

Evaluating a Participatory Plant Breeding approach in a local seed system of Northern Nicaragua:

Challenges for upscaling technologies and institutions

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*“Dale una luz a la gente que ha buscado
su libertad contra el cielo y contra humanos
dale una luz a este pueblo que ama tanto vivir
en Nicaragua...”*

-Guardabarranco

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Abstract

Evaluating a Participatory Plant Breeding approach in a
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Plant breeding initiatives worldwide have proven ineffective to deliver poor farmers with quality and good-yielding materials that would improve their livelihoods and food security. Because of this, Participatory Plant Breeding (PPB) has become a complementary option that takes into account farmers' wants and needs, bridging the gap between formal R&D and the more popular knowledge-based initiatives that address plant variety development and seed diffusion. Escalating successful experiences however, has been difficult. Since 2005, farmers participating in a PPB pilot project in Pueblo Nuevo (Nicaragua) produced two red-bean varieties well adapted to the area. They have tried to register them, so they can profit from selling certified seeds in national markets. For this reason they organized in a cooperative, with the help of an accompanying NGO. Until April 2007 a seed registry for one of the varieties was granted.

In trying to shed some light on the problematic of promoting a successful seed supply to and by small-scale farmers, an ethnographic study was done in Northern Nicaragua with a seed-producing cooperative as the main object of study. The objective was to diagnose the conditions inside the organization that restrain it from commercializing seeds at different levels, as well as preventing PPB to become more widespread within farmers to secure this much needed input. Thus, identifying such challenges, through a realistic evaluation of this pilot project, is what this report is about.

Perceptions about the cooperative were recorded with members of the cooperative, as well as with governmental and non-governmental actors. There are internal and external factors that may be conditioning a successful upscaling, especially considering the market environment and recent political changes in Nicaragua. Therefore, clear objectives and collective vision are essential to strengthen the cooperative.

Some think it may be hard to keep a constant offer of seeds and variety quality, while others view the lack of training and know-how as an obstacle to overcome. The cooperative has been focused on entering a formal market; perhaps giving little thought to the initial objective of supplying material that would yield better in marginal areas. Important resources should be invested for increasing its social capital and services (i.e. providing seed of commercial varieties to the market), if they are to become a sustainable seed-business and a reliable source of seed for impoverished local farmers.

Amidst this scenario is where the actions determined by COSENUP, its relations with members, partners, business associates; and the attention paid to legal matters and the market will determine a positive outcome and a potentially sustainable production and distribution of seeds. This study addresses the questions of identifying "the major bottlenecks for the upscaling of PPB-seeds" and the "challenges for PPB in order to become established as a farmer's practice in the Segovias region".

Key words: *Participatory Plant Breeding, Seed Systems, Upscaling, Seeds, Realistic Evaluation, Collective Action*

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Abbreviations

CDB	Convention on Biological Diversity
CIAT	Centro Internacional de Agricultura Tropical / International Center for Tropical Agriculture
CIPRES	Centro para la Promocion, la Investigacion y el Desarrollo Rural y Social / Center for the Promotion, Investigation, and Rural and Social Development
COSENUP	Cooperativa de Servicios Multiples Pueblo Nuevo Unido
DRCAFTA	Dominican Republic Central America Free Trade Agreement (with the USA)
FAO	Food and Agriculture Organization
GM/GMO	Genetically modified organism
GMV	Golden Mosaic Virus
GO	Government Organization
INTA	Instituto Nacional de Tecnologia Agropecuaria
LSS	Local Seed System
MAGFOR	Ministerio Agropecuario y Forestal
Mz	Manzana = 7000 m ²
NDF	Norwegian Development Fund
NGO	Non Government Organization
PCaC	Programa Campesino a Campesino
PCI	Participatory Crop Improvement
PGR	Plant Genetic Resources
PLxL	Programa Libra por Libra
PPB	Participatory Plant Breeding
PPB-MA	Participatory Plant Breeding-Meso American Network
PVS	Participatory Variety Selection
qq	Unit for quintal = 46 Kg
R&D	Research and Development
TRIPS	Trade Related Intellectual Property Rights
UNAG	Union Nacional de Agricultores y Ganaderos
UNDP	United Nations Development Program
UPOV	International Union for the Protection of New Varieties of Plants
USD	United States Dollar (US\$)
WTO	World Trade Organization

Chapter 1: Introduction

The purpose of this chapter is to present the existing the body of knowledge and documented experience supporting the present study. As such it is divided in two sections. The first section explains the improvement of plant varieties, when it involves the participation of farmers and their communities; and how it affects development projects. The other part describes the specific pilot project in Nicaragua and the relevant actors involved. The final section describes the research questions that have guided this research.

Background to Participatory Plant Breeding (PPB)

Seeds and systems

In the turmoil of our modernizing world, where development, industrialization and commoditization of resources meet and are engaged through trade dynamics, one is most likely bound to find marginalized farmers at the end of governments' priorities and action plans, despite their importance and ample recognition as “keepers and managers of genetic diversity” throughout history (Rhoades, 1989). Broadly speaking, the recognition of agrobiodiversity as a key natural resource crucial to food security, poverty alleviation and sustainable development is strongly related to seed systems (Hardon *et al.*, 2000), since the seed¹ is the very first step in the production chain.

Seed systems can be differentiated between formal and informal systems. The difference resulting from modern specialization in seed production and breeding, based on economies of scale that push for more high-tech farming in order to accommodate for a growing consumerist population (Almekinders and

¹ A very first clarification must be made, resulting from the misunderstandings in conceptualizing the term seed. Semantically speaking, it is defined as “a small part of a plant or fruit from which another plant can grow” (Hornby and Ruse, 1988); however, legally speaking, seeds are defined as “any vegetative structure destined to sexual or asexual propagation of a species” (Law 280). The major difference found in the last part of the latter, by which the *propagation of a species* requires a stricter maintenance of the genotype's integrity.

Louwaars, 2002). Seed systems are also known as Plant Genetic Resources management systems or seed production and distribution systems, in scholar or international agencies jargon. Nonetheless, for the purpose of the present text all terms may be used arbitrarily, though most of the references will be plainly to “seed systems”. In figure 1 it is possible to see how both the formal and local seed systems are laid out. Despite their closeness and to some point interdependence, the figure also portrays how limited their interactions are, giving room to consider more holistic and integrative approaches.

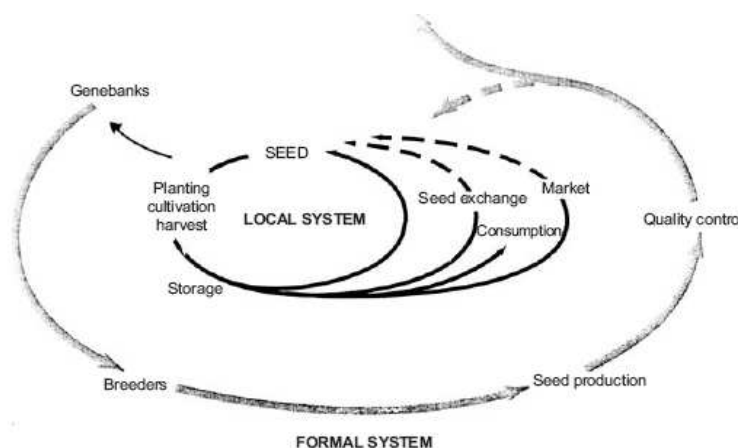


Figure 1. The formal and local seed systems: two complementary systems that need to be interlinked (from Almekinders and Louwaars, 2002).

The assortment of natural resources and human structures known as Local Seed System (LSS) has been described as the “processes of selection, seed production and seed exchange that are integrated into the crop production” and into the farmers’ livelihoods as a whole (Almekinders and Louwaars, 1999). On the same line of thought, these processes are considered to be extremely heterogeneous and highly dynamic in their functioning, thus the complexity of the interactions around its social, economic and political environments (Almekinders *et al.*, 1994). The notion of locality, in this context, refers directly to those farmers who live in a rural (generally marginalized) area and who develop their activities (i.e. saving seeds, selecting materials, etc.) according to such conditions, in most cases with little or no support from government or private parties. A LSS in which plant breeding is practiced more systematically

can be seen as a rather “open” system, with interactive phases in which inputs (i.e. new planting materials) are incorporated, and outputs (i.e. high quality seed) are further spread and incorporated.

In this case, the “locality” element comprises the incorporation of Participatory Plant Breeding (PPB) in the production of food for resource-poor families, linked to the distribution of seeds as well, as key aspects for the system to achieve some level of sustainability. As mentioned by Pretty (1995), the notion of sustainability is indeed a contested term, but in practice “what needs to be made sustainable is the process of innovation (*of seeds*)² itself”. As an integrating component of the agrobiodiversity, seed systems are not particularly recognized in most definitions of the term³, and much less their embeddedness in local or traditional knowledge systems. I believe it is important to emphasize this, as it grants richness and value to the use of such diversity and recognizes the efforts of generations of farmers throughout history. Undoubtedly, improved seeds in production schemes play an important role as a base for the well being of the nations.

Participatory Crop Improvement: a broader approach

Tripp (1997) notes that the focus on seeds is ubiquitous, being “the object of intense care and selection, at the same time it is an important item of commerce and a symbol of self-sufficiency”. However, “formal” agricultural breeding research in developing countries has not made much improvement in transferring technology to small farmers, mostly because 1) the varieties tend not to be suited for resource-poor farmers in unproductive, marginal environments; 2) the selection and testing systems aim at high-productivity, low-stress environments; 3) it has favored cultivars that can only be broadly adapted; and lastly 4) it does not consider consumers or farmers predilections (Atlin *et al.*, 2001; Ceccarelli *et al.*, 2001). This limited success of national crop improvement programs in delivering quality seeds of staple crops has been the

² All quotes that show a text in parenthesis represent my additions

³ A comprehensive definition, by FAO, can be found in

http://www.fao.org/sd/LINKS/documents_download/FS1WhatIsAgrobiodiversity.pdf

igniter for initiatives involving farmers in developing this much needed input in mutual collaboration. This is where Participatory Crop Improvement (PCI) approaches have taken root; and have done so aided by NGOs, research centers and local farmers' groups in many of the cases, and recently in broader collaboration with governmental authorities.

In general, PCI aims at incorporating useful genetic diversity into the local systems and to build on farmers' capacities of seed selection and exchange through linking the formal and local seed developing sectors in an attempt to increase productivity, material adaptability and food security, among other things (Almekinders *et al.*, 2007). In doing so, two different ways of farmer's participation in crop improvement are acknowledged: one where they help in selecting the materials presented to them (on-farm or on-station) by the technicians from breeding centers, considering their predilections and methods (variety selection). In the other way, farmers take full part in the process of crossing and selecting the breeding lines (plant breeding). It has been suggested that Plant Variety Selection (PVS), where farmers work with nearly finished materials, can be comprehended within Participatory Plant Breeding (PPB), in which farmers are actually working with segregating materials; although the latter is far more resource demanding for poorer farmers (Witcombe *et al.* 1996; Sperling *et al.*, 2001). PPB is a more widely used term in the literature, and for the purpose of this report it does justice to the characteristics of this case study. Figure 2 shows where the different categories belong in the general layout.

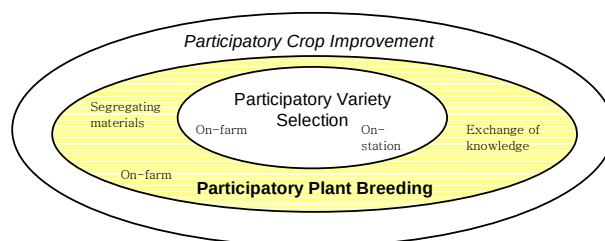


Figure 2. Scheme showing the different categorizations of participatory approaches to plant varieties improvement. The case dealt with in this paper focuses on Participatory Plant Breeding (PPB).

Application in rural development

Participation-oriented approaches have been a part of several rural development projects by international agencies since a number of years now. In the case of PPB, these projects have taken place in locations where subsistence farming is most predominant, and where torn economies prevent the development of large-scale “westernized” agriculture. In this context, two views on participation are presented: one where the pressing goal of the projects is to empower people (as a right) and the other one to increase efficiency (Pretty, 1995).

It needs to be realized, however, that people's empowerment and participation require adequate terms of engagement between the intervening subject (i.e. NGO, donors) and the community. Terms that in practice the *project-paradigm* does not always allow to emerge due to its intricate, hierarchical and ephemeral existence; thus adding to the overall complexity of successful implementation (Batterbury, 1998; Chambers, 1974). In other words, it is the question of whether the terms of participation will be proposed and agreed within the acting parts or conditioned by local elites, organizations or leader-figures, and how to measure such terms dispassionately.

Connecting this issue of participation and development to PPB, an interesting question arises at the point where a project has been successful in linking different actors of both seeds systems (i.e. farmers, breeders and NGOs) and also in delivering improved seeds. It is whether these actors can effectively supply a potential seed market demand and strengthen the LSS. The latter encompasses many aspects of diverse complexity: from the development of seeds to the maintenance and diffusion of crop varieties, as well as the production, storage and distribution of high quality seeds (Tripp, 1997).

It has been no more than two decades since the first efforts to implement PPB experiences took place, so understanding and deriving improvements that can reflect directly in small-scale farmers' livelihoods are also recent. In 2001, Sperling *et al.* reported of some 65 cases present in the literature, exemplifying

how recent the focus was, and how complex each case, making it difficult to draw generalizations. Successful cases have been able to deliver improved *non-commercial* seeds, arriving at a better understanding of selection criteria for stressed environments, as well as making it possible to think of ways to extrapolate results in terms of their contexts by institutional setting, goal, environment and participation type (Elings *et al.*, 2001; Sperling *et al.*, 2001). This does not mean by far that all is solved, as the challenge today may be parallel to on-going challenges at the very technical level. For instance, diffusion of PPB-developed seeds appears as a constraint facing some pilot projects in developing countries, and improvements for operationalising that diffusion need to be identified in order to guarantee an adequate level of stability for these small enterprises.

Almekinders *et al.* (2007) note that the effectiveness of seed diffusion could be increased by means of understanding where strategic amounts of seed should be introduced, so this can be the beginning of a solution-finding process by means of understanding the LSS and the exchange practices between farmers, as well as the movement of the planting materials geographically. Nevertheless, poor diffusion is a concrete, visible problem arising not only from PPB projects but also from seed systems in general. There are complex underlying mechanisms that can result in an ineffective distribution both of seeds as well as the process of making them, negatively affecting the appropriation by small-scale farmers. These mechanisms could be grouped in general categories, being the most noticeable: institutional and organizational, legal and technological. As Sperling *et al.* (2001) argue, reaching “diversified, specialized and segmented markets has been less than well publicized in literature, albeit it is in this thematic area where the PPB challenges seem to be proliferating”, thus the need for such research and one of the efforts of this report.

Finally, it is argued that the realization of PPB experiences in development projects, and their impact(s) on partnership among and within groups of actors, as well as the further development of the technology and quality products derived from it, has resulted in more involvement from all farmers –especially those who took part in the breeding and selecting practices- as well as those

who are using the new varieties for consumption or for sale (Smith and Weltzien, 2000; Almekinders *et al.*, 2003). This is partly what I would hope to ascertain as the document unfolds, or if not in what ways it could occur, given suitable conditions.

The pilot project

The setting: some facts about Nicaragua

The study took place in a town called Pueblo Nuevo, in Northwestern Nicaragua, in the mountainous region known as Las Segovias (see Figure 3).

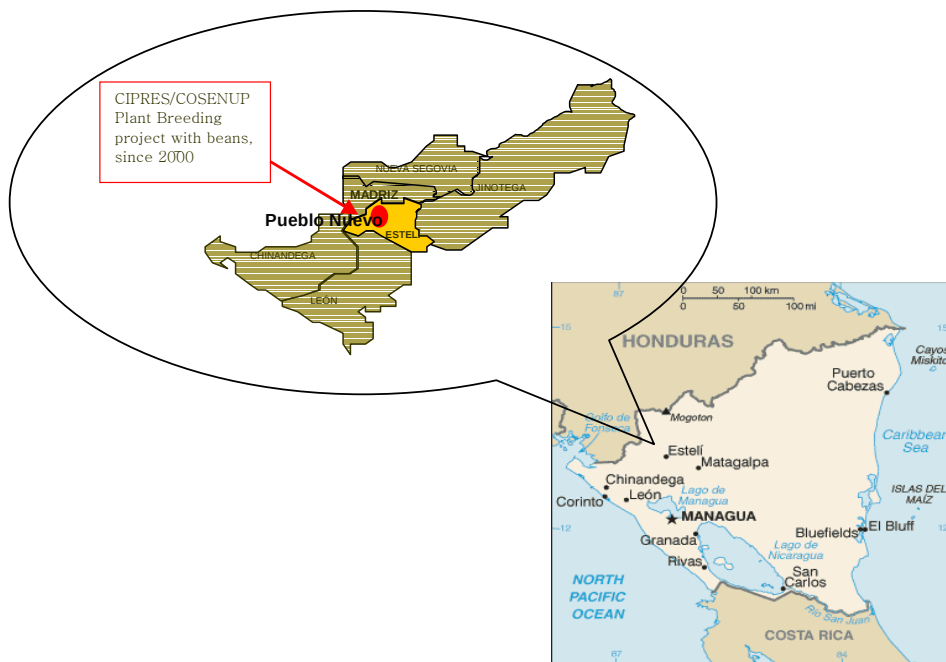


Figure 3. Approximate location of Pueblo Nuevo (red). The Segovias region is comprised of the Esteli (yellow colored), Jinotega, Madriz and Nueva Segovia Departments. [The lighter-colored areas around Esteli represent the potential for movement of the PPB-seeds].

With the highest area of land in Central America, Nicaragua ranks high in poverty as well, being one of the poorest countries in the western hemisphere. Armed conflicts, depleted natural resources as well as merciless natural

disasters have contributed to deepen the economy into a state of privation, affecting especially the least privileged inhabitants of the urban and rural areas.

