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Project Report

Integration between poly-culture and chickens

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Project 2: Integration between poly-culture and chickens

Work team

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1. Background

1. Background information

Boa Vista do Acará is a riverine community in Pará, Brazil. Pre-summit engagements were done to identify project-based solutions within the community in Boa Vista and ABOPV focused on factors to support the livelihood. The associates highlighted chicken farming several times during the session due to a lack of knowledge in husbandry, which is crucial for self-reliance. Coxinhas (or unhas), a popular local recipe, are prepared with egg and chicken meat and served fried all around Belém.

According to Permaculture approach, it is important to establish symbiosis between elements we manage on our environment and chicken (and other domestic animals) can offer far more in their relationship with the environment than only serving with eggs and meat. They play a major role in enhancing sustainable production of nutritious food at the household level. The workgroup will work on integrated vegetable and poultry production techniques on a systematic layer to support egg production and chicken husbandry as well as the utilization of chicken droppings. Besides, this group will also make a connection to integrate this system with an aquaculture project that is going to be developed with another stakeholder. This connection will help build skills and options for the community.

The workgroup aimed at finishing the whole design and project process within the length of the IDDS summit. We also explored alternatives of this venture to allow stakeholders to exhaust all low cost options that are available at their disposal to carry this kind of project out.

2. Project goal statement

Boa Vista do Acará's inhabitants obtain most of the vegetables and meat from Belém – in the region they grow cassava, aromatic plants and extract several product from perennial trees in the forest, especially fruits. The attempt to build a food forest at APOBV in March ended up not successful. On the other hand, there is great interest in the production of vegetables and on its integration with chicken in order to provide food for the families and for selling. This project aims to design an integrated production system of vegetables and kitchens that has low monetary cost of implementation and maintenance, promotes APOBV's strengthening, provides a diverse and constant production, preserve and regenerate forest areas and brings a peaceful life with more quality to the stakeholders.

3. Ecological Design Process

This project's proposal is based on IDDS and Ecological Design Process and considers Permaculture's ethics and design principles. The workgroup had the opportunity to develop a proposal in a collective way, working with our stakeholder and designing a prototype that considered the local context. One of our main goals was to use tools, materials, plants, animals and knowledge that are already there. We proposed the following approach:

a) **Understanding the needs / Goals Articulation**: what we knew, by the beginning of the summit, is that our stakeholder was willing to grow edible vegetables and raise chickens at his land. Besides, we also identified that several families from APOBV intent to have an integrated system in their lands.

b) **Info Gathering & Synthesis / Site Analysis**: during this phase, we interviewed our stakeholder and other people from the Boa Vista do Acará to gather information regarding:

- How they have grown edible plants.
- Which plants they have grown and which ones they are interested in growing.
- How they have raised chickens.
- What characteristics their lands have.
- What kind of sustainable resources are easily available.
- How much time they can devote to farming and raising chickens.
- What the biggest problems/difficulties regarding farming and raising chickens are.
- How they think we can integrate chickens, farming, and fish farming?

Besides, we proceeded with the site analysis, which is one of the first steps in Ecological Design Process. The idea here was to phenomenologically observe the area where we would work and create base maps with information about:

- Climate and weather (precipitation, winds, temperature, etc.)
- Water flows and sources.
- Landscape.
- Sun.
- Existing fauna and flora.

3) **Idea Generation / Design**: the participants designed a modular system that follows the objectives we presented and is supported by permaculture's ethics and design principles. That means the prototype tried to:

- Integrate poultry and vegetable considering the needs, intrinsic characteristics, functions and behavior of every element.
- Look for plant species that are adapted to the local context and from different sizes.
- Be easily handled and not demand daily care.
- Not use chemical and toxic substances.
- Establish connections with fish farming.
- Use available renewable materials and resources from the surroundings.
- Be replicable at other people's house and at APOBV's land.

4) **Build / Implementation**: the proposal was to prototype plant patches integrated with poultry production. Once we had 4 days to design and implement out proposal, we built a small module of this system. Still, we came up with design proposals for the system over time.

5) **Test / Evaluation**: we did not fully test and evaluate our complete prototype during IDDS, but we used the feedback we got from the Food Forest Workshop to design our prototype.

Below, we present a summary of this process (Figure 1):

