

# IMPACT ANALYSIS

## INTRODUCTION

Since 2013, Bambú Social has been sharing knowledge and expertise about the use of local resources for sustainable and affordable social housing, aiming to get one step closer to a solution for the housing problem in Nicaragua. Until now, this resulted in eleven sub-projects who all contribute to this main goal.

The involvement of the locals, students and experts who were working with Bambú Social and the transition of this involvement to other people is essential for the success of the project. Not only on local and national, but also on international level, great effort is done to keep people involved in the project. Simultaneously, Bambú Social is looking for ways to continue delivering to their main goal.

For the continuation of Bambú Social in the coming years, it is important to know what the social impact has been until now. Therefore, the impact of Bambú Social will be discussed in this analysis.

Stimulating the acceptance of bamboo as a construction material is the first step in the direction of the goal. *"We want to share knowledge with locals and stimulate the acceptance of bamboo as a construction material"*. Therefore, it is also important to analyse the current image of bamboo (as a construction material).

We've organised an introduction meeting where opinions of involved people were captured, followed by some interviews with the municipality and bamboo experts. During the home visits the people of El Rama shared their opinion about the project Bambú Social and about bamboo as a construction material.

With the gathered information, we looked for ways Bambú Social could continue living up to this goal. By focusing on how to do this, this analysis concludes in implementation suggestions.

## AWARENESS OF BAMBÚ SOCIAL

The exchange of knowledge and expertise with local craftsmen and students has been a main objective of Bambú Social. They also involved public (municipality, BICU, UCA) and private entities and many other citizens (future beneficiaries). The construction of the model house was one of the eleven projects done in 2014. By the help of many people that participated in the project they delivered to the result either passively or actively.

### **The eleven projects of Bambú Social in 2014 were:**

1. Organise WORKSHOPS AND LECTURES with the community of El Rama and local farmers to promote sustainable construction, the use of bamboo as a construction material.
2. Design a MODEL HOUSE of bamboo in collaboration with the local community.
3. Develop and integrate of a DECENTRALIZED WATER COLLECTION AND PURIFICATION SYSTEM in collaboration with blueEnergy.
4. Set up a BAMBOO INFRASTRUCTURE for cutting, treating, cleaning and transporting.
5. Constructing the MODEL HOUSE with local craftsmen and students.
6. Design and develop a PERMACULTURE GARDEN in collaboration with students from BICU.
7. Organise the COURSE 'CONSTRUCCIÓN SOSTENIBLE' in collaboration with the BICU with local students and craftsmen.
8. Facilitate the COURSE 'ARTESANIA CON BAMBÚ', initiated by the municipality for the community of Esperanza.
9. Develop BAMBOO WASTEBINS for the community of El Rama.
10. Design a SOCIAL HOUSE as a more affordable version of the model house.
11. Guide FURTHER DEVELOPMENT OF BAMBOO STRUCTURES in collaboration by the Universidad Centroamericana.

Great effort has been made and an important element has been injected in El Rama: the construction material bamboo has been re-invented and new building techniques discovered. Now, the question arises what has become of the activities after the team of Bambú Social left Nicaragua. What has become of the impact of Bambú Social and the aim to create and share knowledge of bamboo construction? In this analysis we've focused on two visible projects: the model house (point 2 and 5) and the recycle waste bins (point 9).

## MODEL HOUSE

A contract has been signed by the BICU and the municipality which describes the parameters for the freedom. The function of the model house has to be public and thus open for visitors. Until November 2015 the house has functioned as a university library. Recently, the BICU choose to change its function, as the inner climate of the house was too humid for the books (Constructional Analysis). Also the library was not visited often anymore and the computers with internet not used as much as before, stated the librarian.

During our time in El Rama we found the house often closed-off and we had to contact the principal to open up the house. We doubt the accessibility and the public function of the house which may have affected the social impact.

During the home visits, families were asked whether they know the model house. The existence is evident in El Rama. We concluded that a great majority of the people interviewed, at least knew of the existence of the model house next to the local university, the BICU.

*¿Conoce la casa de Bambú Social? → graphic*

However, none of the interviewed people entered the house. This is due to the fact that they do not know the house has a public function and is open for visitors.