Nicaragua, is situated in the place 112th of the United Nations' Human Development Index, out of a 177 nations. The distribution of wealth is very inequitable, and evidence of it is that almost half of the population has to survive with less than US\$ 1 per day (UNDP, 2007). At the same time, while access to water for sanitation is limited, the lack of water sources and dry conditions (between 800-1000 mm of rain per year in the North) makes small-scale agriculture a difficult activity (INETER, 2007). Around 70% of the population is literate, and out of the approximate 5 500 000 total population a little over 40% live in the rural areas (INEC, 2007). According to the same institute, the production and consumption of beans have nearly doubled between 2000 and 2002, supporting what the report by CEPAL refers to as the only country in Central America to have actually increased production⁴, indicating a growth in the economy (CEPAL, 2003). The same report accounts for about 180 000 families who are dedicated to the production of grains in traditional/artisan ways, at the same time as self-consumption of grains does not exceed 20%. In general, the consumption of fish, meat and vegetables is very low, and beans are the major source of proteins and iron, although energetic and vitamin C deficiencies may limit the availability of the former.

The PPB project

In Nicaragua, as well as in other countries of Mesoamerica, a PPB project was initiated in the year 2000. The so-called Collaborative Program in Participatory Plant Breeding-Mesoamerica (PPB-MA) project, partly funded by the Norwegian Development Fund (NDF)/NORAD as well as other donors, has a local counter part in each of the countries in the region and has been running continuously for over 6 years. Its final objective is to improve the livelihoods of small-scale farmers in Mesoamerica through the use of participatory plant breeding techniques (CIPRES, 2004). In Nicaragua, the project is being carried out

⁴ Although this has been directly related to more land cleared for agriculture.

through the local organization CIPRES⁵ as its counterpart. CIPRES has been working throughout the country, and specifically in the area of Pueblo Nuevo, in the northern Department of Esteli, for about a decade now. I was invited to participate, along with two other Norwegian students, to do our research with institutional support from the NDF, so that in the end the studies would aid in the formulation of future policies for cooperation in the region.

Earlier work by CIPRES focused on strengthening food security of marginalized farmers in the countryside, especially after the devastation and misery caused by Hurricane Mitch at the end of the 20th Century. They started out developing a program called Programa Productivo Alimentario (PPA)⁶, as a way of provisioning resource-poor farming families with enough elements to sustain a self-sufficient agriculture (namely through the donation of cows, chickens, pigs, etc.) to later promote the organization of production units in small farmer-run cooperatives. This has been such an effective attempt at increasing food security and improving rural life that with the coming into power of the recently elected Sandinista government, the program has become a direct line of work for the “Zero Hunger” Program. It is within this program in mind where quality seed provisioning became important to CIPRES. They had already been encouraging the preservation of *criolla*⁷ seed varieties on-farm, emphasizing the importance of preserving agrobiodiversity; therefore incorporating issues of production and improvement of plant varieties matched rather well with the goals and aspirations of the project promoters.

In the late 1990s the Dutch Gene Bank proposed to initiate a PPB project to explore methodological aspects of the approach, and funding was granted, partly conditioned to direct results in increased food security. At the beginning, they sought the participation of the producers to develop seeds with good adaptation to the local social, environmental and economic conditions (CIPRES,

⁵ Centro para la Promocion, la Investigacion y el Desarrollo Rural y Social (Center for the Promotion, Investigation, and Rural and Social Development); funded in the early 1990s (www.cipres.org).

⁶ PPA: Food Production Program.

⁷ Local varieties that have been maintained by farmers through time and space. Otherwise known as landraces.

2004). This translated in addressing the key problems of drought and Golden Mosaic Virus (GMV⁸) in beans by breeding new materials for local consumption and exchange. Indirectly, the project also aimed at the potentiation of the use and conservation of local diversity, the improvement in knowledge of techniques and methods of PPB between farmers, NGOs and academics as well as the establishment of networks of actors. The project claims to have benefited an approximate of 3000 small-farmers and indigenous peasants in the Mesoamerican area up to 2004 (CIPRES, 2004).

Led by CIPRES, the project in Nicaragua took off and within merely five years developed 2 varieties of beans; and in 2004 the farmers presented them in a public ceremony in Pueblo Nuevo. Their names were: JM and Santa Elena. Local farmer-breeders developed both varieties carefully, with the assistance and collaboration of a formal plant breeder from the National Institute of Agricultural Technology (INTA⁹) and technicians from CIPRES. I refer to “local” farmer-breeders when talking about those farmers who became involved in the project and were trained to accompany the process of plant breeding, in most cases performing mass selections and crosses from the segregating materials provided by the breeder from the research center.

As a consequence of having this newly available material, some of the farmers felt it was appropriate and timely to obtain a turnover from their investment of time and resources, and they discussed about a way to profit collectively from selling the seeds in the formal seed market. This required a legal person or organization to be responsible for the registrar in the Ministry of Agriculture and Forestry (MAGFOR), which resulted in the conformation of a cooperative of services, called COSENUP¹⁰. Again, this approach was compatible with the PPA project ran by CIPRES. Communication, participation and partnerships within and among the different actors have been an essential part of the

⁸ The introduction of this viral disease is directly related to the tobacco industry, which flourished temporarily in the area, but stayed long enough to shelter the vector that transmits the disease and affect significantly the yields in beans.

⁹ Instituto Nacional de Tecnología Agropecuaria

¹⁰ Cooperativa de Servicios Múltiples Nueva Unión de Productores / Cooperative of Multiple Services New Union of Producers

development of this pilot project so far. Nevertheless, it is a well-committed set of attitudes that will be essential for keeping the work done so far and in the new maize, sorghum and rice varieties, in which the cooperative and farmers affiliated to the program are working to produce in the near future.

Up to this point, it can be inferred that PPB projects have attempted to be successful in bringing about mechanisms for (economic) collective action¹¹: by increasing coordination, motivations, capacities and a sense of ownership; all of which may enable the actors in the LSS -as a group- to carry on with their learning and upscaling processes, as these become part of their livelihoods. The point is that if farmers want to benefit from the technology, they must find ways to work together, achieving a set of rules, joint investments and sharing mechanisms (Meinzen-Dick *et al.*, 2002). In the same line of thought then, it is possible to consider that these mechanisms have been somewhat materialized with the conformation of the cooperative itself, but it has yet to be seen whether they can take independent and successful steps in the short term.

The actors

As mentioned above, the COSENUP was established as a small-scale enterprise, in order to allow the group of farmers to have a formal register for their seeds before the MAGFOR, and also as a way for them to further develop their plant breeding skills and see to the benefits of commercializing their improved seeds. These seeds are known to be better adapted to adverse and input-scarce environments than those coming from the national breeding programs and international centers (Pasquier, 1998). Through this organization they are addressing two important aspects of the *upscaling* of this pilot experience: the seeds they produce and the process by which they develop them (which can be seen as part of the *institutionalization* of PPB). These two aspects can be consequently associated to the last element of LSS, namely the *distribution* component of it (see dotted lines in Figure 1), mentioned by Almekinders *et al.* (2002).

¹¹ Referred to by Berdague-Sacristan (2001) as the organization of a peasant-owned business firm capable of exporting products.

The object of this study is the cooperative COSENUP, which is composed by small-scale farmers that were originally involved in the PPB project coordinated by CIPRES since 1999. The size of their land-hold ranges between 1-5 Mz¹² (0,7-3,5 Ha). The organization was established in 2005, with 42 members, out of which 15 are female. From this group, 38 are fully active members who participate in the meetings and activities (Rolando Herrera, *pers. comm.*). The board of directors intends to have gender balance, which is why women are encouraged to participate. Besides the board, the cooperative is composed of four committees: the Surveillance, Commercialization, Credit, and Education ones; and although not written in the formal legal letter of constitution, there is another committee formed by the farmer-breeders that is in charge of continuing with the breeding research for potentially new varieties. Since its establishment it has had two boards of directors, many of its members simply rotating from one position to another. Despite that it is the third year since foundation, they are not fully legally registered before the Labor Ministry, mostly due to bureaucratic procedures, however this paperwork is supposed to be complete within this year. This is important, because without such legal-person-status they would be unable to hold a legal registrar for any new plant varieties' seeds they wish to sell.

Other important actors that are accompanying or interacting with COSENUP are: CIPRES, which has two part-time technicians in the area dedicated to assist the farmers in the developing, testing and maintenance of the cultivars. Out of the five offices they have in Nicaragua, only the one in Pueblo Nuevo is working with the PPB project. CIPRES is also a member of a network of NGOs participating in the PPB-MA, which altogether group and represent the interests of farmers in Costa Rica, Nicaragua, Honduras, Guatemala, Cuba and Mexico. In the vast NGO world of Nicaragua, there are other actors who work together with small-farmers in the rescue and preservation of local seed varieties, such

¹² Mz = Manzana (translates literally into apple), it is equivalent to 7000 m² (1 Mz = 0,7 Ha)

as: PCaC-UNAG¹³, UNICAM¹⁴, to mention the ones with a wider scope in the whole country.

INTA, the government-run institution on technology innovation for agriculture has been a very close partner in the last couple years, since one of its plant breeders has worked closely with the farmers from the start and a cooperation agreement was signed last year to allow for a continuum in the exchange of knowledge and the improvement of other staple crops by the farmers. According to CEPAL (2003), it is estimated that INTA can only cover about 1% of the area grown with beans with its improved varieties, making the cultivation and diffusion of landraces and locally improved varieties notoriously more important. MAGFOR has a minor role in interacting directly with the cooperative, but in its role of law enforcer has a lot of power and influence in the final outcome of the cooperative's actions, thus it is important to consider.

In order to visualize the latter in a schematic form, figure 4 gives an idea of the actors involved in this system, taking as a reference point the COSENUUP. Not in the figure, but no less important is to consider the interaction at the funding level, in which various international donors play a role. This, however, can be seen as part of the relationship between CIPRES and the cooperative.

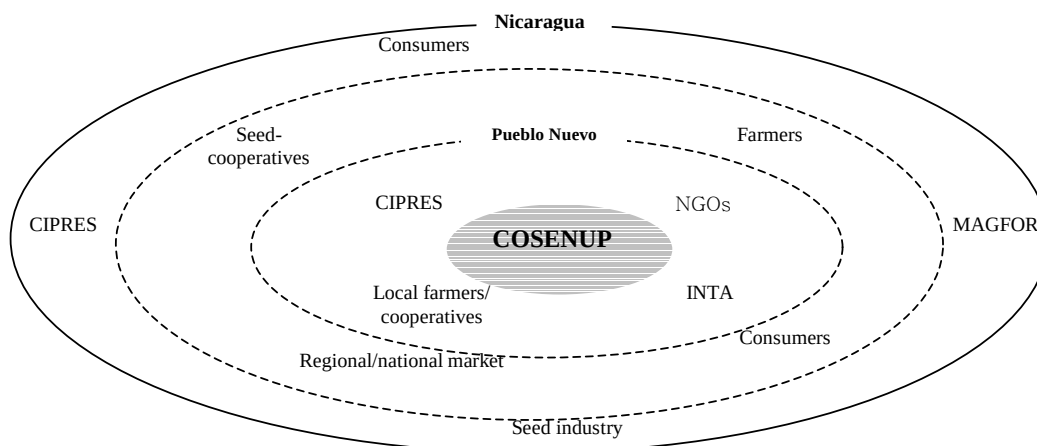


Figure 4. Schematic representation of the actors with which the object of the study is likely to interact with.

¹³ Programa Campesino a Campesino, Union Nacional de Productores Ganaderos y Agropecuarios: Peasant to Peasant Program, from the National Union of Agricultural and Livestock producers.

¹⁴ Universidad Campesina: Peasant University

The seed system in Pueblo Nuevo

As it has been made clear above, the complexity of the LSS must be acknowledged, and also the peculiarities that make up each system, in order to better understand it. Several reasons to why it should be studied can be put forth, but like in the case of Cuba (also part of the PPB-MA), it can be extrapolated that the weakness of the formal (national) seed system, as a result of the economical crisis, the overload of functions in the official bodies and dependence on external inputs, or even the lack of recognition to the role of small farmers in agriculture, makes finding alternatives for and with resource-poor farmers a worthy effort (Vernooy *et al.*, 2006). Figure 1 is important for visualizing possible new ways of interaction between the formal and local seed systems, since the truth is that in most cases both systems remain operating at separate levels, and in many cases farmers develop dependency on the formal seed system when it comes to acquiring new seeds, or become discouraged to value their own (Lohmme, 2005).

The LSS studied is located in the Municipality of Pueblo Nuevo, and to some degree in Condega as well (because some of the members of the cooperative COSENUP are from there). Both locations belong to the Department of Estelí, and the neighboring Departments that could participate in the exchange of seeds are illustrated in Figure 3. For the purpose of illustrating the situation with some numbers, I will use statistics from Pueblo Nuevo only, since it is here where the cooperative operates most of the time. Such numbers belong to the latest national authority's surveys and statistics, INEC, for the period 2000-01 (2007). With almost 1500 production plots the majority of the farmers in Pueblo Nuevo work in family land-holds of about 2,51-5 Mz (1,75-3,5 Ha) big. Of this amount, almost half (729) belong to some sort of farmer's organization, and the majority are male farmers. This in a way shows the tendency of association that exists in rural Nicaragua, and to some degree the levels of participation of women in such activities. Out of all the farms, about 1000 of the plots are dedicated to the production of beans, and a similar number for maize, reflecting the importance of such basic grains in the livelihoods of Nicaraguan rural dwellers. A well-marked characteristic of the post-harvest seed storage is the

lack of appropriate infrastructure (i.e. silos), which prevents producers from getting favorable prices in the markets. In Nicaragua, the difference in the prices paid to producers between October and December has reached 55% for beans and 27% for maize, for example. This is especially important considering that more than 30% of the production comes out after October and many small farmers are involved (CEPAL, 2003).

In this setting, as in many others, the farmers have a long rooted tradition of saving some of the seeds they harvest, to have planting material for the next growing season. However, the situation of poverty many times forces farmers to sell even that reserve, putting at risk their food security. Exchange among farmers, of their preferred seeds is also common, and production of improved commercial varieties is usually done only to have a cash crop; as Aldo Rojas (from INTA) affirms “the farmers’ attitude in general will be to grow *criollo* bean for self-consumption, and the improved one for the market”. In Nicaragua, red or light red varieties are the most popular and have a good potential for commercialization, therefore the development of new varieties by the PPB project went in this direction. The identification of significant bottlenecks will attempt to suggest improvements to the situation of the LSS in Pueblo Nuevo.

Research questions

After thoroughly presenting the body of knowledge concerning PPB, the characteristics of the system at hand and upon reflecting on the framework proposed in the next chapter, I will post some practical researchable questions and sub-questions, which have dwindled over the past few months to finally translate into the following:

- What are the major bottlenecks for the upscaling of PPB-seeds?
 - How do the actors perceive these obstacles at the different levels?
 - How are the attitudes of the group perceived in view of these challenges?
 - What are the forces for and against commercialization of PPB-seeds?

- What challenges does PPB face in order to become established as a farmer's practice?
 - What capacities/alliances/mechanisms need to be recognized commercializing seeds and continue breeding?
 - What collective goals and incentives will ensure a success of the organization?

Chapter 2: Theoretical framework and methods

This section informs the reader about the theoretical approaches that were used to understand and analyze a Local Seed System (LSS) in Nicaragua. Using mostly qualitative data, the study focused on mainstreaming the outcome of a technology process (seeds) and its development (PPB). As it is relevant in the spirit of agroecological systems thinking, and as expressed by Gleissman (2004): “when we (...) consider farm systems as agroecosystems, we have a basis for looking beyond a primary focus on traditional and easily measured system outputs”, thus the tools and ideas used are meant to give another view of the problem of seed provisioning for small-scale farmers in developing countries and the putative improvements to the LSS.

Mainstreaming the development process of the technology means to a large degree the institutionalization of PPB as a practice; this would be done mainly by the cooperative and would imply its establishment as a source of knowledge and experience for other local organizations interested in emulating and adopting the capabilities to their own environments. Other challenges regarding production and distribution of seeds, such as: market contexts, organizational issues, strategic alliances, quality control, production flow and anticyclical demand, legal registrar of the varieties, infrastructure, human and capital resources, price variation, etc, were also contemplated during the collection of data and interviews.

Additionally, despite the fact that the object of the study interacts at other levels outside the local system, many of them presented before in figure 4, there is yet another dimension worthy of mentioning: the biotechnical one. This realm refers to climatic conditions, seed quality or other aspects, which are not necessarily elements induced by the actors. This is important because for an agroecosystem to be sustainable -besides the economic and social processes suggested in the figure- it is still the ecological sustainability that is “the base upon which other elements of sustainability depend” (Gleissman, 2004).

Research framework and approach

In order to pursue the study in a systematic way, a main objective was drawn by means of the following schematic representation, which I include for a clearer understanding, showing the tentative steps needed to achieve (Fig. 5).