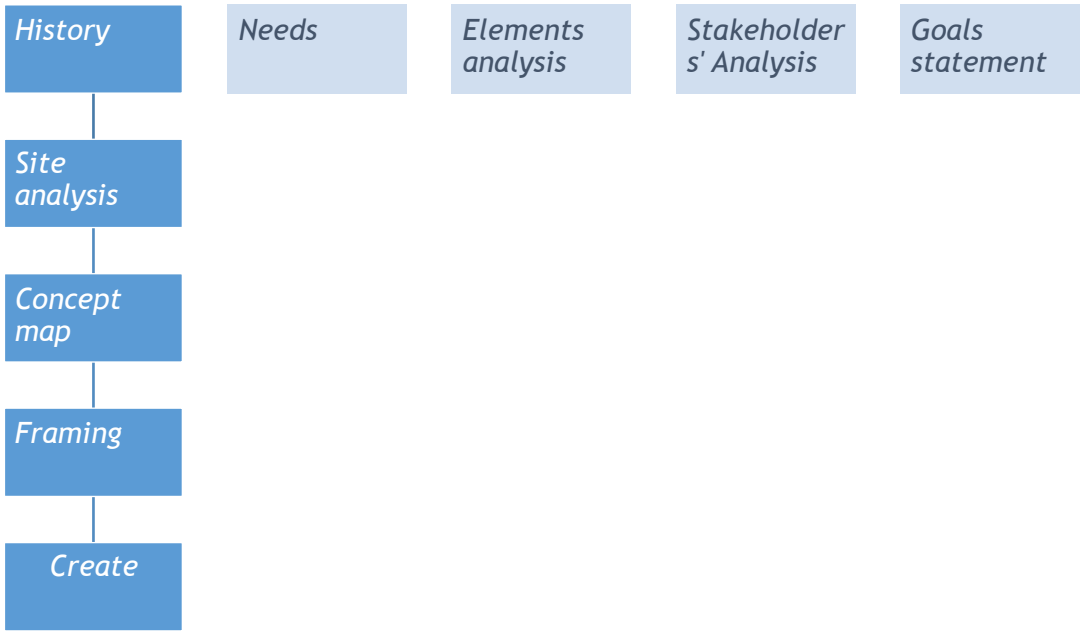


***Figure 1**: A summary of the whole design process we went through.*

2. Element analysis

2.1. Process

An elements' analysis has been done taking in account the needs and yields of each one of them and keeping in mind that yields are not only those monetary in their nature.

The first step was to identify the elements in the process of poly-culture. Those identified in the community that would be able to integrate themselves in a poly-culture process were **chicken raising**, **fish raising** and a **vegetable garden.**

Goal: to identify the needs and yields of different poly-culture elements for the local context of the community of Boa Vista do Acará. We used Brainstorming as a method to collect everybody's ideas and visualize the possibilities we would have (Figure 2).

***Figure 2**: Brainstorming elements connectionsz*

2.2. Analysis

In the following table, we show the elements yields, needs and external connections:

Table 1. POLY-CULTURE: Elements yields, needs and connections			
Element	**Yields**	**Needs**	**External Connections**
POLY-CULTURE Chicken	• Sale of meat and eggs • Composting of chicken's manure • Family consumption	• Adequate space for chicken to lay their eggs • Adequate space for chicken to sleep • Free Area • Protection against predators (bats, snakes and others) • Protection against the elements (tides) • Feeding and water • Management of illnesses	• Balanced diet • Integration of the system with the environment • Sustainable food production
AQUACULTURE Fish	• Composting of fish manure • Family consumption • Sale of meat	• Adequate management • Closeness to house • Not causes environmental harm • Protection against tides	
POLY-CULTURE Vegetable Garden	• Family consumption • Composting of leftovers and overproduction	• Living soil (enriched) • Seed nursery for the production of healthy plants. • Open area with good ventilation. • Food (nutrition) • Water, air and light	

In the following scheme, we show the previously identified relations between the different elements (Figure 3):

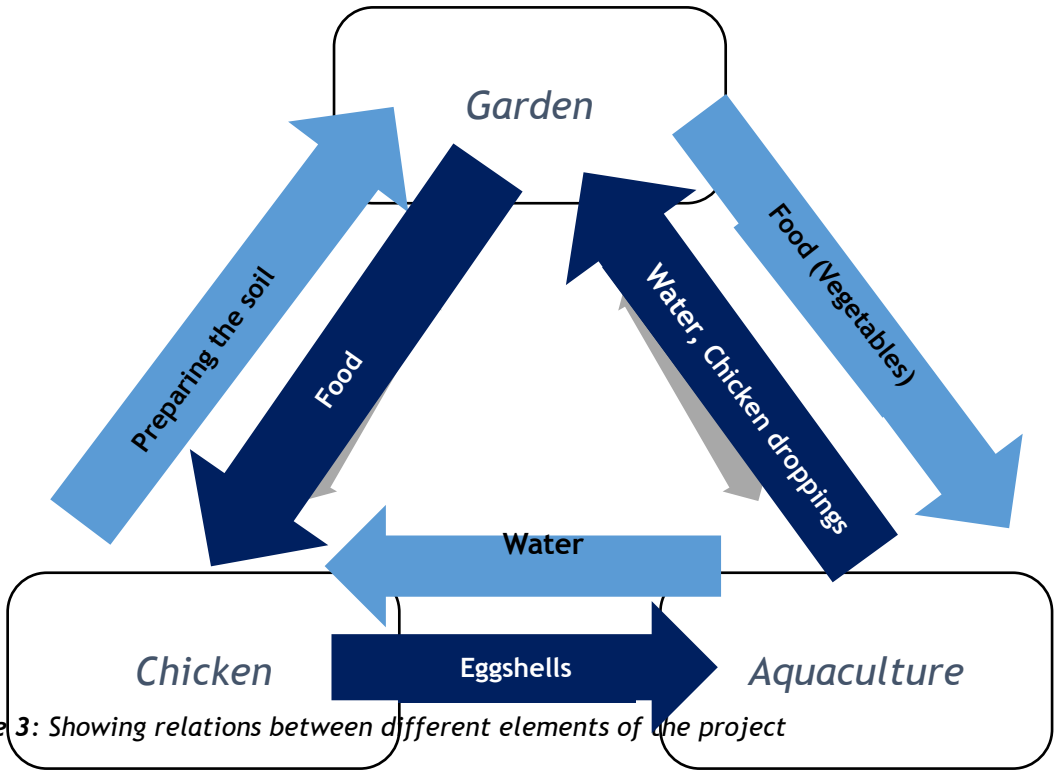


***Figure 3**: Showing relations between different elements of the project*

After doing the site analysis of the place where the project would happen and getting to know the needs of the community member who owns the land, we decided to build the project with only two of the three elements, namely chicken and vegetable garden. Another stakeholder implemented the aquaculture project. This was done to promote a diverse skill set and strengthen the association as whole.

