role of a specific organization in a reconstruction project, management evaluation or auditing is out of the scope of this study.
- d. Not the evaluation of users’ satisfaction. Comments and opinions from users are *only* used as a reference to complement a general framework of discussion. Statistical generalizations of users’ satisfaction are not included.

1. Having made this clear, let me deal first with the first question, *what to evaluate?* Due to the complexity of the projects involved with international development (reconstruction is usually one of those), and the constraints in time and resources, evaluators “cannot evaluate everything” (Zaouali, 1994). Accordingly, The “Organisation for Economic Cooperation and Development (OECD) advocates that the evaluation requires “defining the questions that are to be answered” (OECD, 1992).

It could be said that evaluating a project corresponds to evaluating the product or service that the project developed (or attempted to develop). Then, the question to be answered could be: Was the product or serviced offered ‘good’? However, let me show you that evaluating the product or service says very little about the performance of the project at large. I will clarify this with a simple example of the evaluation of an imaginary project that attempted to improve the quality of the water that people drink. Responding to the fact that people use containers that pollute the water, the project attempted to produce and donate ceramic cups to improve the quality of water consumed by the users. Even if a large quantity of cups was produced (lets say 1,000), and the product was considered of “high performance” (according to certain indicators of cups performance, tested in the donor’s industry); the performance of the project was affected by aspects related to the process, not to the product itself. Here are some possible scenarios:

1. To produce the 1,000 cups, materials and human resources (the inputs) for the production of 1,200 cups were used. In this case the resources were not optimised.
2. Even though 1,000 cups were produced, the targeted production was 2,000 cups. In this case, only half of the targeted production was achieved with the available resources.
3. Users did need a cup but the cups were offered late when they had already produced their own improvised cups that pollute the water. Timing failed.
4. When considered of “high performance”, the cups were tested in a different environment. In the new environment, the particular use people make of cups make

them extremely fragile. In this case the quality of the product was not well adapted to the “new environment”.

5. The cups were offered to a certain group of users who do not drink in cups but prefer to use glasses; while the users that really needed the cups did not receive the cups offered.

6. Nobody really used the 1,000 cups. The users acquired the cups but in reality, due to certain cultural reasons, users continued using their old cups. In this case users did not accept the project.

7. Users already had ceramic cups at home, and therefore the new cups were not necessary. It was not a good idea to produce cups in the first place. It would have been better to produce, for example, water tanks to replace the non-appropriate tanks that people use and that also pollute the water.

8. The project attempted to produce 1,000 cups and in fact, 1,000 cups were produced. However, 100,000 people drink from containers that pollute the water. In this case only one percent of the users improve the quality of water consumed. In another example of the same difficulty, 1,000 cups were produced but only 400 were needed.

9. Using a proper cup does not improve the quality of water anyhow because the water comes already polluted.

10. The media, in order to attack the project for political reasons, gave negative advertising to the use of the new cups arguing that they modify the nutrients water normally provides. This caused that the users that needed and acquired the cups ended up breaking them to be sure they were not used.

These hypothetical examples show that not only aspects related to the product need to be examined. Also aspects related with the process prove to be crucial. The ten cases can be then translated into ten main aspects that need to be examined and, by analogy, ten corresponding questions that need to be answered in the evaluation of reconstruction projects:

1. Efficiency: were the local and external resources optimized?
2. Results: were the targeted outputs attained?
3. Timing: were the outputs available at the right time?
4. The quality of the product: Is the product good in the environment in which it is going to be used?
5. Pertinence: were the outputs available to the right people?
6. Acceptability: did the local community use the outputs/ services offered?
7. Strategy: did the outputs offered correspond to the needs of the population?
8. Scope: How much of the real needs was covered? Is that percentage satisfactory?
9. Impacts/objectives: Did the project reduce the vulnerabilities of the population?
10. External aspects: How did the environment affect the results of the project?

Please note that a similar list of variables is suggested by OECD: rationale, objectives accomplishment, impacts/effects, general results, viability, alternative solutions, and lessons (OCDE, 1992). In the same way, Zaouali suggests the

following 'levels': pertinence, efficiency, results, impacts and durability (Zaouali, 1994). However, the example of the cups has been specially adapted for our interest in reconstruction to show the aspects with which we are particularly concerned.