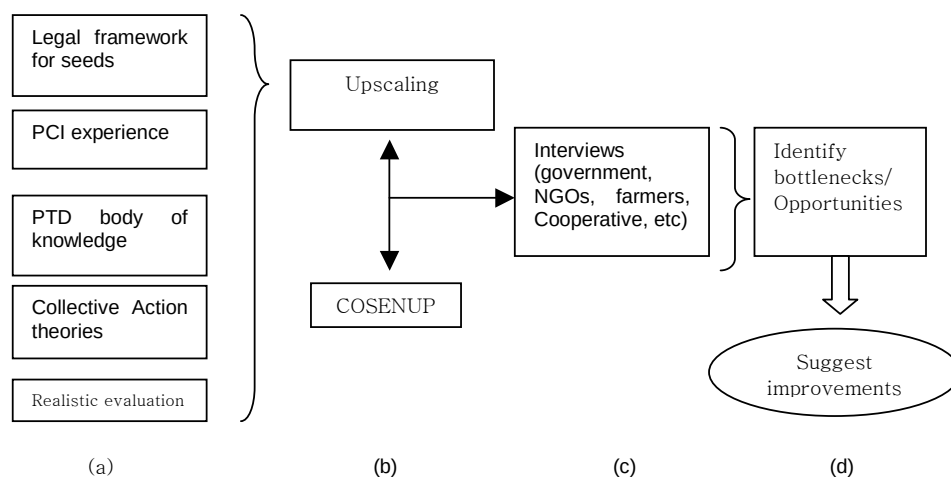


Figure 5. Research framework schematization, illustrating the theoretical background needed to accomplish the objective. As it can be seen, column (d) represents the final outcome, and (c) the data collected in response to the (b) study of upscaling in relation to COSENUP, departing from (a) the body of knowledge. Based on Verschuren (1999). [PCI=Participatory Crop Improvement; PTD=Participatory Technology Development]

This representation can be a useful tool to guide the researcher in drawing a blue print of the topic and investigation process. It may also be possible to derive or suggest where lie the mechanisms that need to be established or continued, in order to allow for the effective realization of the goals of the cooperative COSENUP.

Formally formulated then, the objective of this study is to identify the challenges, whether they represent bottlenecks or opportunities¹⁵, facing an effective upscaling of PPB products and processes in relation to the interaction between the (governed) environment and COSENUP. An association with the cooperative is also made, by providing an overview of relevant theoretical and

¹⁵ I consider that a bottleneck (as a hindering force) is as much a challenge as an opportunity (a supporting force), thus they both need to be considered

practical aspects found in the literature, leading to assess its work as a group. When I refer to the *governed* environment, it is only to give the image that there can be two kinds of environment around the work of the cooperative: one where the people at different levels have an effect, and the other where the natural environment plays its role, independently from the influence of people (what I referred earlier as the biotechnical realm).

The reason COSENUP was chosen as the object of this study, resides in the fact that they have been the final creators of the technology (seeds) from the PPB project, and can be seen as the organization “representing” the novelty of the local seed production and distribution system. Also the way to generate the data and perform during fieldwork derives from this scheme, as it is through interviews that the views on the cooperative and the upscaling aspects were to be collected.

Research approach

The researcher engaged in an ethnographic study of the cooperative COSENUP in order to get immersed into the LSS as perceived by the actors themselves. An ethnographic study allows to plot the different relevant players and their views on what the LSS and PPB mean to them during the normal course of their lives, and also to see the way they act in relation to the challenges ahead. The general characteristics of the ethnographic approach, as a way of participant observation, are drawn in the following table (table 1), adapted from Silverman (2001).

Table 1. Description of the main characteristics of ethnographic studies

Aims of observational research:	
Seeing through the eyes of...	Viewing events, actions, norms, values, etc. <i>from the perspective of the people being studied.</i>
Description	Attending to mundane detail to help us <i>understand what is going on in a particular context</i> and to provide with clues and pointers to other layers of reality
Contextualism	(...) Whatever the sphere in which the data are being collected, <i>we can understand events only when they are situated in the wider social and historical context</i>
Flexible research designs	(...) Preference for an <i>open and unstructured research design</i> which increases the possibility of coming across unexpected issues

**Adapted from Silverman (2001, p. 46) / ** The italic and (...) are mine.*

Observation is undoubtedly a valid way to try to understand the activities of COSENUP, however there are two aspects of it that may have methodological implications, and brings us to the distinction between ethnography and technography. Ethnography, as described by Babbie (2001), is a “study that focuses on detailed and accurate description rather than explanation”. That is to say, it is based on observations of a human group. On the other hand, a technographic approach is about mapping the processes and client groups in order to know how the elements combine in the socio-technical system (Richards, 2003). The reasons these two aspects around the same system are important to visualize are that 1) an ethnographic study, strictly speaking, would take place in order to take records of the organization from within, as well as its interactions with other actors, and derive an explanation; but 2) a technography would enable the researcher to lay out the different actors who partake in the technology use or development of it, at the different levels, more at the organizational levels and of the stage of expansion of the technology. Both aspects are somehow combined in the proceedings of this work, as the research job also occupied on the relationship among organizations, especially those that exercise some kind of power over the activities and future sustainability of the system in question.

Nevertheless, and although both are important –two sides of the same coin one may think-, it is my impression that if the issue of looking at the interactions within the organization remains vague, then the other aspect will unlikely develop much further. That is, if COSENUP’s activities are not clearly projected and its bottlenecks diagnosed and dealt with, then the mainstreaming process will be affected. Another reason for inclining more towards ethnographic elements is because of time limitations; however, future technographic reviews of the same system will probably complement the findings herewith.

In addition, another device was employed to look and analyze the system, so that it would be the *goggles* to view it with. Using *realistic evaluation* to screen through the observations will enable the researcher to identify which mechanism will affect the potential outcome in a given context. Implementing, adopting or overcoming such mechanisms, will presumably lead to a more

effective upscaling of the seeds, and will contribute to improve seed provisioning. More on the latter and other aspects of the research design, such as collective action and participatory technology development (PTD) will come ahead. With all these elements, the research tries to give a brief insight about the readiness of the cooperative for tackling such challenges, and whether the actors have sufficient tools and the right attitudes to continue employing the technology by themselves towards the cooperative's sustainability.

Collective action

When looking at issues of groups working for a collective good, in this case an enterprise for seed production, it is important to link this to what some literature draw on collective action theory. The collective good in this case appears linked directly with the theory of public goods, which is characterized by its *jointness* of supply and impossibility of exclusion. It means that, in contrast to a private good, a public good is that which is consumed in the same, *or fair*, proportion by every individual (Hardin, 1982). In this case it can be the seed itself, through the amounts produced and delivered; but also the financial and social capital of the members of the cooperative. This is what Meizen-Dick *et al.* (2002) describe as the way in which groups coordinate the individuals' actions, acting directly or through an organization in pursuit of the members' perceived shared interests. This suits the case of COSENU in that through the organization, the interests of farmers working with PPB-seeds will bear fruits when they reach self-provision of seeds and start perceiving the benefits of the commercialization.

As a way to extract the concept of collective action from the classical literature on the topic, one can say that it has been mainly explained through three different metaphorical models, which are posted here for reference only: *the tragedy of the commons*, which talks about issues of degradation of scarce common resources; *the prisoners' dilemma*, which is conceptualized as a non-cooperative game in which both players have incomplete information; and *the logic of collective action*, which says that groups tend to act in support of their

group interests following logically from a widely accepted premise of rational, self-interested behavior (Ostrom, 1990; Hardin, 1982).

Nevertheless, the latter notion has been challenged by Olson (as cited in Ostrom, 1990) through the following statement: “unless the number of individuals is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, rational, self-interested individuals will not act to achieve their common or group interests”. This would occur in the event that both the individual and group’s interests are not the same. Recently, an interesting argument by Solstad (2006) was that antagonism does not have to exist between individual rationality (self-interested) and cooperative (altruistic) behavior in common property resource exploitation. This follows from a certain critique to the prisoner’s dilemma in which he says: “dynamic considerations are neglected, communication between players are not allowed, and as no kind of group cohesion and identity among players are paid attention to, the *static* prisoner’s dilemma *does not* provide the players with an institutional setting for analyzing rational decision-making in the context of common property regimes”¹⁶. So, in the debate about collective action, perhaps more intricate institutional settings are needed to give meaning to and to be able to check against terms like cooperation.

Collective action aims at production/consumption of common goods, where the cost of excluding non-cooperating individuals will range from very high to infinite. In this context is where the notion of “free riders” appears as an incentive for individuals in order to maximize their own benefits (Ostrom, 1990). This means that although it may seem rational to work for a collective good, it is also very likely that some members of the group will not make as much effort as the others, but would try to benefit the same with the minimum effort possible. Solstad (2006), though not arguing on the phenomenon of free-riding, comments that a “unified purpose has the potential to form group cohesion among the members of the commons”. The two views, although contradictory to some extent at first, are important elements to analyze the dynamics of the

¹⁶ The italic is mine

object of study, and I believe are essential aspects for the success or failure of a project of this nature.

In this sense, it would be worth looking at two levels of free riding: one where COSENUP itself is an active group as long as CIPRES continues to give them incentives (i.e. financial or human resources) to carry on with the work; or another scenario where within COSENUP some members are not as motivated as the others, or have different attitudes towards the goals that the group originally set out to do. To view this, a cohesion-factor is explored, to see whether COSENUP acts as a free rider in the scheme of CIPRES, or inside COSENUP whether there is a cohesive group, or sub-groups inside the group pushing for the fulfillment of the goals.

Many questions thus emerge after giving some thought to the theory of collective action as a whole, particularly in relation to this small group of farmers: first off, is collective action a useful way to explain whether the cooperative is successful or not in the use/sale of their improved seeds? What about the set of rules, joint investments and sharing mechanisms within the organization? Is collective action a binding ingredient when it comes to PPB-pilot projects in relation to upscaling? Can there be incentives that will enable the commercialization success and benefit of all? Which ones? These issues will be unfolded in the following chapters.

Participatory Technology Development

In direct relation to agroecosystems, the concept of Participatory Technology Development (PTD) is defined by Reijntjes *et al.* (1992) as “a complementary process which involves linking the power and capacities of agricultural science to the priorities and capacities of farming communities, in order to develop productive and sustainable farming systems”. Then continue saying that “PTD is a purposeful and creative interaction between local communities and outside facilitators but does not intend to be a substitute for station-based research or scientist-managed on-farm trials.” All these elements comprise the key

elements of rural agricultural innovation: agricultural science, farming communities, sustainability, farming systems, interaction, facilitation, complementarities, experimentation; and as such should be seen holistically. By doing that, farmers become real partners in research, by means of acknowledging their deeds and rights over the genetic resources they have worked with is an important step forward (Guijt and van Veldhuizen, 1999, Vernooij, 2003).

Based on (Meizen-Dick *et al.* (2002) it would be possible to link PTD to collective action as they argue the latter is an important step (but not the only one) in the adoption of technology. Applied to the case at hand, it would be interpreted as to say that collective organization reinforces and gives meaning to the work they put in the PPB. In other words, it has a direct effect on the technology process. For COSENUP, this has arguably been an important aspect of the project, in as much as the farmers have been present throughout the process of developing their bean varieties according to their predilections. One of the things that surfaces when looking at the cooperative, and as mentioned in the introduction about its configuration, is the issue that since its beginning the cooperative had planned to set a research department or committee. This organ is technically in charge of sustaining the PTD process, so it is valid to ask if it will be a challenge, as it has been identified for other agricultural projects by Guijt and van Veldhuizen (1999) as well.

Realistic evaluation: goggles to view the system

As briefly mentioned earlier, the study is embedded in a realistic evaluation, meaning that mechanism(s) that lead to projected outcome(s) in the determined context(s) are identified and analyzed. Naturally, the expected results are those that guarantee the mainstreaming of the technology and its development process. Then, the supporting forces (or mechanisms) are to be paired to social, cultural, and other conditions (contexts).

In order to do this, such mechanism(s) were preliminarily hypothesized and then empirically researched, in order to see if the predicted explanations were feasible at that point in time. As Pawson and Tilley (1997) put it: “outcomes are explained by the action of particular mechanisms in particular contexts, and this explanatory structure is put in place over time by a combination of theory and experimental observation”. In this way, theory becomes important to explain what is observed in the field. The authors worked mostly on cases around human behavior in urban societal contexts related to crime and health, but I inferred the ideas apply as well to agricultural development systems. As they claim, it is possible to assume that the “stratified nature of social reality” touches all realms of societal groups, in this case resource-poor farmers.

As a starting factor, some areas in which to find these bottlenecks need to be pointed out. The most important issues at hand, identified from the literature and on previous meetings with donors, researchers and technicians, are: institutional, legal and technological. In such conditions, what could be hypothesized is that a set of legal, financial and infrastructural incentives from governmental agencies, research institutions and NGOs will potentiate the capabilities of COSENUP -as long as this one remains motivated and organized- in order to improve the mainstreaming of their seeds and the PPB methodology. Several assumptions are summarized in this hypothesis, such as that the registration of the seeds before the MAGFOR will enable the cooperative to establish itself as a provider of quality seeds for marginalized farmers in the Segovias, and also that there will be access to credit for the cooperative for the purchasing of equipment, land, inputs, and lastly that technical hindrances will be solved in cooperation with the pertinent institutions (i.e. INTA). Also, while some of the conditions may be given, I believe it is the combination of them that would yield the most effective result.

There will be conditioning factors at different levels, but one must focus on those that are directly inhibiting the organization from achieving an effective production of seeds, sound legal status, commercialization and sustainability in the long run. These underlying conditions are essential to understand the importance of the mechanisms, as they are part of the explanatory strategy as a

whole. Deriving from Pawson and Tilley (1997), what is intended is to draw an “apparatus” that will govern the system in order to have an adequate action/balance and produce the desired seed distribution and PPB expansion. The idea here is that the mechanism is responsible for the outcome, and not the other way around. This apparatus might as well be a series of proposed mechanisms, and most likely not a one-size-fits-all solution. Again, and as mentioned in the introduction to this chapter, external factors that have a direct influence in the context are the biotechnical conditions at the production phase (i.e. planting, harvesting, storing, etc.), which will reflect in the social and economic conditions and are independent from this apparatus.

Methods

Unstructured, open-ended interviews with different key informants at all levels in the seed system, as well as reviews of organizational records and national legislation, and even small surveys were used. For selecting the interviewees a *gatekeeper strategy* was used, described in Bryman (2004) as a way to gain access to the group. The technician of CIPRES, Rolando Herrera, who works half of his time for the PPB project, was the person who introduced me to the different informants. Previous to that we would have discussions as to who were the most or least productive farmers, who participated the most, who were on the board, who were from close by or farther out, etc. Among other things, the goal was to get a comprehensive view of the group in order to understand its functioning and possibilities for collective action; as in order “to understand social contexts (one) requires an analysis of the incentives that depend on dynamic relationships” (Hardin, 1982).

The interviews with the cooperative included 10 individuals out of the 42 members of the cooperative, twice with 6 of them, a meeting with the board of directors as a group; and a final group meeting with 14 members at the end of my fieldwork to try to generate a discussion from the preliminary results I was delivering based on what I had been talking with them. In this meeting the farmers also worked in individual groups and presented their observations to all.

Later they put together a SWOT analysis, facilitated by the technician from CIPRES. The idea was to try to understand their motivations and assess their organizational capacity, as well as to know what challenges they perceived in terms of legal support, technical knowledge, quality assurance, market channels, etc. A survey of non-statistically-valid proportions was performed with 8 members of the cooperative, to try to see where there was a preference for commercializing their seeds.

Also, I met with 5 individual farmers who did not belong to the cooperative but were part of the PPB project in other communities, after consultation with the technicians of CIPRES; one of them being a key farmer, as he is doing breeding and investigation. The idea was to understand what did farmers participating in the project need in terms of incentives to organize themselves, and to assess their motivations for participating. Further on, I met with the president of the board of the central of cooperatives¹⁷ CECOOP, formally with 3 members of CIPRES' staff in Managua and Pueblo Nuevo (and informally with many more), 3 technicians of INTA and the director of the Seed Department in MAGFOR, as well as other actors from NGOs or institutions that are likely to interact with COSENUP (6 in total). A few of the interviews had to be done by sending a questionnaire to the interviewee via email due to lack of coordination in finding a place and a time to meet. Not all were returned.

As a way to fully observe while participating in the different activities of the organizations, I would go with the technicians to the field as many times as possible (motorcycle at full throttle and no helmet). I took part in the first national meeting about PPB and also took part in the office work when necessary, and some meetings with staff and the central of cooperatives' board as well. Lastly, but not the least, I found out that informal conversations with locals, farmers who have no participation in the project, as well as dwellers or youngsters in the community or even the bartenders and dining hall owners,

¹⁷ This is one of the superior-level cooperatives typified in the law, in which a number of cooperatives unite in pursuit of broader common goals (i.e. better commercialization, infrastructure, etc.). CIPRES intends to organize farmers up to confederations, if possible. The CECOOP is the one COSENUP, until very recently, belonged to.

were powerful sources of information, not to mention partaking in cultural village events, such as the baseball games.

All in all, the time factor was most likely limiting to perform all the necessary tasks for a thorough study, as 7 weeks total can go by very fast (3 in June 2006, and 4 in January 2007). In any case, it was important to at least try to grasp the most of what was there in order to assess the performance of the project in light of the results that have been obtained so far, and to try to foresee improvements on the LSS, inspired in agroecosystems thinking.

Chapter 3: Upscaling technologies and institutions

This chapter describes and argues on the issues of mainstreaming seeds and Participatory Plant Breeding (PPB) for the specific case study in Nicaragua. In doing so, I try to link relevant literature to the information collected during the field visits; but I mostly show what derived from the interviews involving different actors in the LSS, the national seed system and accompanying organizations.

The importance of participatory approaches has been recognized in R&D literature and reflected in the improvement of rural life in developing countries (Ashby and Lilja, 2004; Morris and Bellon, 2004). Nevertheless, criticisms have raised concerns about the “replicability and, hence, the potential for scaling-up” of such models (van de Fliert *et al.*, 1999). Where other methodologies for production and distribution of seeds related to conventional breeding (i.e. technical assistance) have failed to deliver an appropriate transfer of the technology -due to the extreme and variable conditions of marginalized farmers- is precisely where the strength of bottom-up initiatives take force (NDF/CIPRES, 2002).