The team went on to establish connections between the two elements. The goal for this exercise was to establish the relations between the needs and yields of both chicken and vegetable garden. The result was the diagram of needs and yields of elements and their connections, which we show below (Figure 4):

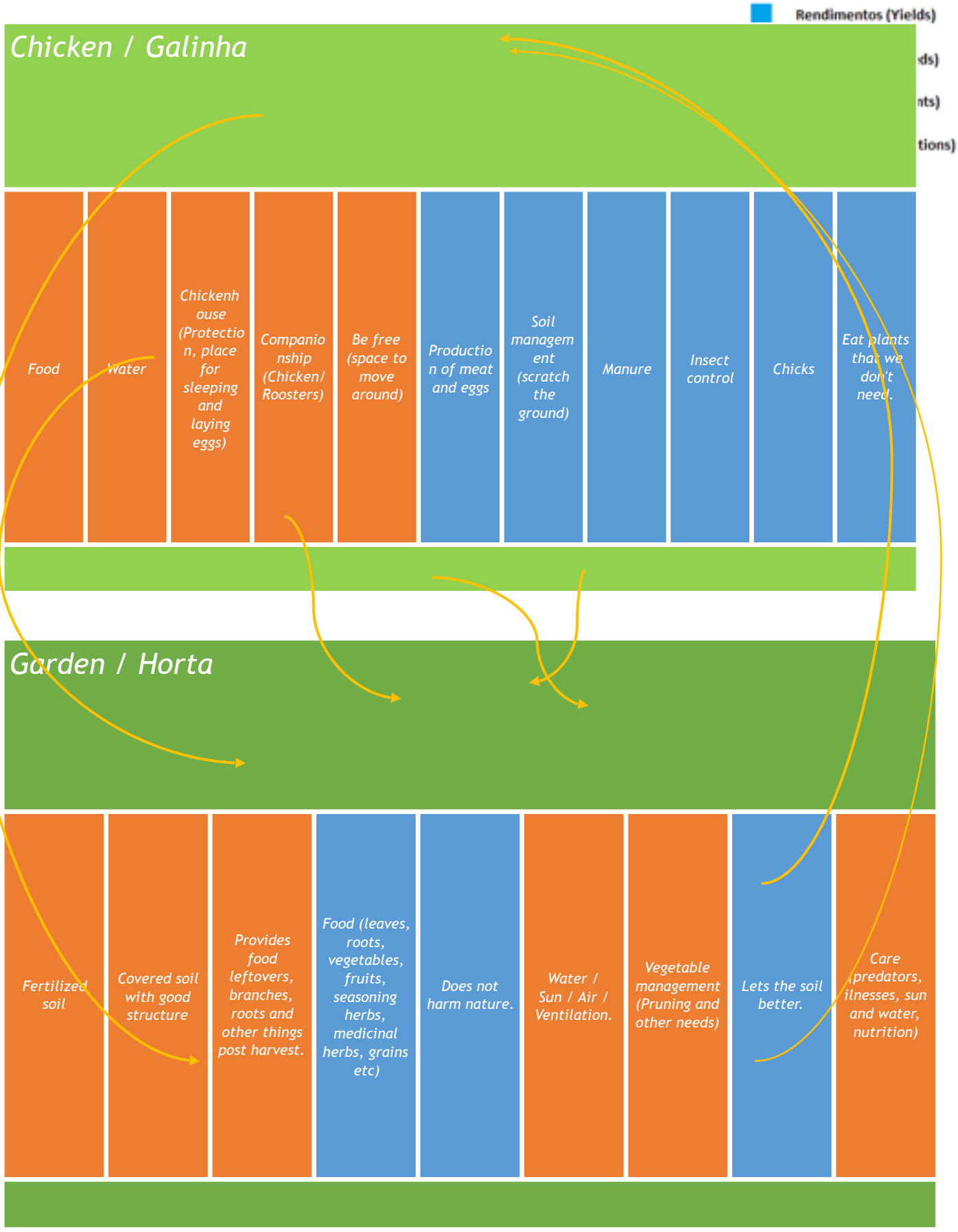


***Figure 4**: Comprehensive diagram of needs and yields of elements and their connections.*

3. Site analysis

The first step for the site analysis was identify the most important elements in the area with influence in the project development. So, elements like weather, vegetation, soil characteristics, infraestructure were previously defined at the visit of the site.

3.1. Background Information

Initially the project model was going to happen at Leandro's house, who is also in the aquaculture project. He was therefore not able to be available for the group as a main stakeholder to take part in critical decisions. This led to the shift in project site to Josue's house. This process was based on a mutual agreement between them and facilitated by the design facilitator.

Upon doing site analysis, we noted that there were unclear boundaries and land ownership issues between Josué and his neighbor. Further discussions made way to a decision to use about 50 percent of the land base, as a way of making sure no conflict deters the success of project goals.

3.2. Land description

The land has 1,350m² and contains a mixture of food forest and housing structures. We can see more details in the base map below (Figure 5):