*Graphhh*

The officials of the municipality explained during the introduction meeting, that one of the unforeseen impacts on the community was that the model has been a local curiosity. Via multiple information and communication channels the construction and existence of the house has been spread. They also explained that foreigners (from outside El Rama) came to visit the house.

There appears to be a missing link between the target group's families and the model house. Whether this has to do with the implementation, the function of the building, or the appearance, is something we cannot draw any conclusions of. Apparently, the model house is not accessible for the local families. This must absolutely not result in that bamboo housing in general doesn't lie within their reach.

### **"BAMBÚ RECICLA"**

Another project conducted by Bambú Social was the design of a recycle wastebin made of bamboo as a result of the recycling campaign being undertaken by the municipality of El Rama. The task to produce fifty recycle bamboo wastebins was appointed to Don Samuel, a local craftsman who has spent many years working with bamboo and has a technical bamboo certificate. Contrary to expectations after two years only thirteen of those wastebins have been finished, due to a mistake in the estimated budget (Samuel, 2015), (Balmaceda, 2015).

However, unlike the model house, these wastebins are distributed throughout the community. Some of them are located in popular areas such as the local municipality, the BICU campus, the Central Park, etc. allowing people to, literally, get in touch with bamboo.

"People have to touch bamboo" explains Ines Ortega. As we concluded from the introduction meeting, having real life contact by touching bamboo contributes to its image and its possible potentials as a building material. Not only to the image of bamboo has improved but also the awareness of Bambú Social.

### **Environmental impact**

The impact of all these projects isn't only limited to a social conscience, but also consists of an environmental aspects. We believe that the model house and the wastebins have a positive impact on the environment of El Rama, thanks to their functionality.

In the model house, the used water is cleaned by the 'Bananeras' and re-used for irrigation (pg...CSTR). And, as said during the introduction meeting, people really use the recycle wastebins. This motivates the people of El Rama to contribute to a cleaner city and recycling.

## IMAGE OF BAMBOO

In the projects, bamboo has been (re-)introduced as a construction material. The (general) image of bamboo is a crucial factor for the project.

The tradition to construct with natural materials (like bamboo) has been lost over the years. Michael Campbell, representative of CEDEHCA (pg. ....CNT) explained that this has to do with the foreign influences that affected the construction culture and mind-set about using local resources, which has had a major effect on the image of bamboo.

"Nowadays bamboo is seen as a material for the poor", said Javier Balmaceda corroborated by many else. Bamboo is used to cover houses or sheds. The rest of the houses often exist of wooden poles, zinc sheets and plastic (Social Analysis). It is very clear that these people do not know of the benefits of bamboo. We can state that bamboo is often times neglected as a construction material but as a cheap alternative to provide some privacy.

*How is bamboo being used now? – examples Barrio Nuevo.*

INTA (Instituto Nicaragüense Tecnología Agropecuaria), the farm at El Recreo, is currently exporting bamboo to Masaya, a city in Nicaragua, where a lot of handcraft is made of bamboo. "In Nicaragua only certain sectors of the economy fully realise the usefulness of bamboo. The foreigners who voice the appreciation of the material and are expressing their willingness to buy crafts made from bamboo" said Don Samuel.

Attitude does change among the society, for example with an external push like EcoPlanet Bamboo. This is a worldwide organisation that recently has invested extensively in the bamboo industry (pg...CONTINUATION). They own a bamboo farm stretching from El Rama along the river to La Fonseca (1100 acres). The social impact is hard to calculate because we do not know anything about their social impact and involvement of local expertise and labour. But it seems that the appearance of this bamboo company contributes to the local image of bamboo by showing the potential of the material.

The image of bamboo changed among other parties in the project, from the administrative part at the mayor's office (municipality) to the eventual beneficiaries. In fact, the local municipality has made plans to exploit bamboo as a tourist attraction; they also want to distinguish a trademark identifying El Rama as a bamboo city. "We think that bamboo can be a trademark because it is native from the area which is not the case in other municipalities in Nicaragua", affirmed the director of urban planning in El Rama, Javier Balmaceda.