Finally, let me emphasize the answer to the first question: *The evaluation of a reconstruction project requires assessment of the following aspects: efficiency, results, timing, the quality of the product, pertinence, acceptability, strategy, scope, impacts/objectives and external aspects. Questions related to each of these aspects need to be assessed.*

2. Now, let us discuss the second question that arises when evaluating a project: *How to evaluate?* As I mentioned before, Appasamy (1983) discusses the long debate that exists among specialists regarding the two main tendencies of qualitative and quantitative research. This controversy is also discussed by Denzin and Lincoln (1994), Sellitz and colleagues (1977), and Patton (1983).

Cook and Reichardt (1979) have been particularly explicit in breaking the barrier in between these two methods and in describing the potential benefits of using qualitative and quantitative methods together. I will not discuss in detail this aspect, as there already exists a general consensus that advocates holistic evaluations that cover both of these aspects. In fact, institutions involved in international aid for development, such as OECD and the Canadian International Development Agency (CIDA), now combine qualitative and quantitative methods of evaluation. Once again I emphasize the answer to the second question: *The complexity of the evaluation of reconstruction projects requires the use of both qualitative and quantitative methods together.* Knowing 'what' and 'how' to evaluate, all we need now is an appropriate method to do it.

Suggested method of evaluation

As I said before, we require a combined evaluation of the process and the results. Aubry and Hivon (1994) suggest a method for the evaluation of international development projects in developing countries that measures different stages of the project in a timescale. The method, called "Cadre Logique" or "Logical Framework Method" (LFM), has been frequently used in environmental projects and is widely accepted by international aid institutions such as CIDA (1997).

The LFM, according to Pierre Aubry and Fernard Hivon (1994), evaluates the project at consecutive stages over time (figure 1). Founded on results-based management theory, it evaluates the project as an evolutionary process that goes from the resources used to the final long-term objectives of the initiatives. In this evaluation, not only are the objectives of the process measured but also the results and the transfer of technology are considered. It highlights the performance of the project in terms of the results for the community rather than being simply based on the products offered.

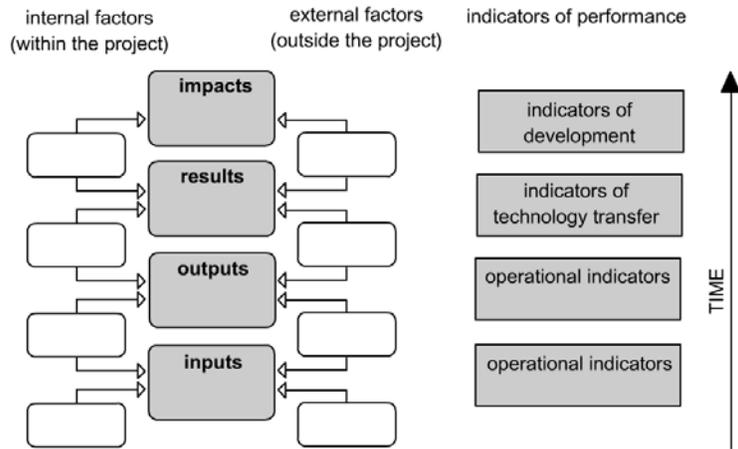


Figure 1: Diagram of the LFM. Based on the model proposed by Aubry and Hivon (1994). Contrasting with the model by Aubry and Hivon, in the model presented here the effects have been merged in the section called “impacts”.

The analysis of the system at these different levels is a very efficient method to evaluate development initiatives promoted by external institutions, particularly to evaluate post-disaster projects, where the timescale represents an important criterion of analysis (Lizarralde, 2002). This method combines ex-post evaluation and follow-up of the process. It evaluates the strategy, the project itself and the results obtained, not only by the institution, but also the ones obtained by the community, facilitating in this way later analyses of costs vs. results. Of course, qualitative and quantitative aspects are considered.

Some important definitions are necessary:

Inputs: the human, material and financial resources required to conduct the activities that permit the production of outputs (frequently measured by operational indicators).

Output: the situation originating from the articulation of inputs. It corresponds to the creation of a product or service before offering it to the targeted clients (frequently measured by operational indicators).

Result: the direct consequence for the user of acquiring a product or using a service offered or developed by the project (frequently measured by indicators of technology/education-transfer).

Impacts and effects: the indirect or later consequences for the user of using a product or service (or the situation originating from the project) in articulation with other initiatives at the long term (frequently measured by indicators of mid or long-term development). (Aubry, 1994).