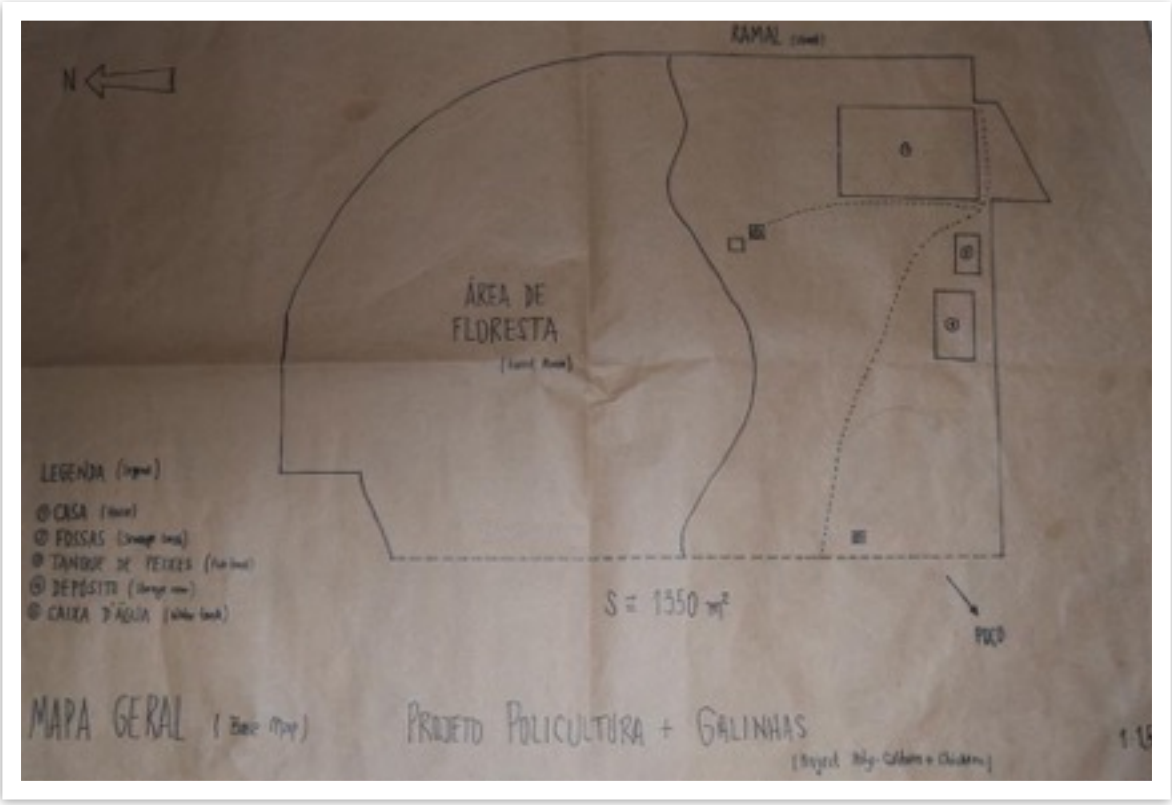


***Figure 5**: Josué's land Base Map*

3.3. Infrastructure

Available infrastructure on the land includes a new house under construction, storeroom, and sewer system for toilets. Rainwater harvesting will take place at the new house and chicken house future infrastructure will also include a fish tank that has been dug, and the producer will benefit from Leandro who has pioneered aquaculture for the benefit of all associates.

3.4. Ecology

This site is in a typical Amazonas region food forest, flat land, in a tropical humid and sunny environment. The soil is mostly sandy to clay soil type. Trees in the yard include, acai and pupunha. The plan of the whole project is to take advantage of the symbiotic relationship that exists between chickens, vegetables, and the forest. The project is sited at an area not targeted as a forest and future forest. The farmer plans to establish a forest in the future, so as to shield vegetables from the hot afternoon sun. The orientation of the structure (Eastward siting) will take advantage of the shade offered by the forest as well as the open space on the eastward direction to receive the morning sun. The rains that are received in this area are easterly rains.

Table 2. Scale of Permanence on site		
More Permanent More difficult to chance	1. Climate	Tropical
	2. Soil type	Old soils, with a 5-10 cm superficial layer of organic matter, 1-metter layer of sand and soil rich in clay after that
	3. Permanent Forest	Sparse areas of forest with no human activity
	4. Farmer's house	Traditionally made of wood, it has changed to bricks and cement ones
	5. Soil fertility	There will be composting and chicken manure used on the soil
	6. Point of road access	Off-beaten tracks, in general
	7. Water availability	Water will soon be received from the rain water harvesting system
	8. Quality of road access	Poor conditions, especially when it rains
Less Permanent Less difficult to change	9. Forest in the Area of impact	Planting more food trees in the area around the project site

	10. Chicken House	As the project experience grows and many families begin, they may take on bigger quantities
	11. Food garden	There are chances of expanding the garden

Important reminders

Before a community member begins mapping, there must be defined boundaries of land between neighbors as this maybe a source of conflict. It is important to always have the key stakeholder with the group as you design, you are better off slower but to a great finish.

4. Stakeholders' Analysis

After this first mapping activity, we proceeded with our stakeholders' analysis. In the table below (Table 3), we listed the possible stakeholders for this project and assessed them regarding their effect, importance and influence on the proposal.

Table 3. Stakeholders' analysis

Stakeholder	Interests	Effect 0 = neutral + = positive - = negative ? = Unknown	Stakeholder's importance U = unknown 1 = none/little 2 = moderate 3 = very important	Stakeholder's influence on other stakeholders U = unknown 1 = none/little 2 = moderate 3 = very high
Producer	Production	+	3	3
	Quality	+		
	Sales	+		
	Forest preservation	+		
	Production cost	-		
	Maintenance cost	-		
	Non-monetary cost	+		
Associate	Retailing	+	2	3
	Knowledge	+		
	Strengthening APOBV	+		
	Diet diversification	+		
Consumer	Quality	+	1.5	1
	Low cost	?		
Retailer	Quality	+	1.5	1
	Low cost	?		

	Supply frequency	+		
Regulators	Quality standards	+	2	U

4.1. The Process

During the stakeholder brainstorming session, the group discussed on who interested stakeholders are in this project. The project intends to be a model for all community households to suit their needs as they see fit.

It is important to note that the project perceives many non-monetary yields, hence the rating given to consumers and retailers. The producer and community or association members are the most interested and influential.

Regulators tend to have an upper hand on quality standards especially if supply will be extended to a broader market.

4.2. Interviews

Only 2 stakeholders were reached, the producer and his family, and members of the association. The special skill of not treating a stakeholder as an information bank assisted in making fruitful conversations.