Upscaling: A multi-dimensional approach

Upscaling, understood as the “development of mechanisms to multiply, maintain and diffuse seeds of the materials selected in PCI-activities” (Almekinders and Elings, 2001), is important in the context of this project as it goes beyond the *extensionist* rationale of developing a technology and getting the end-users to assimilate it. It is both the production of a technology that can be replicated in different locations in order to produce a more adapted research output, and the extension of such an output itself (van de Fliert *et al.*, 1999). In this line of thought, one can think the seeds (the “output”) get scaled up in two fashions: one by making them available to farmers, so they can stock up for their own provision; and the other by selling them as planting material. In this particular case the priorities are to get the seeds in the hands of more farmers; and secondly get the PPB methodology out, which would enable more farmers to

learn about variety improvement of their local varieties. One of the Nicaraguan farmers sums up this visionary feeling in a document for the annual meeting of the PPB-MA collaborative program, with the following phrase: “what couldn’t we do if all of us farmers were plant breeder..!?” (CIPRES, 2004).

I would like to draw attention into the concept of foodshed¹⁸, which can be helpful in providing “a conceptual and methodological unit of analysis (...) for action as well as thought” at a later stage in the process of becoming seed self-sufficient (Kloppenburger *et al.*, 1996). The concept comprises the imagery of converging places and people, in which food is not only something we need to survive but in a way it also defines us. In Nicaragua, beans are strong iconic figures of identity (as well as in Central America). In this sense, having a local production of high quality seeds is surely a move towards more sovereignty in food access, rural communities’ empowerment and even poverty alleviation. In Pueblo Nuevo, beneficiaries of the original program on PPB wish to move from the pilot-project scheme, and spread further to become more independent and recognized. Motivation and capacity building turn into important aspects for each contracting party (from donors and NGO to the farmers), not only for maintaining the success achieved, but in order to escalate in the foodshed.

For the farmers and NGO in Pueblo Nuevo it was after a rather short period of time -compared to conventional breeding- that the PPB project delivered seeds of two new varieties of beans (Santa Elena and Pueblo Nuevo JM 12-7). As a result, new capacities were built on those men and women farmers participating. Because of this, and motivated by the idea of being able to earn a profit from the work they had done, they organized in a cooperative of services. So, apart from the idea of providing locally produced and adapted seeds to generate grains for food consumption (in the household) and sale of surplus (in the market), they are moving towards also supplying seed in a potential external market. As a result, farmers from Pueblo Nuevo and Condega set out to put up a sustainable enterprise that would increase their income and quality of life (FDN, 2005).

¹⁸ This idea comes from the actual imagery of a watershed.

One thing has been evident over the last couple of years, and it is that identifying with the market, and gaining access to it has been a harsh process all in all (Javier Pasquier, *pers. comm.*). As one of the most enthusiastic farmers pointed out about their work: “we also realized that we need to keep improving, because we have varieties that are not the most demanded in the market, then we have to keep working with seeds that will have more acceptance in it”. All in all, the way seeds *move* in rural settings is remarkable and has helped to make more people aware of COSENUP’s new varieties.

Following on the idea of teaching other farmers their methods for obtaining new plant varieties generated the enthusiasm to form a committee focused on research and education. So, the dispersion of the technology development process -the PPB- to other areas and farmers’ groups is integrated into their objectives, though perhaps with a smaller part in the overall goals. This work has been done in collaboration with other actors (i.e. CIPRES and INTA) to guide the farmers in their learning process. This aspect can be further drawn into the idea of institutionalization, meaning the establishment of COSENUP as a seed provider for local markets, or for the national seed system scheme, which would enable them to take a more active role in the development of their area (refer to Fig. 3 to get an idea of the potential geographical dispersion of the seeds).

It is important to take note that when the project delivered the new bean varieties in 2005, and the cooperative was founded, both aspects of upscaling came to a sort of *impasse*. Lhomme reported this situation, as a forthcoming challenge, for the PCI project in 2005. Two years later, still the passiveness is attributed both by farmers and technicians, to difficulties in obtaining an adequate register for their seeds; preventing them from getting the seeds out to the market in a legal and profitable way. This does not mean that the seeds have not moved to other farmers, or that the name of the varieties and of COSENUP is not becoming noticeable in the scene, but only with a slower pace

and no legal support¹⁹. Meanwhile, the farmers continued to organize themselves internally in the cooperative, and in the PPB project as a whole, testing new varieties of maize and sorghum for future characterization. CIPRES has been leading the efforts to overcome this legal obstacle, and just recently (April 2007) the legal register for the first variety owned by COSENUP saw the light. It was granted to the variety known as Pueblo Nuevo JM 12, or simply JM (See Appendix III).

Diffusion of the PPB-bred seeds

It is important to take a closer look at the LSS, in order to get a deeper understanding of the ways seeds are diffused and what are the potentials for the cooperative in this setting. Additionally, looking at the attitudes of the actors from the empirical data helps in determining what are their goals, aspirations and roles in this regard.

Improved seeds enjoy a sort of half-popularity: many agree they are better, but another bunch think their own landraces are better. Whichever the case, the farmers from COSENUP agree that the seeds they have produced are much better than the ones they had planted before; and that now they do not have to worry about finding seeds when the planting season is about to begin. They are also aware that there are many farmers who do not keep their seeds, for various reasons, and end up using inferior planting material. It seems only natural then, to foresee the cooperative playing a central role in the diffusion of seeds in the LSS, as they know better their surroundings and life situations.

The seed supply in Pueblo Nuevo, before this project was even started, and also through the period of the armed revolution (which took place in most of the Segovias), was carried out among farmers mostly through exchange with themselves or by purchasing grains in the market place. As Rolando Herrera, one of the technicians from CIPRES puts it: “(farmers) would buy any beans in

¹⁹ Unfortunately, studying how the seeds move across geographical and social boundaries is beyond the scope of this report.

the market, and perhaps it was a grain with bad color or bad shape, but still they went and planted it". Out of necessity they would plant grains that yielded poorly and resisted badly to pests and diseases. It also occurred that even seeds handed out by governmental or non-governmental programs were many a times ill suited for the varying environmental conditions of the area or the lack of inputs at hand, and unwanted results were achieved. The purchase of guaranteed quality seed has been between null and almost insignificant, due to the economic possibilities of the clients.

An attempt to describe this situation is drawn in Figure 6, where the different ways that seeds would access into the system are placed in accordance to their importance (size of the input arrow). Farmers' practices of saving and reutilizing seed is depicted, and though it may appear as if all saved enough for each season, it is unfortunately a small minority that actually takes and active part in this process, a sign of the impoverished socio-economic situation. The surplus that is sold in the market to generate some income may be consumed by the buyers, or replanted for further production, turning this situation into a sort of "vicious cycle" that deepens the deterioration of the genetic materials and the local economies.

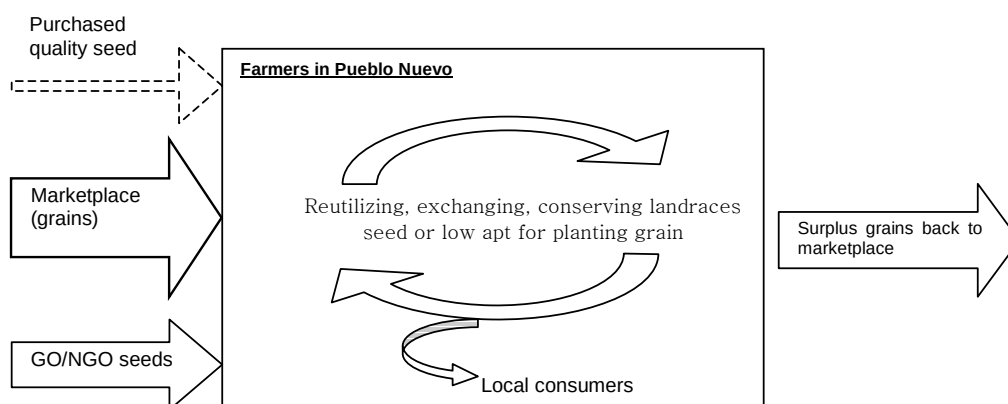


Figure 6. Schematic representation of the seed system in Pueblo Nuevo before the PPB-project was started, where inputs and outputs are drawn. It can also be inferred that this scheme prevails in most of rural Nicaragua.

Alternatively, the importance attributed to the PPB experience relies precisely in being able to supply seeds locally. For COSENUP though, it is also the commercialization of the surplus for a premium price in the market that matters. Drawing this putative situation would look as in Figure 7, where the local seed system acquires more independence and better quality of seeds.

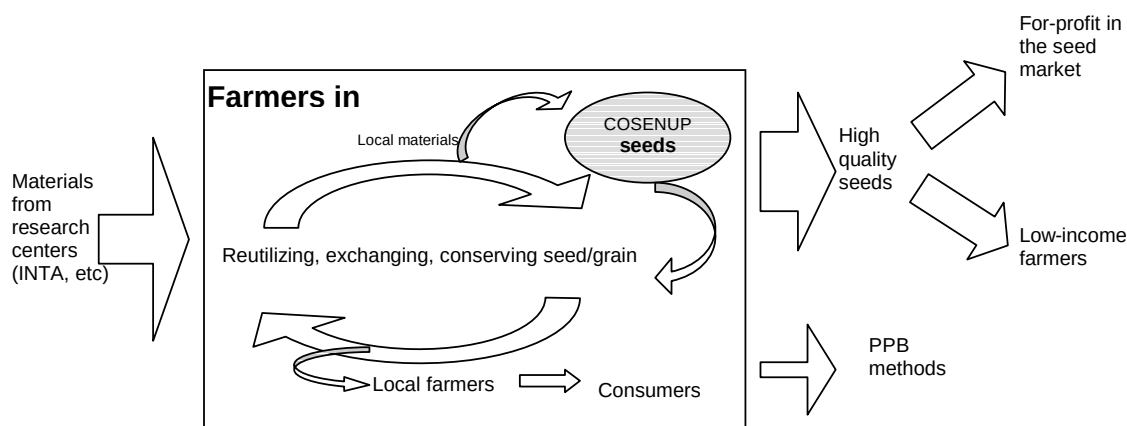


Figure 7. Desired situation in the Pueblo Nuevo seed system, where inputs of segregating/advanced materials are introduced until final varieties are produced, and learning of PPB is another outcome.

I meant to show both figures one after the other, so a comparison could be established between what has been usually the situation for resource-poor farmers in Nicaragua -if not all of Latin America- and what it would be when seed self-sufficiency and commercialization are incorporated. In this “future wanted situation”, the inputs into the LSS are those “raw” planting materials that the research centers (both locally and internationally) can provide. Also there is a new element inside the LSS: the seed cooperative, which could use some of the local materials, in addition to those coming in from outside, to produce new varieties. Within the LSS there would be local farmers benefiting from these varieties, as well as the final consumers, providing they are widely accepted. As an output, seeds are produced for the market, and two different niches are foreseen: one formal market, with premium prices for the seed; and another where small-scale farmers can access the seed through credits, for example. They both may seem a bit far from each other, but they represent the two extremes gathered from the accounts collected in the field.

When studying the different attitudes of the farmers to engage into this process of spreading further their PPB-bred seeds and even commercializing them, it is convenient to refer to the table in Appendix I, to take a look at the more or less raw data.

Seed production

Regarding their seed production it was noticeable how the members of the cooperative have different capacities for production, and infrastructure as well. When talking to Jose Manuel Gonzales, who is considered the “father” of the JM variety, he feels very confident about his production of seeds and infrastructure. Other farmers do not have good production capacities, and openly say that “it depends on the winter²⁰: if the winter is good then the production is good”. This is because access to irrigation is very scarce, and if the rain is limited during the rainy season, then the producers are left out on a limb. The female farmers are somewhat apart from the actual production, and are more active in the organization than in the fields. In the case of one of the interviewees, she said: “I don’t know anything about yields, as I get the seed and my husband does the work”. Altogether, the yields of beans (for grain production) have been greatly increased, as most of them are producing above the previous average of 12 qq/Mz²¹, sometimes doubling it. This perhaps remains the greatest achievement of the upscaling process so far.

Although the cooperative has not been very active lately, they have an arrangement for collecting the production, which consists of first a credit to the farmers of seed and inputs (mostly nitrogen fertilizer, urea or money), and then they collect a fixed amount of seed/grain and the loan. The former vice-president, now in another position in the board, remembered how they first agreed on 5qq of seed per member, and then it was increased to 10qq. This is most likely going to vary, as once they start producing seeds for a formal market, such conditions may not be met, and production may not be so

²⁰ Though the word they use is “winter” to refer to the rainy season, in Central America there is no winter *per se*.

²¹ The yields being also better than the national witness: INTA-Masatepe.

homogenous among producers. In terms of pure seed, a report from their first production accounted they had 18qq of Santa Elena and 18qq of JM guaranteed 100% (NDF, 2005). This however, was something the farmers guaranteed themselves.

An important thing that was stated by a couple of the farmers is how tobacco is becoming a *distraction* for seed production, or cultivation of staple foods in general, since it can pay up to US\$ 2000 per Mz to produce it (Jairo Videa, *pers. comm.*). It is important to remember that after Hurricane Mitch the area started to host many tobacco fields; and in this way the GMV was introduced in the area, since the white fly came with this crop. Today, also many tomato plantations exist, securing a niche for the vector of this disease. That pressure, next to the varying weather, as well as the lack of water for irrigation, access to land and credit, proper storage and lack of funds to have a full time technician were identified as the hindering factors in production of seeds.

Commercialization

Regarding the motivations towards the commercialization of the seeds it can be said that it varies greatly, since some claim not to “know much about that”, while others expect to be able to sell their seeds in “national or international markets”. Nevertheless, more grounded opinions prevailed, such as giving farmers access to good-yielding seeds, since “farmers usually plant grains and are not used to buying quality seed”; or to keep the quality of the variety and to keep breeding new ones. Additionally, some see an opportunity to get their work’s worth -since they “only get 25% of its value in the market”- and to improve their quality of life.

One of the farmers involved in the production of maize thinks there needs to be more follow up by CIPRES. This example talks about the dependence they have towards this organization. However, another farmer thought they had a solid structure, in which they could solve problems by themselves. Such contradictory remarks were collected on several aspects of the different interviews as well, but they will be commented when appropriate. Nevertheless

it is important to keep them in mind when reading the different attitudes, which reflect also the behavior of the group as a whole.

When asked about where they wished to commercialize their seeds, many of the answers were as varied as options there are. Previous to devising a sort of opinion poll and apply it to 8 members of the cooperative, I had spoken with some members of the board and got the impression from them that they were considering mainly five general areas to sell their seeds: Pound by Pound Program (PLxL)²², other cooperatives or central of cooperatives, producers, NGOs, or others. It is worthy of mention that although their answers led to the poll questions; the first data could not be tabulated, since I did not apply the same survey as to the rest of the individuals. And in that sense the poll could have had 12, instead of 8 respondents. With this in mind the answers are presented in a pie chart, where the percentages of the opinion and the spaces are depicted in figure 7.

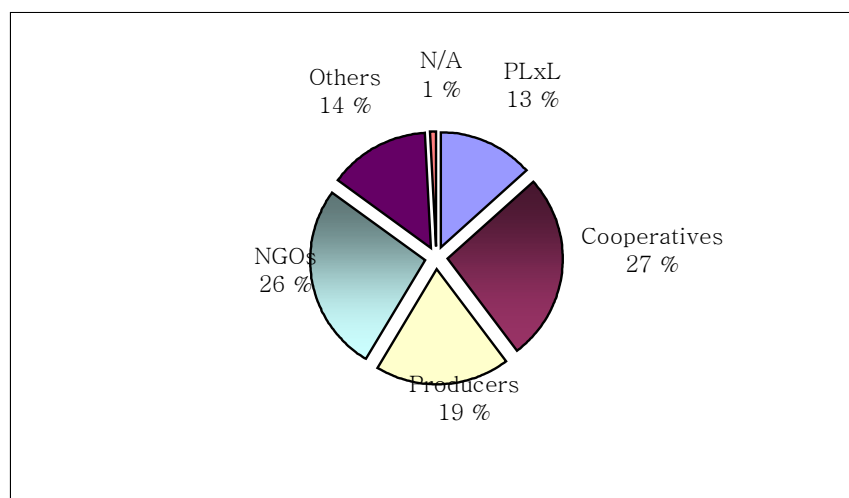


Figure 8. Opinion poll conducted on 8 out of the 42 members of the cooperative, intended to illustrate the preferred channel to commercialize their PPB-bred seeds. The option “Others” may contemplate the export of beans abroad, as well as to sell directly to consumers. N/A stands for “no answer”.

²² Programa Libra x Libra (PLxL): governmental program started in 2002 in line with the national seed plan (PNS). Refer to Box 1, for more details.

What I find particularly interesting from this poll, although not conclusive, is that one can at first glance notice that there seems to be no definite area bigger than another, no unique decision as to where sell the seeds. Two categories (cooperatives, and NGOs) are very similar and slightly higher than the other three (which are similar among themselves). It appears to draw a situation in which little communication or agreements have been reached internally, thus explaining the similar weight given to the answers. CIPRES technicians, on the other hand, are more emphatic when they say that the priority is “to strengthen the local market (...), in the municipalities surrounding Pueblo Nuevo”. Perhaps one can begin to see a difference in the ultimate goals of both organizations.

In terms of market channels, there was an interesting option I explored, through a new fund ran by FUNICA²³. Julio Monterrey explained to me how they could finance organizations such as COSENUP, for developing the markets and further technology; however among their requirements is that the beneficiary has a very strong organizational component.

Anticyclical demand

A very important aspect that was briefly mentioned in the previous chapter has to do with the anticyclical demand of seeds, particularly in rural settings, where farmers tend to save plating material from one year to the next. As defined by Almekinders *et al.* (2006), “anticyclical demand and price is the consequence of price variation in the marketed crop (...), by which high market prices for the product at harvest in one year stimulate the purchase of high quality seed for the next planting”. Although not many farmers actually do save their seed, and some members of the cooperative saw this as a good opportunity for commercializing locally their products; it could also be speculated -without fear of erring- that after a short while of purchasing their seeds many people may start saving seeds on-farm, because of the good germinating and yielding qualities as well as potential market acceptance. When this happens, the

²³ FUNICA: Fundacion para el Desarrollo Tecnologico Agropecuario y Forestal de Nicaragua / Foundation for the Technological Agricultural and Forest Development of Nicaragua. Public institution that invests in developing technical capacities in small and medium scale enterprises.

consequence would be an oversupply of goods at the time of harvest, causing the prices to drop. This would translate in uncertain returns on the production of seed for the cooperative.