External factors: represented by the center column in the diagram, are the ones that do not depend on the project’s decision-makers.

Internal factors: variables that modify the project and that depend on internal decision-makers (represented by the left column in the diagram).

In conclusion, what do we obtain from the LFM? The LFM facilitates responding to a given hypothesis OECD (1992). We obtain an organized way of answering the ten questions in a time-scale framework. Here we can see how the ten aspects that we attempt to evaluate fit, in fact, into the different stages of the process of evaluation:

At the level of inputs

1. Efficiency: were the local and external resources optimized?

At the level of outputs

2. Results: were the targeted outputs attained?

3. Timing: were the outputs available at the right time?

4. The quality of the product: Is the product 'good' in the environment it is going to be used?

At the level of results

5. Pertinence: were the outputs available to the right people?

6. Acceptability: did the local community use the outputs/ services offered?

At the level of impacts

7. Strategy: did the outputs as offered correspond to the needs of the population?

8. Scope: How much of the real needs was covered? Is that percentage satisfactory?

9. Ultimate objective: Did the project reduce the vulnerabilities of the population?

At the level of external factors

10. External aspects: How did the environment affect the results of the project?

But, how does one gather the information necessary to answer these ten questions?

A checklist of indicators of performance at each of the different levels of the LFM needs to be established by the evaluator in order to classify the information required to answer the ten questions.

A similar list of criteria for evaluation is also used by the World Bank in the evaluation of the sites and services project in Lusaka, Zambia. In the World Bank's list, the criteria are grouped in the following categories: project design, project organization, objectives and achievements, efficiency of the implementation, and impacts (Bamberger et al., 1982).

In the chart that I propose here (Table 1), the indicators (left column) lead to a summary of the obtained vs. targeted objectives (second column), the activities in a time scale (pre- and post-disaster – center column) and key comments (right column). Table 1 simulates a few examples to illustrate the way the chart might be filled up. The second column might be filled up with numbers, words (yes/no), or a rank level (e.g. low, medium, high, total), according to the way the indicator is measured. Different tones of shading in the time-scale represent higher or lower intensity in the correspondent activity (darker for higher intensity). Of course, higher

numbers do not necessarily mean better results, and the indicators are accompanied by a qualitative analysis. The questions are not answered by raw data but by correlations and analysis of the information obtained (through interpretation -if you like). This 'interpretation' should not be overshadowed by the pejorative connotation that some defenders of quantitative methods imply. In fact, it should be reinforced by Yin's approach in which the researcher seeks for patterns, which are then compared with broader experience and well-known antecedents (Yin, 1988). In other words, the ten questions will be likely answered *Yes* or *No* or *Yes but....* or *No but....* ("*but...*" referring to the interpretation supporting the answer).

THE 1999 COLOMBIAN RECONSTRUCTION PROJECT

Now that the evaluation method is, I hope, clear, I present here a case study to illustrate it. This case reports the post-disaster housing reconstruction project (PRP) developed by the National Coffee Growers' Organizations -CGOs - (the NGO responsible for the project) after the January 1999 earthquake in Colombia.

The earthquake (6.2 on the Richter scale) occurred close to the city of Armenia, leaving 1,171 confirmed deaths and 4,765 injuries. The quake struck one of the most important regions in the national economy –the coffee growing area- causing a decrease of 10 million dollars in exports in 1999 alone. For the reconstruction, the National Presidency created a National Fund (FOREC) and selected thirty-two NGOs to participate in housing reconstruction. Each NGO was assigned the reconstruction of a particular area or village. For the reconstruction of small villages (max. 20,000 inhabitants) and rural areas, the CGOs were selected. The CGOs are managed by a group of regional committees that have for a long time before the earthquake defended the interest of the guild at the national and international levels, including, among other responsibilities, political lobbying and international promotion through the National Federation and its brand "Café de Colombia". After the earthquake, the CGOs created another fund called FORECAFE using both the resources assigned by the FOREC fund and the funds available within the guild.