The purpose of the interviews was insight into the needs and interests of the people of the community regarding the project.

For the farmer and his family, it wanted to know the work to which they have dedicated and in which areas they like to work. The family has had dedicated to cultivate cassava mainly and process for by product,

Besides that, they have produced chickens for sale and own consumption of eggs. They manifest have not difficulty for raising chickens. They have had difficulty in producing food garden. They state that their diet is based on meat, cassava, rice and beans and it includes a low consumption of vegetables, but they have expressed interest in diversifying their production and consumption. Their expectations with the project are learning; improve productivity, increase production and yields (increase sales). Likewise, we are interested in advancing in conjunction with the association and improve their future.

For the members of the association, the project can be a learning opportunity, better use of resources and improve the economy of the association. Moreover, they think that the application of poly-culture and raising chickens can facilitate the supply of food for themselves and for the community and generate autonomy.

4.3. Findings to note

- The community produces food from the forest and poultry products, they sell to the city of Belem, and then buy cheaper foods from the city for their own consumption.

- They want to be autonomous, and independent from buying from the city

- The producer and his wife as well as most community members have a lifelong experience and interest in chicken raising, and they will be gaining experience in the integration of poly-culture and food gardening.

- As the project develops, they hope to have many households able to supply a school in the area with eggs, meat and vegetables. This income would help them educate their own kids.

5. Framing

5.1. Concept Mapping

Our next step was to connect all the information we had gathered. Thus, we created a concept map (Figure 5) and, from it, we could frame our project during IDDS.

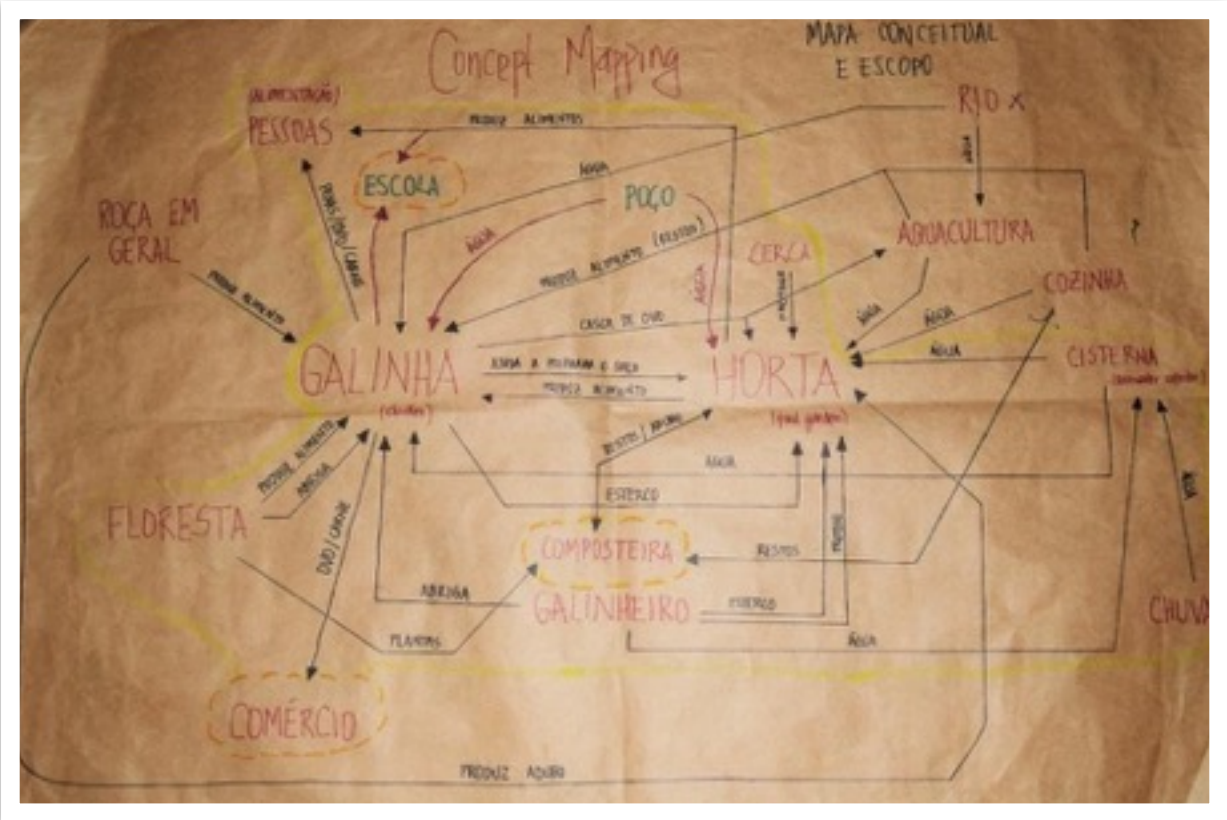


***Figure 5**. Concept mapping and framing.*

5.2. Process

We made a concept map of the project to identify connections between elements and resources, keeping in mind its origins in the community and in the building. We present the map we developed in the previous image – it shows the possible origins of supplies for the elements' needs.

5.3. Analysis

We had the approach to analyze the needs of all the elements. We identified the chicken's need of nourishment may be provided by a crop that the own producer or other people from the community can plant, such as corn, cassava, basil, cabbage and other vegetables. They also can get food from the food garden that may have a plot destined to produce food for the chickens. Another way to feed the chickens is to leave them free in the forest, where they can eat grasses, fruits and seeds that enable a better quality of their eggs and meat.