## ACCEPTANCE OF BAMBOO AS A CONSTRUCTION MATERIAL

To get an idea of the acceptance of bamboo as construction material we combined both current situations of local families as the vision of a representative of the UCA. Concluding from this, we came up with suggestions that might contribute to the image of bamboo.

### Local families

During fifty home visits, the current housing situation and dream houses of the local families were investigated for the Social Analysis. Also the opinion about bamboo as a material for the house and the constructed model house were asked.

*¿Se imagina que la casa de sus sueños fuera de bambú? → graph*

*¿Cree que podría vivir en una casa como esta? → graph*

A clear majority of the survey respondents smiles when they think about living in a bamboo house, but they do not bring it up themselves. "That could be beautiful, very beautiful!" said Lina, like most other respondents who have seen the model house before (76%). Compared to the people that didn't know about the model house or never heard of Bambú Social before, who more often disliked the material.

"What I like about bamboo? It looks pretty, and I think it is really fresh." But also, like many others, Lina thinks the process of curing bamboo is difficult and expensive. "It must be for a reason that so many bamboo houses rot away fast..." Most bamboo that is used as a construction material in Nicaragua is untreated, and thus, falls apart easily within a few years. For that reason, people like Lina are not fully convinced yet about the advantages of bamboo and the material is seen as a fall-back solution for the poorest.

But even though 25% of the respondents state that they don't have a really high impression of bamboo as a construction material, 83% does imagine their dream house be built out of bamboo, and 97% said they could live in a bamboo house.

Most often heard positive aspects: "economical advantage", "more beautiful than wood", "it's durable, it doesn't seem to deteriorate", "fresh, comfortable and affordable". And the negative aspect: "seems expensive", "difficult process".

### Universidad Centroamericana

During an urbanism project of the UCA in El Rama, students and urbanism lecturer Emma Grun had the opportunity to visit the model house. "The model house is aesthetically beautiful, structurally strong and very thought thorough with details", stated Emma.

In Emma's courses about urbanism, there is a focus on sustainability and mitigating environmental risks, e.g. to reduce the extraction of fossil fuels and CO<sub>2</sub> emission by lowering the energy consumption. "We must find a balance in the use of renewable natural resources. This implies that we must radically change our methods of design and construction; from the choice of materials to the amount of waste and lack of reuse." Students do get educated about the use of alternative materials. Emma thinks bamboo is one of

many alternative materials that must be explored in the region, and is proven itself on structural strength and architectural quality.

At the moment the UCA does not have a study specialisation or specified courses in which students learn about bamboo as a construction material, yet. Students do have the opportunity to specialise through internships and their thesis.

## IMPLEMENTATION SUGGESTIONS

We can state that Bambú Social gave an enormous boost to the awareness of bamboo inside and outside of El Rama. A few examples are the involvement of local craftsmen and students and the UCA in Managua and the sudden interest of the municipality in the exploitation of bamboo as a touristic attraction.

As stated before, the success depends on long term processes like constructional continuity and research continuity (source Projectplan Bambú Social 2.0). Based on the brief impact analysis, we can conclude that there is a significant awareness of Bambú Social. At this point the image of bamboo and especially the opinion of the local families about bamboo as a construction material need to be focused on.

To do this, we distinguished four groups which Bambú Social should involve. The bullets conclude in implementation suggestions.

## FOUR GROUPS OF FOCUS

### **Target group**

To improve the image of bamboo, families have to be convinced of the reliability and durability that bamboo could have. After all, they are the future beneficiaries. For them the benefits of using bamboo should be clear and there needs to be a demand for housing. If this is not the case, the construction and implementation of bamboo houses will not have a prolonged effect.

In most interviews, the families told us about their precarious housing situation and their wish for maintenance, expansion or a new house. During the home visits, the interviewees were very positive about the appearance of the bamboo house. However, direct contact between well-constructed bamboo and the families is missing. The most essential concern for the target group is to (literally) get in touch with bamboo; this will promote its image.

According to the introduction meeting it will contribute to the demand if people see a family living in a bamboo house. Also organising meetings in which the families get actively invited will promote bamboo as a construction material. By sharing information and feeling welcome, we believe that the families will feel involved in the project and will be open to bamboo housing.