When consulted about this issue, some remembered the events of the previous year -their first seed production season-, when they sold some seed to an NGO for a good price, and readily agreed on a second batch. When it finally was time to deliver, the prices were so low they would not obtain any profit, so they held the seeds and waited. When they finally sold the lot as grain the price they got was even worse than foreseen. One member recommended to “think about it carefully”, and another to “diversify the products, to avoid that situation”. In the event of actually having more demand than they had planned or could cope with, the ideas of the farmers ranged from getting into the PLxL (to ensure the government would see to move their production) to involving other farmers outside the cooperative or renting more land for the members.

Although upscaling does not necessarily contemplate the sale of the farmer varieties’ seeds only, because they could manage to provide informally a number of farmers in the area, their decision and organization scheme are such that they want to enter a for-profit market. Andreu Pol from PCaC-UNAG, an NGO involved in procuring and conserving local seeds was more supportive of local markets, for as he put it: “the markets with more opportunities and less risks, are the local farmers’ organizations, as well as organizations from both government and non-government that work directly in programs of rural development. This is because, among producers, there is more trust on the quality and origin of the seeds exchanged or commercialized”.

Registration

One thing appears clear when it comes to the cooperative though, and it is that they have not agreed whether to produce exclusively for the market or only a portion of it, so as to leave some seed accessible for smaller farmers, and much less on the amounts to produce. However, in the event the situation was to enter with all the production into the market, a crucial element for the legal

commercialization comes about: the seed register. It is convenient to point that, although there are several categories of seeds in the legal sense of the word, COSENUP would intend to sell certified seeds. Table 2, below, shows the different categories stipulated in the law's regulations. The last two are only considered when the Ministry decrees a national seed shortage.

Table 2. Different seed categories, according to the current legislation (Regulations of the Law 280 of the Republic of Nicaragua).

Category of seeds	Definition
Genetic	<i>Not defined in the text, but it refers to the breeder's seed.</i>
Basic	It is the first generation of the genetic seed multiplied and produced by the research centers.
Registered	It is the first generation of the basic seed multiplied and produced by seed producers and research centers.
Certified	It is the first generation of the registered seed, multiplied and produced by producers and seed enterprises, previously authorized by the General Seed Bureau.
Authorized	It is that which originates from the certified seed and is produced under the control of the General Seed Bureau.
Apt grain	It can come from the authorized, or from common grains (Xavier Eslaquit, <i>pers. comm.</i>)

**Free translation from the law text*

Though mentioned earlier as one of the major drawbacks preventing the upscaling, it is at the time of writing this paper a reality that the cooperative has gotten a legal register for one of their varieties. The law defines it as the process of *inscription, annotation and registering, carried out by the General Seed Bureau for the different activities related to research, production, import, export, commercialization and distribution of seeds (...), or any other activity related to their breeding* (Law 280; Art. 5.15). And in order to get it, they went through a process of certification, which involved the *supervision and verification of the genealogy, production, processing and final analysis of the quality of the seeds, destined to maintain the varietal and physical purity, genetic identity, physiological and sanitary quality for production, commerce and distribution of seeds (...)* (Law 280; Art. 5.5). This process included a number of field validations and paper work, and took almost two years after the variety was released to complete and see it become a reality.

Seed registry

Since fieldwork was done while the register had not been granted yet, I must report on what I experienced. Interestingly, many farmers showed little knowledge about what they were applying for, or when they should expect to get it. Farmers, and even staff of CIPRES, were speaking of patents, trademarks, author's and plant breeder's rights or labels, as the missing link between them and the market. It is not the point to argue against not knowing the precise name of the legal figure for things to be done right, but in this situation it can certainly help clarify the implications²⁴ and also arrange the steps to follow as a group.

It was very clear at this point how the farmers entrusted CIPRES all the responsibility to deal with the different aspects of the registration, and those farmers validating experimental plots were the only ones contributing occasionally with the technicians to collect the data to present before MAGFOR. The rest are waiting for the register to be official to begin planting. Nevertheless, judging from the way the technicians of CIPRES handle this issue, it is no surprise that the cooperative is leaning on them, so to say. Both parties say that the registration "is more of a technical thing", so it's better if CIPRES and INTA deal with it.

Finally, another aspect deriving from the commercialization was that of employing the benefits resulting from the sale of seeds. Most of the male farmers that replied were emphatic that the money would be re-invested in their farms, to procure better production conditions. Female members on the other hand, were speaking of using the income for "something that is more" or to "save for an emergency". The board answered more in terms of the projected 10% increase in the income of each farmer, saying that they wanted to see farmers with a better quality of life in their homes, and hoped they did not have to go out to buy the seed for the next season.

²⁴ For instance, the implications of an Intellectual Property Rights (IPR) regime are quite different from those of a commercialization permit, and can go as far as limiting the access of small farmers to seeds; but it is not in the scope of this study to go deep in this subject.

The attitude in MAGFOR, as expressed by the director of the General Seed Bureau, MSc. Xavier Eslaquit, is very positive, and they “don’t see any problem that these varieties are certified and introduced in the national production system”. His opinion is that it is a very good thing, because “out of 30.000 or so varieties, only about 14% are certified, and the rest are in the hands of the farmers, being a good opportunity to expand and distribute more their seeds”.

Diffusion of the seed-developing process

For Irma Ortega, from CIPRES, “it is not to think that the seeds themselves will solve all the problems (...), because climatic conditions may change and seeds may need to be improved constantly. It is important then to have people with that curiosity to keep experimenting. This project is like a provocation, to motivate people and keep promoting plant breeding”. This quote introduces the other aspect of mainstreaming, which touches on the PPB-methodology itself through the farmers’ cooperative.

In this area, the participatory technology development (PTD) approach gains more significance for as the literature suggests that “the development of both technologies and methodologies are highly dependent on local context” (Biggs and Smith, 1998). My interpretation of this is that in a given situation, a group may work on a specific technology with the tools given by their promoters, but in time they may (consciously or not) veer from it and diversify their methods.

Needless to say that upscaling the technology development process tends to be a more complex issue than the seeds, since it is not solely a transfer of technology (ToT) approach. Perhaps PTD came to challenge the ToT model itself, because of its lack of flexibility and adoption through linear flows of information (Sinzogan, 2004). As articulated by Haverkort *et al.* back in 1988, ToT “has not been able to formulate adequate answers (...) for the creation of sustainable agricultural systems, and for 'low resource' areas it also has not been able to contribute to a substantial increase of the production levels”. When breaking up PPB into its components, clearly the key term is “Participatory”.

Thus, the emerging challenge of participation depends on the underlying mechanisms of who is using the technology, for what and how; and its limitations should be acknowledged and dealt with (Biggs and Smith, 1998).

PPB is not just the introduction of a useful and beneficial technology, *from change agents to clients*; it is also a matter of finding users who will continue systematically with that process. COSENUP in this case as well as with the upscaling of seeds, would be the recipient of such a responsibility. As explained in Figure 7, the ideal future situation for COSENUP includes an outcome from the LSS that is less tangible, but nevertheless essential for the continuation of the seed supply inside the so-called foodshed: to continue developing the technology and to teach other farmers or groups of farmers how to develop themselves new plant varieties, in association with important actors, such as researchers and NGOs. Again, it is pertinent to highlight that PPB is no more than a complement to formal plant breeding, since the latter counts with more resources to operate. Figure 1 illustrates well this complementarity.

As in the past section, the accounts from the different stakeholders will follow in order to build the argument. First of all, it is necessary to confront the farmers in the cooperative with their motivations for participating, to somehow elucidate their enthusiasm for plant breeding. In this sense, about the importance they give to PPB, most of the farmers agree that knowledge is the most important aspect of the project they started with. “I have discovered some things and learnt about others; now I know that it isn’t that beans marry, but they mix”, says one of the farmer-breeders about the project. All in all it is the spirit of learning that has permeated the group of farmers, though it would be interesting to deepen in this topic to see how much knowledge the farmers really hold, since some say they “have discovered the life of maize and (...) learned to breed it” while others speak of their seeds as something “we’ve been given” by an external agent. The impacts from learning will be reflected in the short and long terms, as could be evidenced by the success of their future breeding endeavors; independently from the commercialization in the national or local markets.

The diversity of seeds, of different colors and in different environments, as well as the improved yields and adaptation of the varieties are other important points recognized by the farmers. On this aspect, however, Morris and Bellon (2004) recognize the advantage of producing these diverse and locally adapted materials, but warn that “in many cases they are unlikely to spread as readily as varieties that have specifically been developed to have wide adaptation”.

Altogether, perhaps the motivations to participate have been an internal struggle for many of the farmers, partly because of the slow process to obtain a registry to sell their seeds, partly because many of them participate also in other cooperatives; but it seems they are heavily impregnated with a sense of pride, of calling the seed “my seed” and of not “just being an anonymous group”. To be taken into consideration is another strong motivation, especially for some women, who said it was good to have seeds and be taken to workshops and field visits. Obtaining beans that have better flavor and smell, pleasant color and even good cooking qualities are important; for as stated by the president of COSENUP “the flavor matters more than the nutritional value of the beans”.

With the knowledge and the motivations to keep improving, as well as not having to purchase an essential input they can now produce on-farm, comes the question of how qualified they are to produce the seeds. Julio Molina, a breeder from INTA, thought at the beginning the project was not going to succeed, but “it is all a process, and what’s important is that they finished what they started”. At a later conversation, in reference to the level of training he considered the farmers of COSENUP had, he said that “(...) there are producers who have more interest than others, and with these it would be possible to carry their own improvement works. I think they are well trained and in the future could be promoters (of future INTA projects)”.

Perhaps a more thorough study would be necessary to measure the impact of the learning, but at least qualitatively the farmers feel ready to practice PPB. That is, they have adopted well the methodology, not just adapted to a new tool. Nevertheless, it is quite evident also that there are a number of members of the cooperative who do not participate actively in the actual breeding of materials,

especially women. Geographical distance from Pueblo Nuevo seems to be an important factor in this respect. Some members that live about one hour away (by car) said they followed some essays, or multiplied seed, or had attended a field day's visit to a farmer-breeder's field; but that was all. The board of directors says that it is important to preserve the quality of the seed; therefore they cannot have too many farmers working in the breeding.

It is no easy task, for the developers nor the beneficiaries of this pilot project, to be able to work out a new variety of plant. Capacities are necessary, or to be built, in order to guarantee sustainability of the methodology. In this sense the farmers declare themselves curious, but it was palpable that enthusiasm varied from person to person. The technicians from INTA have been an essential bastion in giving training opportunities to the farmers, to make crosses, to choose from lots of plants, to conduct small essays and replications. As Santos Luis Merlo, one of the most enthusiastic farmer-breeders, says: "the virtue of this project is in the sharing of knowledge between farmers and scientists; (...) we have to try to continue with it because weather changes and varieties change".

So, for upscaling the methodology beyond the organization, PPB has to be well implemented and internalized within. The research activities have to become institutionalized. An opinion on this, related to IPM²⁵ participatory research, is that of van de Fliert *et al.* (1999) who think that "extending (the methodology) among more farmers should in most cases not be done by involving more farmers in participatory research activities, but rather by designing training/learning activities that enhance farmers' experimental and analytical skills". This is in a way what the board of COSENUP does by not involving many farmers in the breeding process directly, yet the other component is lacking. In so doing, clearly defined objectives in terms of research and extension would help in not creating false expectations among participants, as some may become disappointed for not been considered for the "important" tasks.

²⁵ Integrated Pest Management

Training and generating capacities within the organization is important so that other farmers can learn from them, because as expressed by one member of COSENUP: “it is good to receive training from the members who know the most”. CIPRES and INTA have taken a task of mentors -through a written cooperation agreement-, and among the two have led the farmers through the individual selections and on to the validation of final plots. However, the breeder from INTA has a skeptical view regarding the capacities for seed production in the current conditions, when he says: “what I don't know is if in reality the producers by themselves will be able to do those processes for obtaining basic seed. We would have to give more training, and maybe then they could in the future, but for now we would have to be helping them”.

This talks about the opinions of those with the technical *know-how* and those with the skills to produce new varieties. It is clear at this stage that the cooperative should work on a low-profile production of seeds, and also on establishing research methodologies from within, while planning on forming *trainers* in the organization who can speak *the same language* as other farmers. In the article by van de Fliert *et al.* (1999) they mention the development of a training curriculum, which as such should be in the competency of the NGO or the research institution, to design “activities, modules and media for farmer training, (...) and then a curriculum for training the trainers can begin”. The interesting thing is whether this can be applied to COSENUP as an independent organization; because although there have been papers written by researchers and technicians, documents from meetings of the PPB-MA and publications from CIPRES about breeding, they aim at recognizing and legitimizing the experience as a whole. This is not to underestimate such support from the *outside world*, but the point is that a systematization of the tools the farmers need to acquire and methodologies for trainers to train them should be a clear objective of the project, so it could be replicated from within.

Empirical evidence suggests that the skills acquired by the farmers involved in the PPB scheme within COSENUP -though significant in terms of motivations both personally and collectively- are insufficient and need further planning. To

say the situation for PPB-bred seeds is more optimistic is not an overstatement, considering a recent PPB-MA report, which says: “despite the limitations, the results so far are inversely proportional to the size of the teams and projects” (NDF, 2005). It is however pertinent to pay attention to arising limitations, so they can be counter balanced. It is my impression that the two dimensions of upscaling this chapter has referred two can be treated separately in practice, and that establishing PPB may be more crucial in the long term, than gaining access to a for-profit market.

Chapter 4: Challenges in the *governed* environment

The previous chapter gave an insight into the issues of upscaling the seeds and the PPB methodologies. The purpose of this chapter is to connect those issues with the forces that are present in the governed environment; forces that are external and somehow shape the reactions of the actors in the LSS in Pueblo Nuevo. Once again, by the governed environment I indicate the setting in which people or institutions have an effect, in this case, on the cooperative's objectives. Understanding the project as an intervention program to bring about change, and paraphrasing Pawson and Tilley (2006), PPB can be seen as a “theory” that is “embedded” and “active”, and which is part of an “open system”. By looking at it in this way, a realistic evaluation can be elaborated based on the experience generated by the PPB project and the venture of COSENUP.

A look at the *governed* environment

Parallel to the concept of LSS, there must be some space for considering the relations within and among actors that will have a further effect on results, especially for the cooperative. In such map of people or organizations, beyond the seed flow-charts from the past chapter, one must include the main institutions that hold some power in the decision-making processes, from the grass-roots level to the international sphere.

In this way is how we arrive at figure 9, which shows the institutions that in one way or another shape the events around COSENUP. They are CIPRES, with its local and national office, which are funded for the PPB project mainly by NDF and ACSUR²⁶. Nationally, INTA is in charge of technological innovation for agriculture, and is regulated by the MAGFOR. The local farmers in Pueblo Nuevo are of course important, since their acceptance of the final product is

²⁶ ACSUR-Las Segovias: Asociacion para la Cooperacion con el Sur / Association for the cooperation with the South. Spanish NGO with long history of cooperation with the Segovias region in Nicaragua.

vital for the continuation of the mainstreaming process. The dotted lines between COSENUP and the local farmers and the central of cooperatives indicate the somewhat un-established relationship still, due to lack of promotion and inability to sell the seeds. The national office of CIPRES has a special connection to a wider market, since they are pushing for initiatives to connect many cooperatives through federations and a marketplace in Managua; in this way having a privileged channel for commercialization, though still disconnected from COSENUP. In this scenario it becomes quite evident how the dependency of COSENUP on CIPRES is not only necessary, but at this point inevitable, since they have not yet managed to construct their own marketing strategy or production planning nor have they built alliances at the local or national levels.

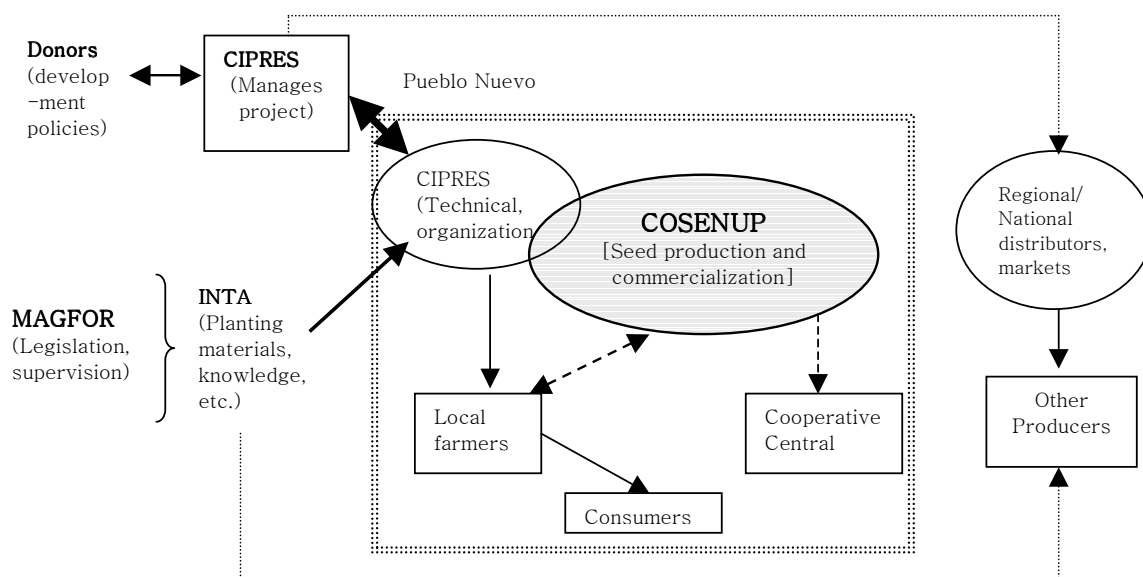


Figure 9. Schematic representation of the governed environment; COSENUP being the central component. [Note that the PPB-seeds produced so far have not been able to be distributed or sold regionally or nationally, and also that the relation with the scientific institution is with CIPRES and not with COSENUP.]