Another need chickens have is a comfortable are to spend their daytime – we have found that 3 m² per chicken is enough area to provide this. The free areas in the forest may be parted in sectors to improve its own soil. Besides nourishing the chickens, the forest also offers them protection against climate conditions such as intense sun and rains, quite common in the region, and provides shelter to some of them during the night – our stakeholder told us some of his chickens never get used to sleeping in the chicken house; they prefer to sleep on tree branches.

However, due to the presence of predators during the night, the chickens need a shelter to protect them against snakes and bats. Because of that, the project meets the construction of a chicken house structure to protect them during the night. The chicken house needs enough space for the chickens sleep – according to our references, we can fit 5 to 10 chickens in 1 m² –, a nesting area and also an area to collect chicken droppings. It is also possible to think of a composting area around the chicken house considering the great amount of droppings they produce and other organic materials that area easily available in the area, such as fruits, leaves, branches and other leftovers from the garden and kitchen.

It is important to reinforce that the chicken droppings cannot be directly applied in the garden – they need to be decomposed first.

We thought of a rainwater collection system using the chicken house roof. Another source of water are the wells and water from fish or shrimp tanks, as well as the igarapés and rivers.

The food garden needs water, sun, good soil, protection against predator and the chickens themselves. We identified the need of building a fence around the garden, which would be 1.5-metter tall.

6. Forms of capital

6.1. Process

We noted that in most settings any project success is evaluated only in its financial gains. However, it is important to note that projects like this one have many benefits, that are far beyond monetary pr, The impact the project's development and implementation have in different kinds of capital for the community has been analyzed (financial, material, social, cultural, quality of life, spiritual, intellectual and experimental capitals).

6.2. Analysis

It became evident that the project strengthens the **financial capital**, as it aims to better profit from the resources available in the community, including those that are not valued in the present moment, to use them as production supplements. In addition, it tries to tune the processes and allow the farmers to provide themselves food (eggs, meat, vegetables) without having to invest in those items and facilitate the goods sale processes aiming to generate income for the farmers. The yields in financial capital relate to those in **material capital** and reflect in a lessened need of buying goods and inputs both at the implementation of the system as in its maintenance, since the farmer can produce his own inputs with the yields of the system, for example composting harvest leftovers and manure to make fertilizer. Besides that, the farmer can provide himself a great part of the food he needs. Otherwise, a material yield not directly related to the financial gains is the conservation of the forest and of natural resources in the impact zone of the project.

The yields in **social capital** are also a goal of the project. Strengthen family organization, generate new connections between consumers and retailers from the community that include the association as a production distribution center and at the same time strengthen it. Furthermore, the appropriation of products and its processes add to the cultural strengthening

of the beneficiaries. Last, a better **quality of life** is expected for the farmer, who will be able to guarantee himself premium food, as he knows its origins and takes care himself of the appropriate management for the production of meat, eggs and vegetables. Currently, the goods supply comes from the city of Belem and the community inhabitants depend heavily on it. People from the community do not produce many of the goods they consume and some are not consumed regularly due to the difficulty of supply. Producing their own food will allow them to diversify their diets and have the autonomy to choose high quality goods more easily, both for farmers and for the community. Another aspect is the need felt by community members of having work options inside the community and reduce the need of commuting daily to cities and zones with greater job opportunities.

Other enhancements as the participation and knowledge of community members and summit participants in ecological design process, the evaluation of some technical criteria in the production of food in vegetable gardens, raising of chicken and production of eggs are additions of intellectual, cultural experimental kinds of capital. Finally, it has been considered that the spiritual capital is not directly enhanced by the project and the kinds of capital better represented are the financial, material, social and of quality of life.

***Figure 6**: Analysis of the main forms of capital approached in the project.*

7. Creation

7.1. Process

The design of the food garden and chicken house model were to meet the needs of both as listed in the **(Connections between Needs and Yields of the elements document in this**

report). The project makes use of the permaculture principle of integration instead of separation, and the whole design integrates important aspects for the wellbeing of all elements.

7.2. Brainstorming model design

The design group engaged many summit participants to give their ideas on the suitable design for this environment. The group got together to do a brainstorm of sketch diagrams, and deep discussions on design details, advantages and disadvantages of each design.