Also, the effect of distributed, minor projects (like the bamboo wastebins) also seems to have effect to the image of bamboo.

- Organise meetings with local families to promote bamboo
- Invest in minor projects

### **Local craftsmen and entrepreneurs**

If the families are convinced and interested in constructing with bamboo, knowledge must be available and distributed among the people. Information about bamboo (how to cut it, treat it and prepare it for construction) must be available. Bambú Social is working on a construction manual explaining how to construct a bamboo house. If this manual is accessible for the target group it seems to us a solution for approachable bamboo construction.

After all, to promote the bamboo image, more bamboo constructions have to be built and therefore the craftsmen must know how to construct with bamboo, explained Lester Antonio Bermúdez a local craftsman. In this process of sharing information started by Bambú Social, craftsmen are closely involved by exchange experience and knowledge, to create applicable techniques.

By outsourcing the bamboo techniques and by making prefabricated (prefab) construction elements, the barrier of knowledge transfer gets reduced to the craftsmen. This way, local bamboo experts are created and bamboo construction can get more accessible for the families. These craftsmen can become entrepreneurs who set up (local) companies that for example produce prefab bamboo elements. In the business plan Bambú Bueno more entrepreneurial opportunities are describe (... CNT). Specialisation also has a positive effect on the working hours and thus the price of the elements. As it adds to the image and accessibility of bamboo, Bambú Social can support these kinds of initiatives.

- Share education about bamboo construction
- Support local bamboo companies

### **Students**

We must be aware of the fact that the target group's families often do not have resources to cover their basic needs. There are families dependent of national or international housing projects as described in the Social Analysis. In these projects, which are centrally tendered, architects are involved.

Architecture and engineering students are the designers and builders of the future. For bamboo to be a country's next standard construction material, students have to get educated and gain experience of the use of bamboo. Bambú Social could help and promote the process of including the bamboo courses in the architecture and civil engineering curriculum. Besides this, the involvement of students through internships and theses, contributes to both experience and knowledge of the students and of Bambú Social.

- Promote bamboo courses at universities
- Organise internships and thesis projects

### **Bamboo suppliers, clients and entrepreneurs**

All over the world bamboo is an upcoming material. The beneficial characteristics of bamboo are being discovered and new techniques for this multi-functional material are explored every day. The environmental revolution also has influence on entities and results in greater investments of renewable natural resources (Online, 2015).

Bambú Social can use this positive development to anticipate on local as international initiatives. There are projects throughout the country who want to invest in the use of natural resources, for example a national organisation CEDEHCA. This could be a way to promote and improve the image of bamboo.

If Bambú Social wants to anticipate on these kinds of projects, there has to be a bamboo supplier. Also for housing projects, a functioning bamboo infrastructure is necessary.

Bambú Social does not have to set up this infrastructure itself, but can collaborate with (local) bamboo farms to supply bamboo for future projects. This is possible through local farm owners and with international invested farms, like EcoPlanet Bamboo.

Not only suppliers, but also constructors are necessary for housing projects. A construction infrastructure is needed which includes a prefab bamboo companies (mentioned in Local craftsmen and entrepreneurs). It is important that these companies match the scope of tendered projects. Bambú Social can support these (local) companies during the process of up scaling and upgrading.

- Anticipate on future projects
- Collaborate with (local) bamboo suppliers
- Collaborate and support (local) prefab bamboo companies

## CONCLUSION

As suggested before to improve impact of the project, Bambú Social should focus on four groups:

- Families of the target group
- Local craftsmen and entrepreneurs
- Students
- Bamboo suppliers, clients and entrepreneurs

By involving these parties as described above, the process of up scaling and upgrading can improve and will contribute to the success of the project. So it is important that this is continuous during the whole project. Therefore these groups must be involved in every step of the project. We call this direct implementation.

## To be continued

With this analysis the evaluation part is concluded with implementation suggestions. Together with the constructional and functional design suggestions, we can continue with the direct implementation. In the next chapters will be described how we did this and how this could be continued.