The CGOs form a guild and the coffee growers are indirect owners of the enterprise. Corruption and suspicion, common in several public institutions in Colombia, were almost totally avoided by using this community-owned NGO. With a budget of approx. US\$ 58 million, and an original organizational design, the CGOs project dealt with an ambitious agenda that included seven main outputs: (i) provision of funding in the form of loans and subsidies; (ii) housing (provided, self-help and combined); (iii) industry structures (beneficiaderos - small-scale infrastructure used for the coffee industry); (iv) infrastructure recovery; (v) community services (schools, churches, health centres); (vi) information and (vii) education and technical assistance. Complementary outputs included, among others, a census of the affected population, provision of tents, provision of food and temporary infrastructure.

The project attempted to meld the two most commonly used paradigmatic approaches to reconstruction; namely the community-based approach and the technology-based approach. In this way, and complementing the self-help construction part of the project, great efforts were made to offer prefabricated houses that respected the traditional typologies of the region. Figure 2 shows the plan and façade of the prefabricated prototype 1 promoted by the CGOs, compared with two vernacular dwellings that represent the typology in which most residents lived and upon which the self-help component was oriented.

For the users, the process to rebuild their own projects (house, infrastructure or other) after being registered in the census of affected families was: **a.** fill a one-page form and include a picture of the affected building to apply for a loan and/or subsidy (a maximum of US\$ 5,000 for the two); **b.** upon acceptance and receipt of the first 25%, present a simple plan and budget for approval; **c.** upon acceptance and receipt of the 50%, proceed with the construction (self help, hired labour, buy a house, mixed, etc); **d.** upon verification by specialists (engineers) the remaining 25 % was allocated; **e.** liquidation of the project and monthly payments of the loan.

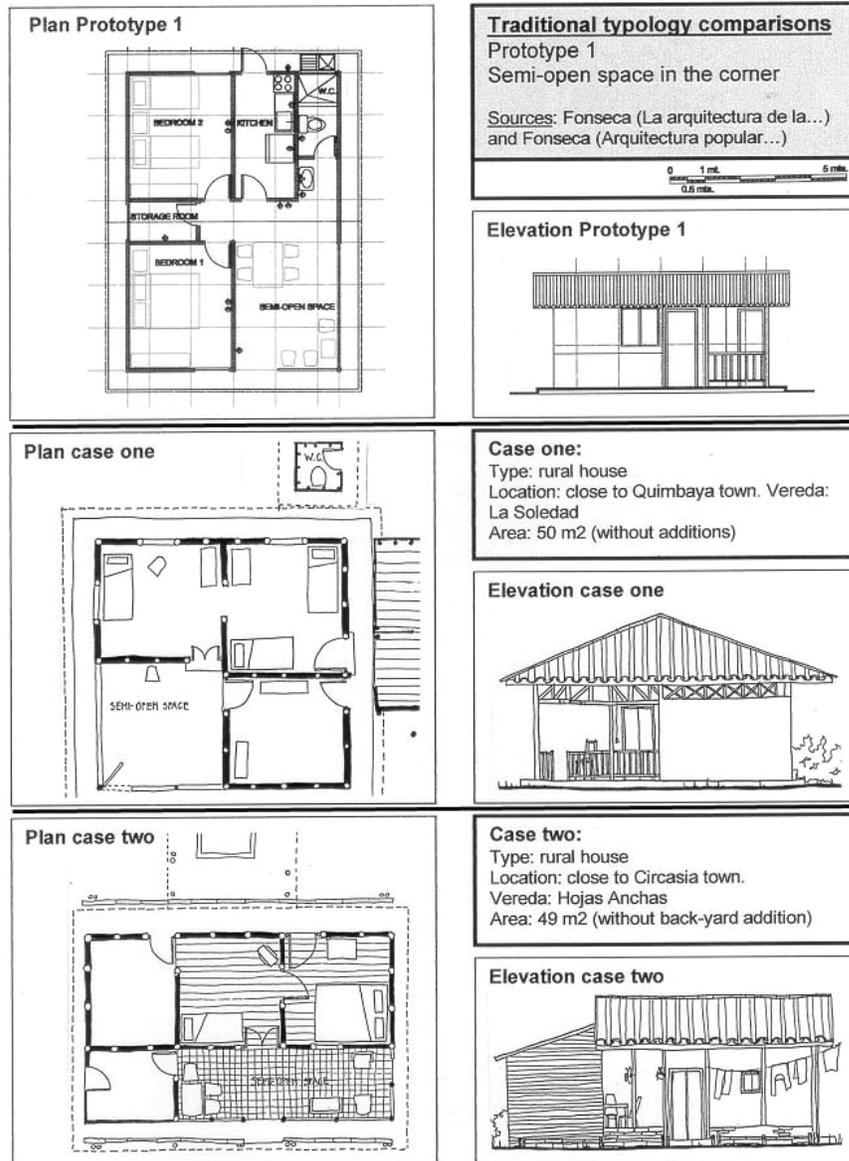


Figure 2: Prototype pre-fab unit compared with traditional typologies. Note the similarities between the layout and façade of the prefabricated prototype and the traditional dwellings. Also the area and some aesthetic characteristics of the prototype (such as colours and balustrades) attempted to match the ones used in vernacular architecture. All the drawings are at the same scale.