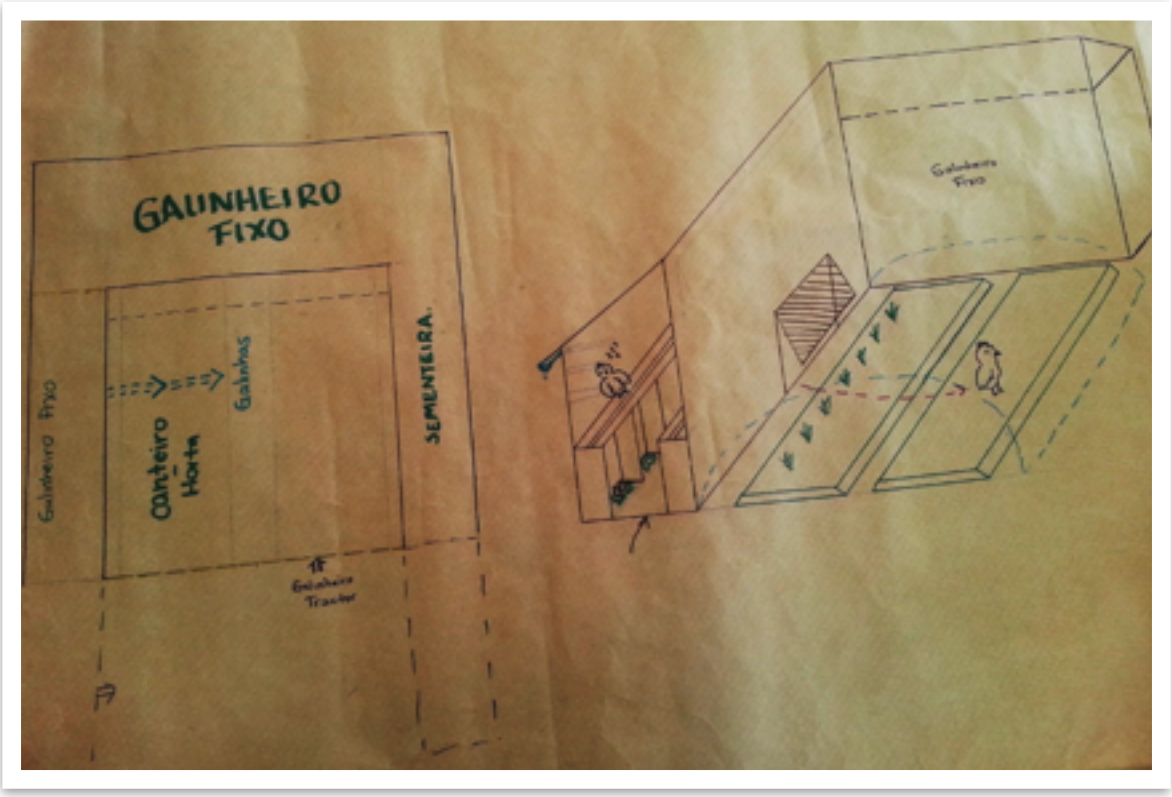


***Figure 7**. Model of chicken run and food garden*

The group agreed to use 3 m x 3 m piece of land in total for the planned model. The chicken house would measure 2 m x 1.5 m, and garden measuring 2m x 2m. The chicken house would be a permanent structure for housing chickens at night and safe from predators, egg laying and nesting. Chickens either spend their daytime in the chicken tractor or out in the forest eating.

As discussions on the structure continued, the producer made a decision not to work with chicken tractor because he has never used it before and was therefore not comfortable, as well as time needed to be moving as he usually works alone. He therefore suggested that he would keep the chickens in the garden area until noon for the number of days that he would determine as he continues to assess the impact by chickens. The chickens also have access to the forest for foraging. The chicken tractor still remains as an option and would enable the chickens to work on the land to prepare it for garden planting. Besides, it may be useful to manage insects and other arthropods in the food garden.

8. Material selection process

8.1. Process

Identification of model elements and its basic characteristics:

The first step was to identify the elements of the construction according to the preliminary needs analysis. Thus, we identified the following items:

For the chicken house:

- A cover (roof) that allows rainwater harvesting.

- A water tank for storing rainwater and subsequent distribution to irrigate the garden and hydration of the chickens. Is necessary too, the elevated support structure is necessary too, to guarantee pressure for the out flow.

- A water collector to transport water the roof to the tank, large to avoid overflow with high water flows.

- Walls to provide shelter for the hens of unfit weather conditions and protection from predators like snakes and bats. The doors should satisfy the same requirements.

- Window or space to allow air intake and ventilation for the chickens. This element must prevent the entry of predators and be located to prevent the entry of rain. To satisfy that requirement, it thinks in the use of a mesh or net.

For the food garden:

- Fence for garden to protection of vegetables and other food planted of damage caused by hens. Similarly, it functions as retention barrier chickens when it wants them to work a given area of land. The height of the fence should be sufficient to prevent hens fly and pass. Another strategy is to prevent the chickens have visibility of the garden when it is planted and avoid their desire to enter.

- Seeds of varieties adapted of the local conditions of the soil and environment and local consumption needs.

For booth structures is necessary the use of elements of connections.

8.2. Alternatives of materials

The second step was the identification of possible materials that match the characteristics that must have each of the elements of the model. This process was conducted through brainstorming and the result is shown in the next table.

Table 5. Possible materials for the proposal

Model elements	Material options
Roof	Brasilit roof, najá leaves, bamboo
Walls	Bamboo, açaí wood, purchased wood, bricks, mud
Water tank	Plastic, iron-cement, bricks
Fence	Bamboo, Açaí wood, metal chicken net, plastic net, guarumã
Net (ventilation of chicken house)	Plastic, metal, guarumã
Connectors	Metal nails, vines, metal wire
Water collector	Pupunha wood, Bamboo, PVC pipe, metal pipe
Seeds	Commercial seeds, shared seeds

8.3. Tools

Similarly, we discussed the required tools for the chicken house and food garden construction: axe, machete, hammer, digger, saw and hoe.

8.4. Materials analysis

We based the construction on locally available materials and the incredible ability to use waste materials. In this case, for example, the açaí wood we used to make the walls had been in the forest as residue wood after harvesting, and it is likely going to last for four more years. According to most community members, acai wood had always been a great resource for construction in everything they built long back, until the industrial era of refined timber. To make the doors and the garden fence we used bamboo tree, for aeration, we used a plastic chicken net, roofing was done using asbestos that the farmer already had, for rain water harvesting, we used a dug out pupunha tree trunk, nails and vine for connectors and a plastic water collector. The focus was to make the project as cost effective as possible such that anyone from the community can implement regardless of how much money they have.

For the analysis of materials and their selection, it was made a brainstorming session. The objective was to define the most important criteria to be evaluated in the materials. These criteria were the cost, the local availability, the environmental impact, maintainability, durability and the time to produce or collect because most resources are natural.

We present the weight for the each criteria selected of the materials used in table 6.