The law affecting the commercialization of seeds, as far as planting material is concerned, is the Law 280 and its regulation, which is apparently undergoing a series of reforms along with all the laws related to MAGFOR, in order to avoid doubling efforts with other institutions such as INTA (Xavier Eslaquit, *pers. comm.*). This reform is not aimed at improving the access of small producers to

obtaining registered seeds, and perhaps the two things that will be more visible in direct connection to producers is the shortening of the validation period to one year (1 cycle) and the reduction of the fines (since they are very high and rather un-payable for most). MAGFOR is also in charge of running the PLxL program, which this year expects to benefit 130.000 small farmers (see Box 1 for more details).

Box 1. About the PLxL

The objectives of the program are to promote the development of a seed market, through the strengthening of the demand and the establishment of distribution networks; as well as to promote the production of staple foods and contribute with food security (MAGFOR, 2007). With the new government the program has been recently been re-named to Programa Nacional Alimentario-Semilla Certificada (National Food Program-Certified Seed).

The program claims to have supported many small-scale farmers, however there has been some exposure in the press, and through farmers and institutional staff about its effectiveness and ultimate goals. The farmers claim that many times the seeds given have not worked as expected, or that by purchasing the expensive inputs they still have economical losses, and that by not having appropriate storing conditions they risk losing their crops or get very low prices in the market.

On other hand, people from Centro Humboldt (Friends of the Earth Nicaragua) and FUNICA mentioned that the program was rather controversial because it took away farmers' seeds to replace them for improved varieties. "In this way", continued Julio Sanchez (from the former) "there is a de-capitalization of the germplasm, leaving the farmers *addicted* to new seeds and making them feel their landraces are not good". It also opens the door for big transnational corporations to come into the supply chain, among which GMO-seeds can be filtered or smuggled and further controversy about contamination, loyalties and accountability would unravel. For Mr. Monterrey (FUNICA) the program has been a waste, since the seeds collected were being stored in bad conditions and nothing was being done with them due to the bureaucracy in governmental institutions.



INTA, on the other hand is still working on the production and promotion of new varieties of basic grains, with materials coming mostly from the CIAT and Zamorano, which they try to put in the market at the lowest possible price. Another approach they are trying to engage farmers with, is to get them started in the production of seeds for the nostalgic market²⁷. Aurelio Llano, one of INTA's most experienced plant breeders, refers to this after mentioning the lack of institutional evolution within the government, saying that: "another problem is the outside market, (...) which is asking for "silk red", and no one else can

²⁷ This market tries to cover the demand of those Nicaraguans who have migrated, mostly to the USA, and who are now looking at purchasing the beans they used to eat back home. The demand has increased considerably and Mr. Llano was speaking of multi-million dollar investments in Central America to fill this market niche.

produce it. It is of specific adaptation, climatic conditions, and management; and what we can do is to manage it better to get higher yields, because when one tries to do breeding of this variety the cooking qualities are lost, and then it loses market". Evidently this attitude is more sober in terms of creating the breeding capacities in farmers that would lead them into self-provision of seeds, and it seems to be something all of the people from INTA I spoke with agreed on.

About the relationship with INTA, though all agree that it has been necessary and important, it was somewhat criticized by some of the members of COSENUP. There were remarks I heard more than once, blaming INTA partly for the delay in the registration of the new varieties, because apparently "they felt jealous of them", because they were able to produce a variety as good as the ones they promote and "it could hurt them (INTA)". Again, it can only be implied by this that internally in the cooperative there are several opinions and levels of knowledge as for the things that are going on. It is clear from the conversations with the technicians of CIPRES and the different people I spoke with from INTA, that the delay was due to the formalities established by the law and in charge of MAGFOR. Aldo Rojas, from the main offices of INTA in Managua, thinks that, on the contrary, COSENUP's varieties "won't compete with (us), because they will supply seeds to other producers. Besides, one of INTA's mandates is to help producers get into the market".

Another important actor in the area that I was able to interview was a seed-producing cooperative, in a place called Guasoyuca: COSERME. This cooperative, established in the year 2000, is dedicated to reproducing commercial varieties of beans (seeds), which they buy from INTA and the crops are sold through contracts with major exporters. For its president, Alejandro Alfaro, producing their own seeds for the market would "have more costs than benefits". On other hand CECOOP, the central of cooperatives in Pueblo Nuevo, is more inclined to the production of poultry and animal feed at the moment, so it is not prioritizing the commercialization of seeds, partly because of the registration issues (Rolando Herrera, *pers. comm.*).

Political situation in Nicaragua

This picture of the governed environment is influenced greatly by the political events, and in this sense the current political situation in Nicaragua is important for the mainstreaming of the seeds and the PPB. This is mostly because the rural areas have been neglected from adequate development policies during most of the liberal governments since 1990. The return to the power of the Sandinista party, with Daniel Ortega as its president for the second time, has stirred lots of passions and hopes in many farmers, as I witnessed during the change of governments last January. One of the farmers describes the new situation as “an abyss between what was there before, and what there is now”. Nevertheless, it is still very early to predict whether there will be better conditions in general (i.e. access to credit and storing, which seem to be the most felt necessities for small-scale producers (La Prensa, 2006)).

One of the positive signs of new and better policies from the new government towards this marginalized sector of the population comes from the implementation of a new program called “Zero Hunger”, with initial funds of USD50 million coming from the recently condoned external debt from the International Development Bank (IDB). The very interesting thing about this program is that it is an extrapolation of the PPA program ran by CIPRES for almost a decade now, and so much it is that its director is no other than the former director of CIPRES, Orlando Nuñez. This program has been the bastion of all the projects of CIPRES, in which the PPB itself is included.

Incidentally, another approach that is becoming very close to the farmers' sympathy is the new alliance established by the Sandinista government and its Venezuelan counterpart. The incoming government was only quick enough to announce, on the very first day of its taking office, that Nicaragua was joining the ALBA²⁸, which is in principle an initiative to counterbalance that from the

²⁸ Alternativa Bolivariana para la America/Bolivarian Alternative for the Americas. It is in principle a scheme of integration based on cooperation, solidarity and complementariness launched by the Venezuelan government, and which is becoming stronger in South America, and now Nicaragua.

USA called ALCA²⁹. Among many other things, the ALBA might open a possibility for the export from Nicaragua of black beans. As many people in Pueblo Nuevo would say: “we’re going to be trading oil for beans”.

It was almost shocking to see the recently welcoming attitudes of public servants from MAGFOR and INTA, compared to my previous visit before the elections. This could possibly be another positive sign of future cooperation, and the fact that the new variety JM was registered without any further obstacles clearly talks about it. However, it remains to be seeing whether this will give more space of action to COSENUP in establishing cooperation agreements, or providers for government seed programs such as PLxL.

Challenges to move into the national market

It is then convenient to bring out again the concepts of *realistic evaluation*, *context*, *mechanism* and *outcome* that were going to serve as a basis for the analysis the situation of the seed cooperative COSENUP, in face of its external (as well as internal) challenges. In the words of Pawson and Tilley (2006) “realist evaluations asks not, ‘What works?’ or, ‘Does this program work?’ but asks instead, ‘What works for whom in what circumstances and what respects, and how?’”. By saying earlier that the project is embedded in an open system, it was to confer the idea that there are different layers, at different levels configuring its possibilities; thus resulting in an interactive set of factors that can promote or deny change. These layers will be described ahead.

The previous section served to indicate the *context* in which the cooperative finds itself immersed. A context in which the possibilities are determined by a set of factors, be them for now: a situation in which there is a legal register for the seeds and one in which there is not. I will try to examine each situation also in the light of the different dimensions of mainstreaming: the seeds and the

²⁹ ALCA: Area de Libre Comercio de las Americas/Free Trade Agreement of the Americas (FTAA). This initiative started since 1994 but has seen many obstacles on the way to be concreted, and at present is rather stalled.

PPB. Since the current circumstances tell us that there is already a registry for one of the varieties, the first scenario will draw on the challenges for the seeds to be launched into a bigger market. These challenges have been arranged in the following categories: legal issues, varietal quality, costs, post-harvest management, market niche and product's acceptance and finally PPB.

Legal issues

The structure around national seed systems in most developing countries has failed to serve the majority of resource-poor farmers, nor sufficiently protect the genetic diversity on which all farming depends (Tripp, 1997). Green Revolution technologies are a good example of breeding and seed production handled by the government without widespread success. Seed laws, incidentally, were made to regulate for public sector activity, with little thought to commercial or community-level alternatives.

The challenge is to convey a fair legislation that can also favor those farmers with fewer resources, promoting varietal and seed quality while not hampering economic growth, and with effective and efficient information flows (Tripp, 2002). Theorists question which role should governments assume, all with different implications for the local or national seed systems: market mechanisms (competition), industry association or independent certifying agencies (cooperation), or centralized control (Tripp, 1997; Louwaars, 2002). Arguably a one-size-fits-all legislation could never be implemented; therefore one aspect that could be important to work on is the framework for registering the plant varieties itself. In view of the current context, in which the government is willing to open some possibilities for smaller farmers, a possible amendment in the requisites for registration, namely allowing for associations with INTA, would ensure that in the future it can become part of the normal procedure and not an exception.

A legal seed register gives the planting material the right to be sold for a premium price, once the proper criteria and registration processes have been

fulfilled. So, in terms of institutions³⁰, for COSENUP the association with INTA is vital, since one of the requirements to even apply for a seed register is to count with an experimental station (Xavier Eslaquit, *pers. comm.*). As mentioned before, CIPRES and INTA are engaged in a cooperation agreement, which for several reasons took almost two years to approve, but which finally came through in 2006, which guaranteed the collaboration of a plant breeder in the different stages of the PPB project. An agreement like this, but directly with COSENUP, will certainly propel a greater protagonism of the organization and more independence from the accompanying NGO, as was clearly stated by the technicians and the farmers themselves.

Varietal quality

Beyond the legal area, the cooperative has to face the technical challenge of complying with varietal quality standards once they register the seeds, in order to keep the certification. According to Parlevliet (2007), improved varieties can lose their identity and healthiness unless they are maintained properly. The author recommends as the best way to maintain seeds to have them at very low temperatures, but since conditions will most likely not allow, then maintenance selection would be the most proper way.

For Xavier Eslaquit, from MAGFOR, the new seeds are nothing but ecotypes, rather than new varieties; and warned the farmers to be alert against possible susceptibility to diseases and varying yields in other agroecological conditions. Testing will be an important aspect to address in this case. For COSENUP, the challenge begins at the stage of capacities and infrastructure, all the members agreeing on the fact that they need to receive more training (from INTA) on how to maintain varietal quality of basic seed. Its president, Jairo Videa, told me how most of the farmers are traditionally used to harvest their crop and immediately sell it, thus having nothing to manage afterwards.

³⁰ As proposed in the technographic approach.

On the other hand, Aurelio Llano from INTA pointed out that the farmers need to have a validation network, keep the seeds stored (i.e. cold room), produce the seeds in a different planting season than the commercial grains and in plots that have not been planted with beans earlier. In addition, and in similitude to what Parlevliet (2007) exposes, they must work on the pedigree, selecting individual plants, planting the progenies and then putting them together, by concentrating the genotypes, and finally obtaining the genetic seed. This is a procedure that must be done at least once every two years. In his opinion, with their resources (of land and infrastructure) it is a tremendous task and most likely an impossible one. Besides, sound maintenance practices other aspects for maintaining the new varieties must be kept in mind, which could bear additional resource inputs, such as: controlling the contaminating forces (outcrossing, volunteer plants, mixture, seed-borne pathogens) as well as the effects of mutation, natural selection Parlevliet (2007). Finally, the maintenance procedure will vary if the plants are different than self-pollinating crops with very little outcrossing (like beans). Maize, for instance, is an open pollinated species, and therefore the process would be different and to a certain degree more delicate.

Registration costs

The costs for maintaining the title of commercializing rights are not to be overlooked, as they represent an output that at this moment has been covered by CIPRES, but may as well be part of the expenses for COSENU in the future. First of all is the cost of the registration itself, which according to the present law is of 1050 USD (divided in 500 the first year, 250 the second and 100 the next three). This amount does not cover the expenses of registering each of the plots that will be planted with the registered seed; which according to the current internal normative of MAGFOR, in USD are: 1,12 per Mz, 4,50 for the seasons' inspections and 0,98 per each labeled quintal (qq). If all members of COSENU plant at least 1 Mz each season of seed production (which is the minimum allowed), the costs ascend to about 700 USD, considering a mean production of 12 qq/Mz. When the cooperative started their initial capital was roughly 500 USD, and apparently still some of the members have not cancelled

their initial contribution of C\$ 200³¹. The amount for paying the certification then can be burdensome to come out with each season if the sales do not go as well as projected. Nonetheless, a technician from CIPRES reported that their funds are rounding the 4000 USD right now.

Unfortunately, the story does not end there. In addition to the information provided by MAGFOR, Alejandro Alfaro from COSERME added to the list the costs of fertilizer (2 qq/Mz of 18-46-0 and 1qq/Mz of urea) and irrigation. Besides the inspection costs mentioned earlier there other important costs to bear in mind, such as the processing of the harvested seeds before packaging, which include transportation and storage fees, sorting of the beans according to their size, laboratory test for germination (minimum 85%), the bagging and the cost of the bag with the logo stamped. Non-monetary costs, also mentioned by Mr. Alfaro, but which also put an extra pressure on the producers' lands are to have a maximum of 20% slope, use of plough, and a specific plant density (12-16 seeds per linear meter, each mound separated by 60cm). Human resources are significant, as it is important to have someone supervising the weeding, as well as the health in the fields (i.e. plant diseases). It has been their experience in the last season that they certified 40 Mz and only 11 Mz were approved for seed production by MAGFOR, thus there is no guarantee either that all the plots and all the production of COSENUUP will enter finally in the labeled seed bag.

Post-harvest management

An issue, parallel to the genetic quality of the variety and which also bears its costs, is that of post-harvest management. For COSENUUP's president it is a felt necessity to have appropriate storing conditions, both for the individual farmers as for the organization. A few years ago some farmers were provided with metal silos, which have worked so far, but are insufficient for all the farmers. Mr Molina (from INTA) argues for the need of simple, non-expensive yet necessary equipment like grids, seed selectors and seed treatment devices. "We have given them the models and they are not hard to build", he said.

³¹ US\$ 1 is roughly C\$ 17 (cordobas). The initial contribution by each new member was established at C\$200, or US\$ 12.

Managing the humidity of the seeds³² has been a difficult issue for the cooperative that has already brought the cooperative some problems. Mr. Videa pointed out that some farmers have delivered their crops with a high level of humidity, and since they do not have the means to measure it, it has compromised the whole quality of their lots (i.e. last harvest). Achieving good storage conditions is not only very important for quality standards of marketable seeds, but of the utmost importance as a cheaper alternative for reducing the deterioration of the improved variety itself; for if very dry storage conditions are possible, then the maintenance can be alternated between one cycle of maintenance selection and one cycle of dry storage (Parlevliet, 2007)

Market niche and product's acceptance

Van den Fliert *et al.* (1999) talk about anticipating wider scale impacts by a careful planning involving “organizations and individuals that can provide mechanisms for (...) scaling up”. Part of this planning then would include the market in which the registered seeds are to be sold. However, and as mentioned in the previous chapter, in figure 8, it appears as if there is a lack of agreement internally in the organization as to which is the preferred niche to upscale the seeds. This move toward the market was, after all a component that was picked up *on the way* as the project unfolded; and as Julio Molina recalled “the idea at first was to do it (PPB) so that the neighboring producers would be benefited by the selected varieties, but they were not thinking then in seed production” in major scale. Also from INTA, Aldo Rojas, was very emphatic in saying that he believes “the seed market for small farmers is not attractive because of seed reuse. However, the export market is well demarcated”. And then he continued pointing out the clear advantages of exporting “red silk” beans to the *nostalgic* market, or black beans to Venezuela. As I said before, these options leave little room for the apparent goal of COSENUP, of selling its own seed varieties for a demanding market, as well as encouraging PPB in farmers groups.

³² The seeds must not have a humidity higher than 12% when stored.

In spite of this, there is still the question of whether the chosen market will accept the product itself. After all the variety has yet to be tested for different climatic conditions, which all in all will render the seed adequate or not for other regions. Moreover, these seeds are still unknown to many farmers, therefore the need for a balance between farmers informally spreading the voice about the goodness of the seeds, and about the advantages of purchasing them; or even trying to engage the State's authorities in the promotion. On the other hand, if it were the case they could sell the seeds to the PLxL program, they would have to pursue a contract with MAGFOR, aside from the seed registry. Entering this program requires a troublesome procedure, and according to Mr. Llano (INTA) the cooperative would find it hard to follow.

In order to offer seeds for a wider market, a careful planning of the production must take place, as improvisation will not deliver a sustainable solution. However, the cooperative has not had a session to plan its season's production, to which many of the farmers in the cooperative replied, somewhat puzzled somewhat undisturbed, that the next meeting would be to discuss those matters.

PPB

This shift in gears, towards looking for a market niche to earn a profit, can certainly stir up issues of personal interests and motivations within the organization, as the visions of what to do with the seeds could vary. Almekinders *et al.* (2006) pointed out about the initial PPB project that the motivations of the farmers comes from their pride and prestige and the learning they get from the experience. But, are these qualities sufficient to accomplish a successful and satisfactory supply of seeds for a formal market? Maintaining a group sufficiently motivated, especially in circumstances of "inadequate information, conflicting interests, or the nature of the (common) good itself" have been reported as problematic in cases of collective action by Poteete and Ostrom (2004). This seems to be an important issue in this case study, but will be referred to in the next chapter.