Organisational design

To deal with this ambitious agenda, a careful organizational design was chosen by the CGOs. This organizational designed attempted to permit beneficiaries to gain access to the 'hard' and 'soft' resources that were developed and made available through the combined work of local and external organizations. To illustrate the

articulation of all these variables, two models are used here; the first one refers to the main reconstruction outputs and the second one to the accompanying outputs.

The first model (figure 3) illustrates the relationships between institutions, processes, outputs and beneficiaries. This model is particularly useful for understanding the relations between the various outputs obtained by the project.

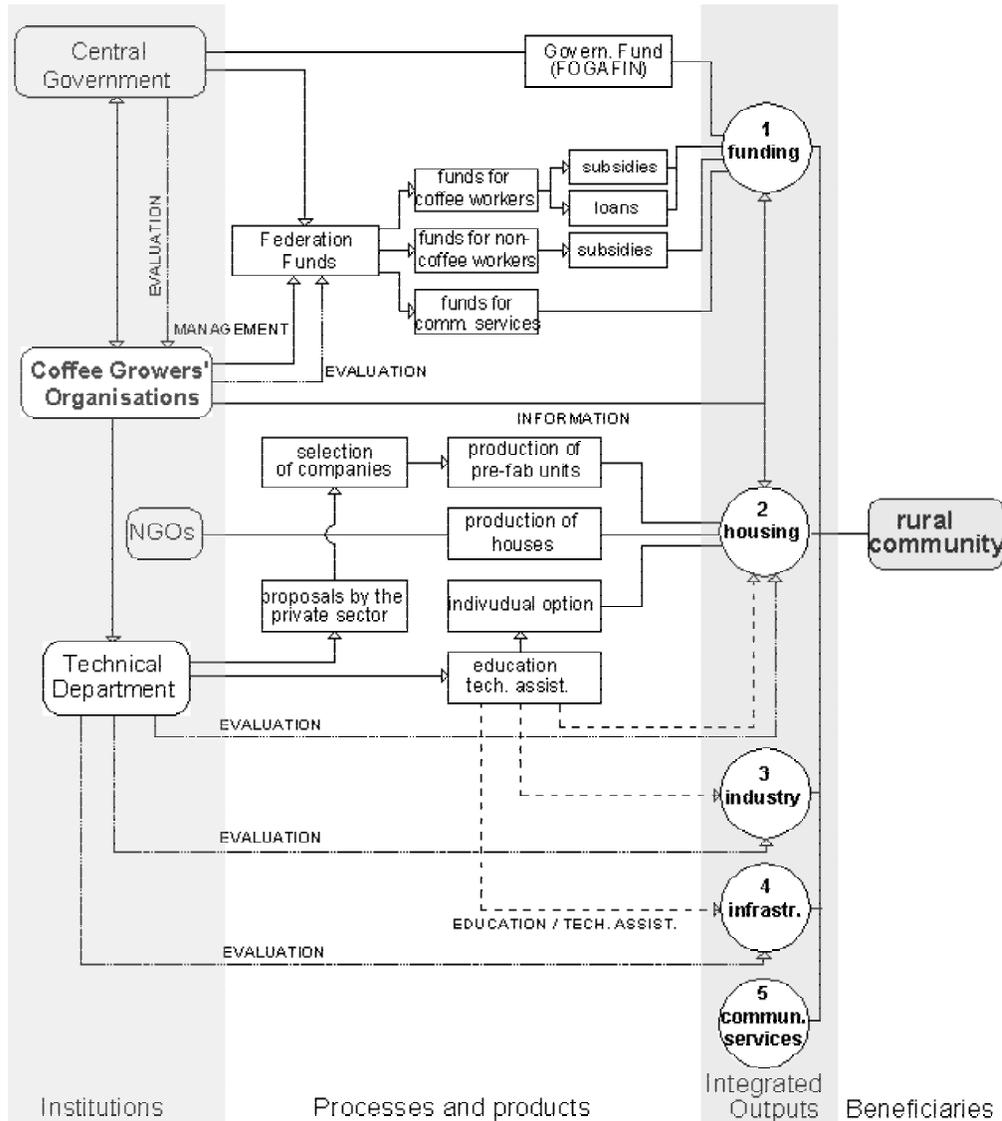


Figure 3: Model or analysis of the organizational design. The model shows that the CGOs simultaneously developed different processes targeted to provide five main integrated outputs supported by “soft” ones (information, evaluation and technical assistance illustrated in different arrows). Several options were offered in both funding and housing; an activity of evaluation supported each of the processes.

The second model (figure 4) illustrates the relations between external organizations, local institutions and beneficiaries developing other accompanying outputs during the first stages of the project. This model facilitates understanding the articulation of local and external resources, and the administrative means used to offer or promote the resources among the beneficiaries.

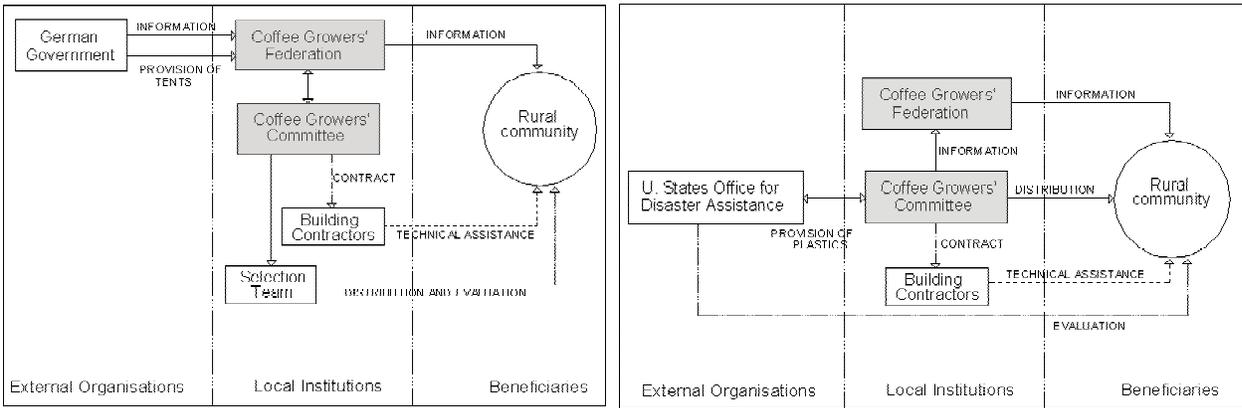