Table 6. Analysis of the selected materials

Criteria	Materials								
	Bamboo	Açaí wood	Pupunha wood	Vine	Seeds	Plastic Water tank	Metal Nails	Cement roof	Plastic net
Cost 3 - Low 2 - Medium 1 - High	1	1	1	1	2	2	2	3	2
Local Availability 3 - Easily found 2 - Hardly found 1 - Not existing	3	3	3	3	1	1	1	3	2
Environmental impact 3 - Low 2 - Medium 1 - High	3	3	3	3	2	1	2	1	1
Maintenance 3 - Low 2 - Medium 1 - High	2	2	3	1	2	3	1	3	3

Durability 3 - High 2 - Medium 1 - Low	1	2	2	1	2	2	3	3	3
Time to produce or collect 3 - Short 2 - Medium 1 - Long	2	3	2	2	1	1	2	3	2
TOTAL	**12**	**14**	**14**	**11**	**10**	**10**	**11**	**16**	**13**

The group also explored different models for chicken run and food garden.

Mud chicken house structure

This is a chicken house made out of mud and straw and other waste materials. It is cheaper to make, as all resources are available in the community. Mud chicken houses have an advantage of being a perfect air-conditioned system, providing an amazing thermic comfort. Mud chicken houses demonstrate to the community that one does not need to have a lot of Money to run a successful chicken and vegetable garden venture.

Chicken tractor system

Farmers also have an option to use chicken tractors to manage chicken movements and protect vegetables from being ravished by chickens. Chickens are naturally created to perk and scratch the ground; chicken tractors are temporary moving floorless structures that enable chickens to play their perking and scratching role on the soil with ease. In a forested area like Boa Vista, chickens would have access to plants and insects for their foraging at the same time dropping their manure and working on the ground. Chicken tractors are made of light materials and are therefore manageable by one farmer.

Besides, we also analyzed other materials that we could use to build our proposal (Table 7):

Table 7. Analysis of other possible materials

Criteria	Materials							
	Najá leaf	Brick	Mud	Iron-cement	Metal net	Guarumã net	Metal wire	PVC pipe
Cost 3 - Low 2 - Medium 1 - High	3	1	3	1	2	3	2	1
Local Availability 3 - Easily found 2 - Hardly found 1 - Not existing	3	2	3	1	2	3	2	2

Environmental impact 3 - Low 2 - Medium 1 - High	3	1	3	2	1	3	2	1
Maintenance 3 - Low 2 - Medium 1 - High	2	3	2	3	3	1	2	3
Durability 3 - High 2 - Medium 1 - Low	1	3	2	3	2	1	2	3
Time to produce or collect 3 - Short 2 - Medium 1 - Long	1	1	2	1	1	2	2	1
TOTAL	**13**	**11**	**15**	**11**	**11**	**13**	**12**	**11**

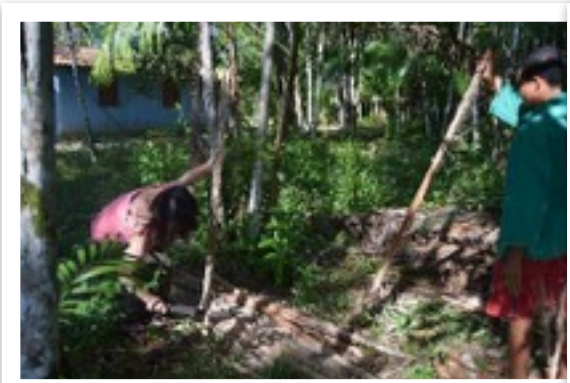
8.5. Construction Process

The construction process lasted three days. During this period, we were able to create a module or a prototype of the system we had thought. As we mentioned before, we tried to use resources that were already available in the area.

It is important to highlight here the importance of Josué's and Manoel's knowledge in building and using natural resources. Josué has already worked as a carpenter and knew his land very well – this helped a lot finding the materials we would need; Manoel, even though he is not from Boa Vista do Acará, knows a lot how to use the available resources and has a lot of experiences in buildings, both from the period he worked in constructions in Manaus and from his live in the indigenous tribe he is from. André, Angelica and Precious could learn a lot from this.

We present a summary of this process in the figures below (Figures 8 to 13):

***Figures 8 & 9**. Area during site analysis and first steps in building the prototype.*




***Figures 10 & 11**. Collection, recovery and adaptation of Açaí wood and bamboo; food garden's bamboo fence and chicken house's wood structure.*


***Figures 12 & 13**. Final structure of the model of the poly-culture and chicken integrated system.*

We present the final structure in the picture above. The final chicken run structure is 2 m by 1.5 m and can host around 15 to 30 chickens, with a range of 5 to 10 birds per square meter. We also considered special spaces for sleeping and nesting. The garden measures 2 m by 1.5 m. We present our budget in the table below:

Table 8. Project Budget Details					
Income	Expense Item	Amount	Unit price	Subtotal	Balance
R$500.00	Garden seeds	4 packages	R$1,00	R$4.00	R$496.00
	Net	2 m²	R$11,00	R$22.00	R$474.00
	Door Handles	4	R$2,50	R$10.00	R$464.00
Total	Nails	2	R$15,00	R$30.00	R$434.00
	Chicks	10	R$10,00	R$100.00	R$334.00
				R$166.00	**R$334.00**

9. Final presentation and next steps

Our group decided to build a sketch model for the final presentation. The model was scaled (1:2) and can be used by other associates to create their own poly-culture and chicken system. Besides, we also printed out figures 8 to 13 to show the process to the other participants. Images of the sketch model and our group during the presentation may be seen below:

***Figures 14 & 15**. Sketch model and group during IDDS Amazon Final Presentation.*

Our next steps are to test the system with Josué's experience to analyse if it is a good alternative for other people in the community and for APOBV as well. We intend to write a Portuguese version of this report so that people from Boa Vista do Acará can access it too.

Pictures of the process:

https://drive.google.com/open?id=0B1XHYLjBZBOXV1FHdGJxTlBoSHM