I have not referred much about the situation of PPB in this context, because perhaps there is little room for it to grow, given that the farmers would have to invest a great deal of their energy and resources on maintaining quality and production, obtaining capacities internally both in administrative as in technical aspects. Thus, developing more varieties or even spreading the experience seems unfeasible, at least at the earliest stages.

Altogether, if the final approach of the cooperative is to enter this so-called formal seed system, and doing a bit of realistic evaluation, it may be helpful to summarize all that has been exposed in the previous paragraphs as portrayed in figure 10. This would be what Pawson and Tilley (2006) call context-mechanism-outcome pattern configuration (CMOC), which indicates how “programmes activate mechanisms amongst whom and in what conditions, to bring about alterations” or outcomes. In this case, the context that would be supportive would be the expedite processing of the seed registration, along side with access to marketing channels. The mechanism is the supply of seeds by the cooperative, which in this context would presumably satisfy a demand from other farmers, increasing the income of the cooperative and as a by-product allowing for the PPB to gain more visibility.

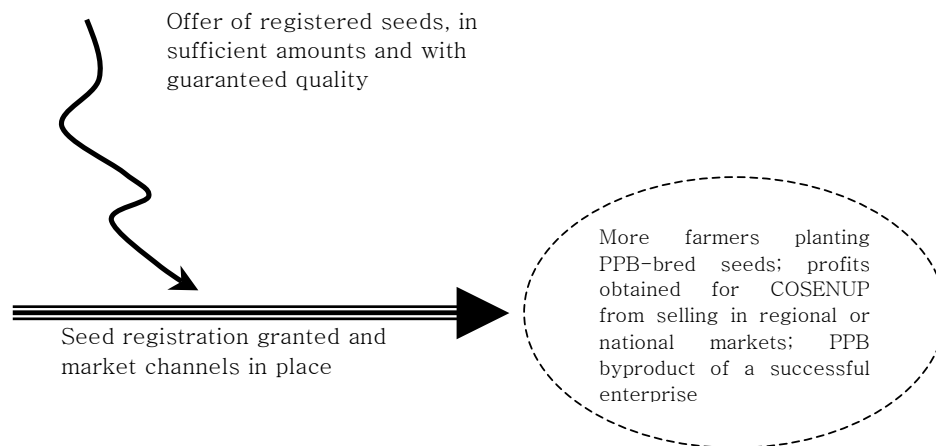


Figure 10. Configuration of the putative scenario in which COSENUP supplies PPB-bred seeds the formal seed system, following the realistic evaluation approach.

Challenges within the local seed system

Though most of the efforts during the past two years have been directed at entering the formal seed market, it is essential to consider the foundations of PPB: the LSS. Moving from bigger to smaller, it is time to focus on the primary objective of the project from its conception: upscaling the seeds and PPB. The greater context outside Pueblo Nuevo matters, of course, but in a way does not determine as much the outcomes of the upscaling because, after all, the informal market has existed despite and before State regulations.

The issue of de-centralization of PPB, or breaking plant breeding into specific areas, so that more locally adapted materials can be created, reaching more producers with high quality materials delivered in a timely fashion has been the subject of ample discussion in the literature (Almekinders *et al.*, 2006; Morris and Bellon, 2004; Wiggings and Cromwell, 1995); and though not the focal point here, yet it is important to emphasize that it is within the LSS that most of these goals are likely be achieved. As the authors have rightfully argued, the problematic is to enhance participation, maintain motivation and provide constant incentives to the farmers. In this particular case, how to create a profit for the local seed provider within the LSS, given that most of the farmers in the region are in a similar socio-economic situation.

It was clear by the positions collected from some government officials and NGOs that the best place for the farmers to start selling their products is within the region, through farmers' organizations, other NGOs, or other less formal ways. By this it is derived that the registration of the seeds takes a secondary role, though it is suitable to look at the situation in more detail. In the event such registry was found to be unnecessary for the successful upscaling of PPB-bred seeds and PPB, an interesting picture of collective action begins to get more protagonism, as it would be at the local level where the mechanisms for providing incentives and exchange possibilities would be established and agreed upon.

The first thing that emerges from this scenario is the fact that by not having to comply with the strict regulations of the law, many more possibilities open up for COSENUP. Only to emphasize on this a bit more, Louwaars (2005) advocated in his article for alternative non-certified seed classes, with different levels of categories and requirements, according to the needs and demand. I believe this option is important to consider, though perhaps a more lengthy process has to take place. In this sense, the effort to convoke a so-called *National Meeting on Participatory Plant Breeding* gave its first fruits last January when there was a first meeting, in an attempt to build a network of organizations nation-wide interested in PPB for exchange of knowledge and experiences, and possibly markets. All this circumscribed in the PPB-MA project. Nevertheless, concrete agreements on measures, standards and other important topics may take still more time to develop.

Since not many legal constraints nor quality assurance guidelines are holding back the means for upscaling, it is possible at this point to draw, as in figure 10, the following configuration (Fig. 11) showing a CMOC for the LSS situation.

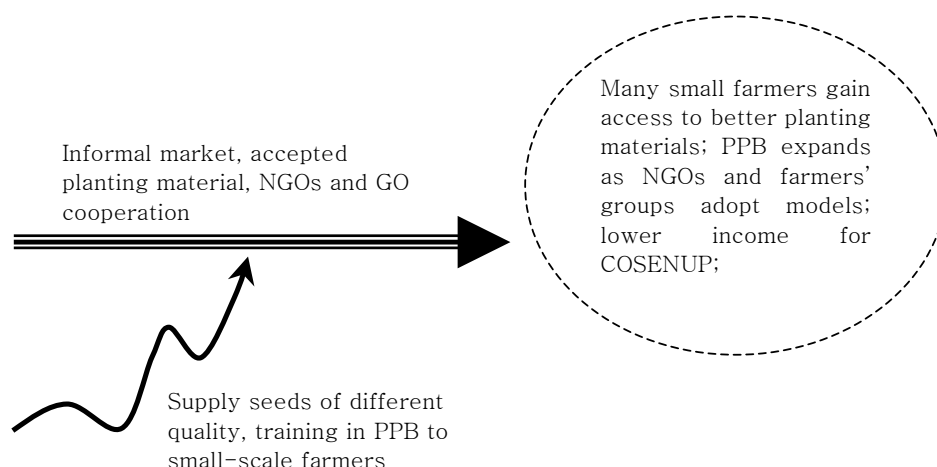


Figure 11. Configuration of the putative scenario in which COSENUP supplies PPB-bred seeds within the LSS, following the realistic evaluation approach.

Based on field observations and my personal reflections several things come into this picture. Most noticeably, what varies in this case, besides the less

tense context, is the possibility to include a stronger PPB-training component and more small-scale farmers being benefited. This means that through the establishment of alliances with development NGOs it would be possible to slowly conform a learning curriculum, or training-of-trainers approach, which could serve the purpose of establishing new breeding experiences, in accordance to the needs of different locations. PCaC and UNAM are perhaps the two most recognized actors nationally that could help in this area. Governmental cooperation also matters, because it is with the help of instances like INTA that more capacity building and technology adoption can take place, presumably through an initial cooperation agreement between INTA and COSENUP.

A drawback of this CMOC could be that the cooperative would not earn a premium price for its seeds. Nevertheless, if the internal credit structure is strengthened and maximized, farmers outside the cooperative could receive credits in the form of seeds and return it as grain (i.e. 1 qq/seed for 2qq/marketable grains). COSENUP then could profit from selling these grains in the local markets. So, besides from the commercialization channels for grains that the cooperative or the central can achieve, the national and international NGOs working on related topics in the area become important actors, because it would be through negotiations with them that some of the seeds could be sold for a later distribution through their networks and seed programs. The map of organizations that could participate is probably more ample than the one I could see in such short time, but it is very likely that CIPRES can continue accompanying COSENUP through the networking process. This would help to obtain additional profits for the cooperative, despite the apparently popular remark that “to generate an income one must produce for the market, and the varieties it demands” (Aldo Rojas, *pers. comm.*). In spite of this, if there were organizations willing to recognize the hard labor of COSENUP and pay a higher price for the seed based on trust and solidarity, the appreciation would certainly foster more motivations towards PPB, and a stronger command over the organization.

Collective action takes a very important spin, as free-riding due to limited exclusion obstacles can compromise the venture (as with the seed humidity example). Not only that, but the group needs to be clear on the reasons and objectives of their participation; thus a high commitment from the members would be required. One initial step that has not been fulfilled yet, though for many members is not a big problem, is to have a planning session for all aspects of production.

A combination of strategies

Alternatively, there is another possible scenario to look at that constitutes a viable and less risky set-up for the cooperative: a combination of the above. This means to consider what the INTA technicians recommend in order to help the task group enter a market economy, by producing –or rather multiplying– registered seeds of commercial varieties, for an established contractual market. This would carry two considerable advantages: 1) to guarantee an income for COSENUP, with premium prices, at the same time as the investments would be minimized. And 2) the cooperative would gain lots of hands-on-experience about production conditions for registered seeds, without minding and risking so much on the varietal quality, which can take out lots of resources out of the farmers.

While doing this, the research committee could still engage in the production of new varieties, stocking up the cooperative's portfolio; the commercialization division would still promote the varieties locally to gain more acceptance of the materials by facilitating credits of seeds or another exchange method. At a later stage it would still be possible to consider registering their varieties, if there is a mature market for them. Contradictorily, Alejandro Alfaro from COSERME, claims that the more the varieties have been around in the area the more market they lose. And for this reason they would not purchase seed from COSENUP. In this sense, negotiations or exchange of information between the actors themselves have to take place, because at this point neither COSERME

nor COSENUP have met other than informally through Rolando Herrera, but more in relation to CIPRES' agenda.

A hybrid scheme such as this could be conceived as a semi-permanent structure, in which the cooperative could learn to diversify and adapt to varying market conditions. Most importantly the sacrosanct objectives of PPB of reaching resource-poor farmers could still be maintained while an economic activity sustained. Figure 12 finally, shows the outcome of such a CMOC.

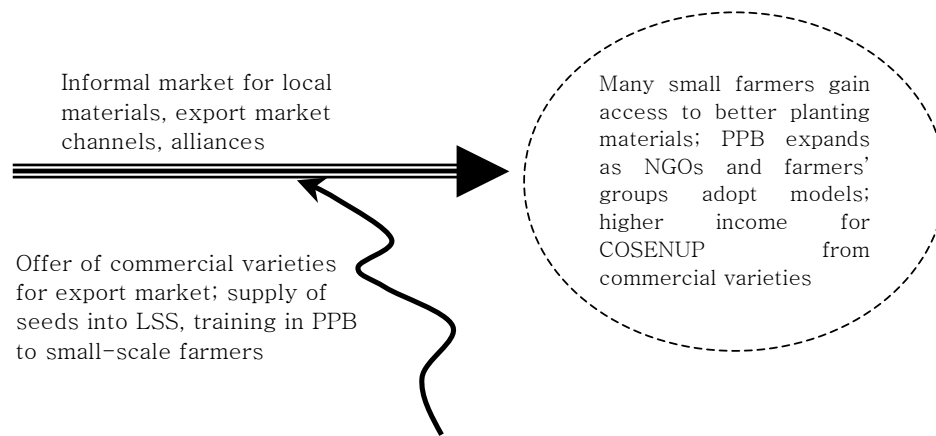


Figure 12. Configuration of the *hybrid* scenario in which COSENUP supplies both PPB-bred seeds within the LSS and commercial registered seeds for a contractual market.

Chapter 5: COSENU

This chapter addresses specific aspects of the cooperative as a group. As such, this unit of analysis can help in exploring the possibilities for collective action. Poteete and Ostrom (2004) argue that “membership in the set of individuals with the potential for collective action depends upon the problem under consideration”, and thus this part explores the members as individuals and their visions for upscaling.

This unit may be seen as a dynamically changing one, in which for now a polarization can be drawn between farmer-breeders and the other farmers. This is especially evident in the former, a group consisting of 12 or so farmers who have been involved in the PPB-MA project since the beginning; and that has followed more closely the development that led to the new varieties. Though seed commercialization and PPB methodologies could be considered as the visible outcomes of the collective arrangement, it is important to externalize the internal challenges for this unit to remain functioning. After all, it is not only understanding collective action that is challenging, but also where it emerges, and even how to define and measure the conditions for it to happen (i.e. willingness and ability of people to work together) (Meinzen-Dick *et al.*, 2004).

A look at the cooperative

Chapter 1 introduced the reader to the actors that interplay in this so-called local seed system (LSS), among which the center of the scope is COSENU. This small cooperative has not yet seen sustained positive results, partly because of outside forces preventing the seeds to be legally registered and marketed. It is worth to take a look inside, in order to determine whether there are internal factors contributing to a halt in other aspects, or even if collective action takes place under different circumstances. This obeys to a recognition that “groups with common rights and responsibilities *may or may not* be involved in collective action, or (may or may not) have institutionalized rules for

collective decision-making”, and that is partly what I will try to draw here (Poteete and Ostrom, 2004).

The literature on the subject talks about attempts to measure collective action through qualitative and quantitative data. The idea is to obtain consistent and comparable data, such as that good empirical analysis can be translated into sound policies for its operationalisation (Meinzen-Dick *et al.*, 2004; Poteete and Ostrom, 2004). Though I did not measure it perhaps with the ideal systematic method or accuracy, it is still valid to analyze the situation of the upscaling in confrontation with the situation inside COSENUP. In other words, collective action is expected to occur in the cooperative, as a result of their desire to commercialize seeds, but there are other aspects within or beyond the cooperative itself that may condition its presence; and in this sense this study only tries to cover the topic rather superficially with the hope to further understand the role of the groups of farmers in the seed system.

Inside the organization

As part of this scrutiny I will draw from the interview material to key informants within COSENUP, in which I tried to gather their visions about their collective work, their cohesion as a group and the agreements regarding behavior and membership regulations, among other things.

A first aspect that I was interested in digging into was that of the member's personal idea of the group as a whole, enquiring whether the group had a strong cohesion, and the members a common vision. In order to do this I asked them how they saw themselves working in the cooperative, and whether they thought all were thinking similarly as to what to achieve from the work. As a sort of another heuristic tool in this report, I asked from a scale of 1 to 4 how they would rate this cohesiveness (1 meaning the most cohesion and strongest long-term vision; 4 the least). Almost all the interviewees agreed to category 1. All in all, it was surprising how easily and promptly most of the people answered this question, without much hesitation. One of the farmers reckoned the group must be strong, since after having had losses they were still together. A member of

the board thought that it is true they all have a similar vision, but perhaps they are not all that united, so he gave a 2. On the other hand, another farmer said that he agrees that perhaps the board of directors falls into category 1, “but there are people who are in the committees who don’t seem to have vision, so as a group I think we would be in the middle”.

One remark from one of them was that the group “has a lot of both (cohesion and vision)” and that in this sort of business “it is better to do things in groups”; however shockingly, he also admitted that there are “some of us (who) don’t give much importance to the organization”. According to a technician in CIPRES, this farmer could be expelled from the cooperative, along with 3 others who are not active, since the statutes so mandate for people not participating in annual meetings. He claimed that that the cooperative still hopes to attract them, so no actions have been taken so far. Another interesting case was that of a farmer-breeder who started with the PPB project, but never joined COSENUP. At first he had given me the impression that he did belong to the cooperative, and that he had left it to work with another one he previously belonged to. Afterwards, a technician from CIPRES added that the reason for him not to join was that he could not afford to contribute financially to two organizations. My interest in talking to him was to try to find out why he had left in the first place; and while at it he was speaking as if he was still a member of the organization, and a very motivated one for that matter. In his view, the group was divided when it came to cohesion/vision, and that the category for it would be in the middle as well, as “some are defined and some are disappointed”.

With respect to the level of independence of COSENUP from CIPRES, the data suggests that CIPRES is still a very strong and influential actor. Although many of the members admit there is a future for them without CIPRES, many also acknowledge that a lack of financial resources is their link to them as well. In this regard, they are expecting CIPRES to get them loans to acquire the inputs necessary for production. One farmer continued saying that “the day we have researchers who can ensure our project’s sustainability, then we will be independent and sovereign”. This is a powerful observation, as it expresses projection and the same time the realization that it is still too early to talk about

independence. CIPRES, on the other hand, has been advising the farmers to try standing on their own feet, as one day the operations will be ran entirely by them.

When consulted about what aspects they saw as positive in their organization it was unanimously replied that the *organization* itself was a very positive thing. The human resources are considered to be “ideal”; and though some people are not very active at the moment, it is “because there is not much to do”. On the negative aspects, the answers varied from “there could be, but I don’t see any” to issues related to the lack of financial resources, people not paying their loans or contributions, unequal production conditions, deficient management, lack of information and not having a product to commercialize. Worthy of saying that not all answers talk directly about the organization as such, like the different production conditions (more related to the biotechnical realm) or deeper socio-economical differences.

In trying to get a closer peek inside the organization, particularly its seasons’ planning and created vision, I noticed there was a general agreement that there should be a “planning (session) like a few months before (planting), depending on the moves of the cooperative”. For Mr. Merlo there is still time to get organized, as the season begins in May. Nevertheless, there has not been any such a meeting to plan, or even discuss, the possibilities of developing further the capacities of the cooperative (whether for potential seed markets, or for improvement of the production conditions for some). One of the producers also blames this situation in not having the legal registry. An instance was mentioned in the previous chapter, where a farmer affirmed there was going to be a meeting the next Saturday (after our interview), to talk about the next season’s plans. He assured it as if it had been summoned in those terms. However, the meeting was appointed by request of CIPRES and myself to discuss an offer from the former, and for me to be able to hold a group meeting and foster a discussion based on what I had experienced during fieldwork.