Figure 4: Models of analysis for the provision of tents (left) and temporary shelters (right). The models show that rather than working individually, the CGOs articulated a network of local and external institutions to provide alternative services to the beneficiaries. Information, technical assistance and evaluation complemented the CGOs' relations with the other institutions. Other services offered through this system included distribution of food and temporary repair of infrastructure.



Figure 5: Pictures of the projects built **Left:** house rebuilt with the CGOs reconstruction program. In this case, a tenant family that works on a farm benefited from the money given to the landowner. Even though some labour force was hired, the tenants cooperated in re-building the house. Also a 20 sq. mt. extension was built in the back. **Right:** a coffee-industry related project called "beneficiadero" was built with the funds provided by the CGOs.

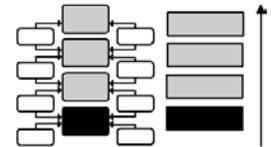
The method of evaluation applied to the CGOs' reconstruction project

(See the list of indicators of performance established for the Colombian case study Table 2).

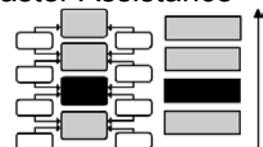
The table shows the active participation of the CGOs before and after the disaster in several activities, not necessarily considered as "hard factors of reconstruction". By including several indicators of infrastructure, community services, institutional building, etc, this checklist has been specially adapted for the analysis of both urban and rural housing projects. Different alternatives were offered and the results are synthesised in the table. Please note that the checklist shows not only aspects that were included in the project, also, and for the reference of the evaluator, it shows aspects omitted in the project (or from which information was not available).

I summarize below the main aspects of the evaluation of the project. Note that not all the aspects studied are included, only the ones necessary to develop the argument of the paper (for a complete reference of the CGOs project refer to Lizarralde, 2001).

At the level of inputs



1. Efficiency: were the local and external resources optimized? Yes. Here the following six aspects are compared with the results obtained: the local resources, external resources and developed tools used, the organisation itself, its contract (mandate), and the environment. The community was used as an important resource for reconstruction. The normal economic activity of the region, namely the coffee industry, already requires strong community interactions. This aspect facilitated the creation of community-based coping strategies after the disaster. In fact, during the interviews, some residents declared that neighbours, relatives and friends helped them to rebuild their houses. The other main resource was obviously the CGOs that have many years of logistical experience and have been working with the rural community for a long time. The CGOs knew who they were working for, their needs, their particular culture, their occupations, etc. A very well-optimised resource was the partnership established by the CGOs with financial entities, public institutions, emergency aid institutions, foreign Governments, and private companies. Forty-six percent of the National Government's disaster relief budget came from loans given by the World Bank (WB). According to the representation of the WB in Colombia, the institutional model adopted was innovative, allowing different NGOs to participate in a decentralised system that brought more participation by the citizens. The United Nations' World Food Program and the United States Office for Disaster Assistance



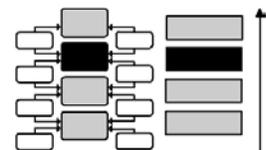
(OFDA) applauded the results of the cooperation and partnerships established with local organizations.

At the level of outputs

2. Results: were the targeted outputs attained? Yes. After one year, close to 80 % of the funds were already given to victims for industry and housing reconstruction, and the reconstruction of community services was beginning. This is an impressive investment in areas previously affected by a dramatic economic recession and high unemployment. Note in the checklist (Table 2) that the provision of some products and services (such as lots, materials, and medicines), that have been offered in other reconstruction projects reported in literature, were not included in the CGOs' project. On the contrary, information and technical assistance were translated into effective programs of publication of technical manuals, direct consulting, information in newspapers, etc.

3. Timing: were the outputs available at the right time? Yes. During the first 10 months of reconstruction, 14,138 building projects were finished, leaving just 3,164 still to be completed. Completing an average of 50 projects daily, 8,163 houses were rebuilt, 3,844 projects related to the coffee industry were developed, and 2,131 other projects related to infrastructure and other needs were finished (Actualidad Cafetera, 1999).

4. The quality of the product: Is the product good in the environment it is going to be used? Yes *but...* The pre-fab houses were largely promoted and offered at modest prices (US\$ 5,000), promoting at the same time the participation of both local and external companies. However, very few finished pre-fab houses were sold. Examination of the program demonstrated that the notions of 'going to buy a house' or 'buying a house by catalogue' do not exist in the community. In reality, dwellings are built in a long-term process, and are extended and improved as the resources improve or as the family's requirements change. The pre-fab housing program included a real-model housing exhibition that worked as a "show room" (show-village) for seventeen construction companies selected by the CGOs as a way to market their products among the community. Showing a great variety of technologies, this exhibition was successful in two unexpected ways: First, it served as an open market to buy building components (windows, doors, modular roof tiles, etc.) rather than complete homes. Secondly, it was a useful educational medium for the peasants who visited the models and then copied the layouts and earthquake-resistant construction details.



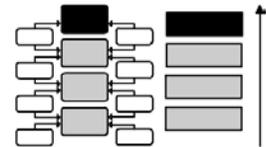
At the level of results

5. Pertinence: were the outputs available to the right people? Yes *but...* The project was positively influenced by the fact that it was targeted to landowners. Yet it was

not necessary to include relocation of residents, many tenant families indirectly benefited from loans allocated to their landlords.

6. Acceptability: did the local community use the outputs/ services offered? Yes. According to the CGOs, nearly 10,000 jobs were created during the PRP process. At the same time, self-help construction became a self-employment activity for householders between the coffee harvesting seasons (Actualidad Cafetera, 1999). Most of the residents not only repaired the damaged houses but also rebuilt their so-called "beneficiaderos". The residents also added their own resources and used the opportunity to make improvements to their dwellings.

Residents were entirely responsible for their own house and external decision-makers were not responsible for the provision of housing. Survivors responded to the responsibility of choosing the most appropriate solution for each particular case from a 'package' of alternatives offered. These alternatives attempted to satisfy a great variety of needs and expectations and guaranteed the total satisfaction of the user as the residents built what they needed and when they wanted it. Note here that community participation (as suggested by Roesch Da Silva, 1980) was evaluated not only at the level of construction activities, but also at the level of design, management, financing, construction of components and decision-making (for an extended argument about this decision see Lizarralde 2002)



At the level of impacts

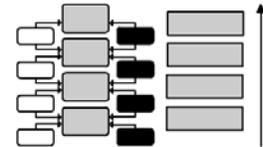
7. Strategy: did the outputs offered correspond to the needs of the population? Yes *but...*A closer analysis of the case study shows that in spite of the failure in selling finished units, the pre-fab technology cannot be excluded as an alternative, at two different levels. First, well-conceived pre-fab houses, as offered in this project, are an affordable alternative for families that cannot or do not want to opt for self-help construction or that are not willing to hire constructors to work with traditional technologies (i.e. bahareque, guadua, masonry). Second, the acceptance of modular construction components in the region could represent a potential market for pre-fab companies.

The CGOs did more than build houses. The CGOs gained the people's confidence after working on badly needed parallel projects of emergency response and infrastructure (sewage systems, temporary electricity, construction of roads, distribution of food, etc).

8. Scope: How much of the real needs was covered? Is that percentage satisfactory? 100%, Yes *but...*More than 43,000 houses were affected by the earthquake nationwide. 10000 families benefited from the project. According to the census conducted by the CGOs, the total of projects attempted in the rural areas and small villages was completed. Illegal settlements (most of them in risk prone

areas) were not properly included in the projects and a slow redevelopment process was reported.

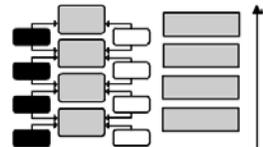
9. Ultimate objective: Did the project reduce the vulnerabilities of the population?
Yes. As explained elsewhere (Lizarralde, 2002) the reduction of vulnerabilities is a dependent factor of the improvement of access to resources ('hard' and 'soft' ones). With a strategy that permitted active individual decision making, the reconstruction has not only mitigated the effects of the disaster, but it has also improved the quality of life of numerous families, reducing residents' vulnerability to future natural hazards and yielding accepted and desirable construction forms and technologies. Normal activities were recovered eighteen months after the disaster.



At the level of external factors

10. External aspects: How did the environment affect the results of the project?

Despite the recovery of the coffee growing infrastructure and the efficient introduction of resources by the CGOs, several external aspects limited the economic recovery in the region. Some of those aspects were: the unfavourable weather conditions that affected the coffee harvests, the relatively slower reconstruction process in the main urban centres, the general economic recession, reduction of exports and increasing unemployment in the country, and the change of the Colombian housing financing policy that stopped the offer of loans by the financial sector (Actualidad Cafetera, 1999).



At the level of internal factors

Continuity in both the organisational structure and the internal policies, and a simplified process for the user, with a strict but easy-to-manage control, facilitated the delivery of services and outputs in a short time and minimized the administrative costs.

LESSONS TO BE LEARNT

The success of the CGOs' project was achieved with an organizational design that:

(i) articulated technical aspects of reconstruction ('hard' factors) with other factors less related with traditional building practice ('soft' factors); and (ii) articulated external and local resources to offer multiplicity of choice and gave to residents the responsibility for active decision-making. More cases are still required to draw analytical generalizations about the relationship between the organizational structure of a reconstruction project and its performance. However, evidence from the CGOs'

project already suggests the importance that the organizational design of the project has in the following aspects: efficiency, results, timing, quality of the product(s), pertinence, acceptability, strategy, scope and impacts/objectives.

The method of evaluation proposed here bridges several of the difficulties frequently encountered in the evaluation of projects. The method bridges the gap between qualitative and quantitative evaluation by giving a more adaptable and holistic approach to evaluation. The LFM, accompanied by judiciously selected indicators of performance, has also bridged the gap between evaluation of the system and evaluation of results by giving a time frame reference to measure the effectiveness of the project at different stages.

Further research

Further research is needed to examine more case studies in order to test the method suggested here. Also a way of validating the results obtained from the evaluation needs to be developed (or adapted) for each particular case of reconstruction projects.

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