Another topic of my inquiry, which follows naturally, is participation. In this meeting it was notorious how less than half of the members attended, despite

the early notification. Even the afore mentioned farmer did not come that day, despite his personal assurance to me. Noticeably, participation in meetings can be seen as a quantifiable indicator of collective action, if only data on the number of meetings held and the number of people attending are considered (Meinzen-Dick *et al.*, 2004³³). Although they have to hold two meetings per year, apparently not always do they have a full participation. Mr. Herrera, though, says otherwise, as he assures that all the active members attend to all the meetings. Mr. Gonzalez, on the other hand, was very emphatic in affirming that the group “easily gets along without much discussions”. However, it has yet to be seen whether no discussion in this group is a sign of like-mindedness or of just going-along with the rest.

In relation to participation, there is another aspect I addressed, related to the role of women. Gender inclusion has been a policy applied towards processes within the organization, and as a result the cooperative counts with 15 women in its membership. That is 36% of the total. At least two women are currently participating in the board of directors, and as they say: “we feel very supported”. While interviewing one of the male farmers and talking about members’ participation in the different committees and board he said emphatically: “there we have also that weakness... (that) there are some women in the board who *cannot differentiate the o for a 0*³⁴!”. This talks about the view many men still have towards female participation, and the work still laying ahead to improve the situation for women, which is an important fraction, and the group’s integrity (clearly specified in the objectives of the cooperative’s core objectives).

On the other hand, one of the women stated there was “enough space for women, though I would like to see more support (for example with tubers)”. In this quote another special situation arises, as it appears there are several instances where the PPA program and the PPB project are mixed up. In other words, it seems as if the farmers saw them as the same thing. Nevertheless, I

³³ Although the same authors consider as well that “it is not clear whether meetings are a transaction cost of collective action or an indication of effectiveness” (p. 204).

³⁴ This is a free interpretation, to a figurative speech from the farmer that literally translates into: “(some women in the board) who don’t know the round o”. What he meant is that some women are not capable enough, in his view.

failed to go more in depth as to why this occurs, or why is it that the farmers do this. Presumably, this is related to the close relation they have with CIPRES, and since they were farmers originally summoned by the PPA project and later on introduced to the PPB, it is possible that some feel that CIPRES is there to give them something concrete, material. This happened especially with women, who after all are the direct beneficiaries of the PPA itself.

As for the incentives to belong to and work for the cooperative, the board emphasized how the fact of being in an organization gave them more power, more voice; “as well as (something in) the social part”, in which participation makes people feel better about themselves and useful for playing a role in their society. As it was put by one of the farmers: “when we are together, we solve our problems together, (...) even family problems”. One of the farmer-breeders saw advantages in getting better conditions of production and for storing the seeds, and another talked about the good prices and better demand, which are attractive even for new people to join. It is no surprise then that some farmers are getting disappointed when the seeds have not been commercialized as they had hoped. Bottom line: economic incentives are a strong reason to belong to the cooperative; past the threshold of seed provision itself.

As part of the concerns expressed by some of the farmers for keeping the project in motion, for instance through incentives, Mr. Merlo summarized it in the following phrase: “my concern is how we are going to make this project sustainable if we don’t get paid well; for one thing to maintain the quality (of the seeds) and for another to keep breeding new varieties”. The farmer-breeder mentioned earlier, who although not a member gives opinions as if he was, was perhaps more specific about the need for a solid incentive; so much that its absence appears to be his reason for not being a member. For him “there should be a fund for the 12 of us that are taking part in the breeding; (we should have) another treatment, since we have to be day-by-day with the seeds and take care of them; and it doesn’t seem very cost-effective for us (as it is)”. When asked if he would “officially” join the cooperative provided things would improve in that sense, he replied positively. Despite of it all, the majority of the farmers

are concerned about their production conditions, but the sole fact of being organized is a good incentive, and there is hope for improvement.

Regarding the committees, and the fact their inactiveness, none of the farmers thought there was any reason to rearrange or restructure them just because of that. “They are working fine the way they are”, summarized one of them after pointing that only the credit and education committees are active. One of the members of the commercialization committee commented how it was CIPRES “doing all the work for us, because they have the resources (telephone, office, motorcycle, etc.), so we let them (*do the job*)”. He also added that “they have managed that as CIPRES, not as COSENUP, let’s be clear on that”. Some think that once the commercialization begins, there will be a reactivation of the committees and the work will catch full speed. Additionally, Mr. Gonzales thinks that perhaps joining the INTA proposal of engaging into a seed project for black beans³⁵ will be a good way to “refresh the knowledge” and reactivate the group. This proposal was made by INTA on the last days of my stay and to my knowledge it did not generate a concrete agreement between any of the parties yet.

It was also commonly agreed that there is a need for more training. Some of the areas in which the farmers recognized they need to have more capacities include: accounting books, cooperativism³⁶, socio-political issues, quality maintenance and storing of seeds, organizational and business management, secretarial skills, and others. Clearly there is consciousness about the organizational weaknesses, which is perhaps one of the reasons they rely on CIPRES so much. In this sense, some acknowledge it is CIPRES who “have taken us where we are today”. It is not the intention here to argue against the support from the local NGO, but it is more to acknowledge how the present

³⁵ This was recently proposed by INTA to COSENUP (via CIPRES) for a project aimed at finding producers to teach them skills for multiplying this kind of bean (seed), for a potential export market (i.e. Venezuela). It is important to notice that a PPB orientation in this proposal is missing.

³⁶ Some think the 40 hours of training they have to fulfill is not enough to understand the functioning and ideals of a cooperative

circumstances are conditioning factors, and support the thesis still a gradual move towards a solid independent organization.

Elements of collective action

Elucidating which of the elements presented in the previous section generate collective action, or on the contrary prevent it from sparkling, is a burdensome task. The literature informs “there is still a need to refine findings and improve empirical research methods so that it will be possible to inform (...) on the best way to scale up success stories” (Meinzen-Dick *et al.*, 2004). Despite any methodological shortcoming, I will try to present an interpretation of the actual scenario.

Looking at collective action in the framework of upscaling PPB-bred seeds has been the focus of limited research, even the conceptualization of seeds as an object of public good is not so clearly delineated. Unlike other resources, like water or forests, the problem of over-use is not really an issue in this case; on the contrary, the more seeds are used the better (Badstue *et al.*, 2006). In any case, for the purpose of this paper the definition of collective action as a “voluntary action taken by a group to achieve common interests” fits the profile (Meinzen-Dick and Di Gregorio, as cited by Badstue *et al.*, 2006). In other words, I have presented a resource-poor farmers’ cooperative interested in commercializing their seeds while procuring themselves and other farmers a profit and quality planting material. Their actions then are expected to be determined within these perceived common interests and must be unraveled in an adequate dimension.

Incidentally, other aspects of collective action in which there is little agreement on is whether it is a process involving homogenous units (i.e. institutions) or an aggregate of actors (Badstue *et al.*, 2006). In this case study, though not underestimating the latter, the idea is to examine the role that collective action plays within the main actor in the evolving new seed system of Pueblo Nuevo: COSENUP. Moreover, collective action takes the form of institution

development³⁷; providing rules for the management of the resource, and to a broader extent working to establish a particular participatory methodology (Poteete and Ostrom, 2004). As such, it is not alone or separate from what occurs in the LSS, but as the creator of the new varieties, and as promoter of the mainstreaming initiative, it is here where collective action can be taken to a higher level.

Collective action can be manifested also in the *boundedness* of the group (in similarity to what I call cohesion), “which allows people to know who else is (or should be) contributing” (Meinzen-Dick *et al.*, 2004). This is where the scenario depicted in the past section gains an opportunity for insight. Earlier on it was said that all the members considered their group a fairly united one, with a common and long-termed vision. However, clarity as to what is this vision comes to a sort of crossroads when issues such as marketing channels, members’ participation and organization come into the scene. One of the farmers made the following remark, which I could return as a question: “as long as we know where we are going, we are fine”. Because it is true that the attitudes are very positive regarding their future, but at the same time it is evident that there has not been a proper tracing of the path to reach this so-called future-wanted-situation.

Recognizing whether a group acts collectively should be a more straightforward task when the study object is well defined. COSENUP, a cooperative of services regulated by the General Law of Cooperatives of Nicaragua (Law 499), has then a series of duties and responsibilities, as well as its members. However, at the moment of writing, it has just in early May completed its registry before the Ministry of Labor, and all the original papers are still there. This is rather irregular, since it was founded in theory in 2005, and the law establishes 30 days for this process (Art. 23, d; Law 499). However, this may be a consequence of the endemic bureaucracy in local governmental institutions;

³⁷ The authors mention other reasons why there would be collective action: resource mobilization, coordination of activities and information sharing. Not to say that these categories exclude one another, but it is a way to facilitate the analysis.

and at the same time shows how collective action is not exempted from friction with external forces that may appall its occurrence.

Among these papers is the original letter of constitution, of which neither the board of directors nor the Pueblo Nuevo or Managua offices of CIPRES, seems to have a copy of (not even in a digital version). For that reason I had to settle with a digital document that is more like a template for all the cooperatives that CIPRES puts together, and which had the name of another organization. I was told all the cooperatives have a similar text, and therefore it is hard to draw any particularities in terms of codes of conduct, obligations or agreements for benefit sharing for COSENUP alone. The book of acts is also in the Ministry, which means that the “minutes” for the last meetings have not been recorded in an organized way. That said, I had no access to any act and was told that at least one was lost.

Interestingly, collective action cannot be assumed to be present because of legal papers or formal structures; for as it can, and does, occur spontaneously in real life. As there have been different forms typified in the literature, COSENUP is more a case of a process of collective action (Meinzen-Dick *et al.*, 2004). This means a process to develop an institution, in which the group is slowly conforming its bases, structuring its means for production and refining its channels of communication. As such, it is perhaps natural that the state of things is as described above, considering the circumstances. The practical result of this passiveness, as it was exemplified in the last section about one of the least participating members who could technically be expelled, is a lack of “obstacles to exclusion (that) encourage individuals to free-ride on the efforts of the others” (Poteet and Ostrom, 2004). The other remarkable example is that of the farmer-breeder who remains outside the cooperative’s formal structure (while still in the PPB-MA), waiting to see if the conditions are more convenient for him to join; meanwhile others would have to procure such conditions. The need for control or even exclusion mechanisms remains an important issue to be addressed adequately and consciously.

Furthermore, and as mentioned in the theoretical framework chapter, it may be possible to visualize -at least ostensibly- another instance of collective action from another perspective: that of the cooperatives interplaying in the CIPRES projects. The idea of this NGO, framed originally within the PPA initiative, is to set up a network of local farmer cooperatives (from cooperative, then central and on to federations) that can become self-sustaining enterprises, guaranteeing channels of commercialization, incentives, credits and resources for its members (Javier Pasquier, *pers. comm.*). Before April 30th, when I spoke on the phone with Rolando Herrera, I was told that COSENUP was a member of the cooperative central called CECOOP, which is supposed to serve for Pueblo Nuevo. Both COSENUP and CECOOP are rather recent and inexperienced organizations; so much that recently CIPRES offered to take over the management of CECOOP for one year, to ensure it would yield positive numbers before handing it back to its members. At least from COSENUP, the answer I perceived in the meeting was no. In any case, the reason COSENUP is no longer part of CECOOP lies in its orientation, since all members of the latter must be multi-sector cooperatives, while the former is of multiple services. Nonetheless, according to Mr. Herrera, this is not going to affect the already built alliances or market possibilities for the seeds, since the formality affects only the formal participation of COSENUP in the structure of CECOOP.

The point to be made though, is that the data is suggesting that many members of COSENUP are still dependent on the aid and strategizing provided by the NGO, which is taken almost too open-handedly. It could be boldly interpreted in this paper, at this level of visualization, that this may be a form of free-riding, as they deal with their internal organization many times using the resources (i.e. travel, food and other expenses) and suggestions (i.e. for commercialization or seed validation/registration) from this NGO. In this situation, CIPRES has been providing for the last two years technical assistance both for the seed process, as well as for the cooperative establishment. It is true that farmers have their own social and economic circumstances, which at times are very limiting, but in a collective action scenario this is somewhat compromising both for project developers as well as for beneficiaries in the longer terms. By no means this idea should be taken beyond its context, but it is important for further reflection.

Later on I shall discuss more on the participation paradigm and this paradox in rural development projects.

Complementary to collective action

In addition to recognizing the importance of collective action for a defined organization in a governed environment, other elements of social science and development economics play a role, however scarcely they will be commented in this report. Deriving from Meinzen-Dick *et al.* (2004) two elements that are found to complement collective action are mentioned: agency and social capital.

Agency, understood in general terms as the capacity of individual actors “to influence, directly or indirectly, the outcomes and directions of (...) processes and (...) the ways in which individual choices and strategies are also shaped by broader contexts”, represents an essential component of action-oriented research (Badstue, 2006). However, it can be implied that agency also has an effect on the cooperative and its collective action; and is reflected in its members’ views and actions (or *inactions*). On the one hand there are the accounts presented in the first section, which present evidence of how some farmers are more comfortable with the initiatives being taken and driven by the accompanying NGO -through their board of directors- than by the group as such. This can turn into a dissociate situation in the short and long terms, when it comes to encouraging collective measures to pursue a sustainable commercialization of the seeds or the PPB.

On the other hand, some of the farmers mentioned how they have tried to stimulate other farmers in their vicinity, so they become interested in learning about PPB or becoming more curious about the cooperative’s activities. This is a positive element that must be highlighted and emulated, as it improves self-esteem and draws attention to the group. It is difficult to foresee the outcome of agency, as it may also vary depending on the individual circumstances around each farmer. Nevertheless, the most enthusiastic ones have been so since the beginning. One can think that it has to do with the social tissue itself, having to do with status, as those farmers are very respected within the organization.

However, it is a sensitive tissue, and as one farmer put it “some people may be over-using their rights, thinking perhaps they know more than the others”, and this may influence others negatively. Finally, from field observations I noted that the technicians of CIPRES have a lot of influence on many decisions, adjusting perhaps the behavior or augmenting this tension within the organization.

Social capital, among several conceptions, has been conveniently defined by Ostrom (as cited by Meinzen-Dick *et al.*, 2004) as “the shared knowledge, understandings, norms, rules, and expectations about patterns of interactions that groups of individuals bring to a recurrent activity”. In this sense, and as of lately, social capital can be seen as a way of rectifying the imbalances of development projects, in such a way that it allows the focus groups to plan their own futures (Krishna, 2004). On more material grounds, the word is additionally used in the letter of constitution of the cooperative, to denote the amount of financial resources that each new member contributes with (C\$200 each).

Briefly applied to the case at hand, the concept helps to understand how it can complement collective action, in as much as the individuals in the group are involved in an environment in which they can share their PPB *know-how*, their seeds and even the benefits from the future lucrative activity. Identifying the need to build further on the quality of human relationships within COSENUP and towards other actors takes relevance, especially for mainstreaming their work. Lacking certain knowledge can also affect their performance as a group, which will be necessary for training other farmers on PPB methodologies; as well as in decision-making processes for running the enterprise and investing the profits.

Challenges for COSENUP

I have tried to show the current situation within COSENUP, through the views of its own members, and in confrontation to their ultimate goals: seed provision, seed mainstreaming and PPB institutionalization. By summing up the findings of

this chapter, and viewing them on the light realistic evaluation, it is possible to come to visualize the mechanisms in which collective action can be fostered.

It was recurrent to find the explicit need of incentives to the members, especially for those carrying out the development of new varieties. Such incentives could be manifested, according to them, in financial aid to keep running the essays, in better infrastructure for production and in having more materials to breed from. On the part of the members who are -or will be- in charge of reproducing seeds once commercialization begins, some would like to be able to participate more in the breeding process itself and acquire more technical knowledge. All say the organization needs more training in organizational matters, related to management (i.e. accounting, production, etc.), cooperativism, and others. A general feeling of disappointment was felt because they all expected to have profited from the sales of seeds since a couple of years ago, and until now they are going to start with the commercialization.

SWOT analysis

During the last days of my stay I was able to hold a meeting with the cooperative as a group, and they drew together a SWOT analysis (Table 3), which shows some of these aspects, and from which further strategies could be formulated. Unfortunately, due to time constraints and the long session earlier that day, the people present were not willing to continue with the activity.

It is interesting to note how among the strengths good communication was included, although individually many farmers had complained of not knowing much of what was going on with the cooperative; and I could personally witness a rather conspicuous incommunication. Nevertheless, what should be paid more attention to in my opinion, are the threats. Particular attention should be drawn to the seed availability.

Table 3. Strengths/Weaknesses/Opportunities/Threats (SWOT) analysis of COSENU, done in a group meeting in Pueblo Nuevo, on the 27th of January 2007.

S ☐ PPB knowledge ☐ Recognition as producers ☐ Positive results so far ☐ Monetary funds (though limited) ☐ Responsible personnel ☐ Ability to discuss/transmit ☐ Good communication and support ☐ Vision	W ☐ Organizational consciousness ☐ Dependence from CIPRES ☐ Lack of knowledge about cooperativism law ☐ Training (organizational aspects) ☐ Disappointed members ☐ Non-stable capital/bad management ☐ Seed maintenance ☐ Undefined/mixed roles of members
O ☐ Possibility to rush paper work (i.e. banks) ☐ INFOCOOP (Institution for cooperativism) ☐ Positive national/international image ☐ Negotiation / self-management ☐ PPB institutionalization	T ☐ Being up-to-date with legal papers ☐ Seed availability ☐ Commercial competence ☐ Weather/production ☐ De-motivation ☐ Lack of technical support ☐ Little contribution to the common fund (social capital) from the members

Beyond what was mentioned in the previous chapter about the challenges to enter in the national seed system is the issue of actually having seed to provide for themselves. In this part I would like to present what happened that same day of the group meeting to exemplify this. When they were discussing about the next growing season (beginning May 2007), the president mentioned that Jose Manuel Gonzalez was the only one who had JM seed properly stored and saved for the cooperative³⁸. For everyone's amazement, CIPRES technician included, at this moment he got up and said that there was going to be a problem then, if everybody was expecting him to provide for one and all, because he only had enough seed for himself. To this there was a sort of confusion and nobody really knew how to react. It was all too ironic that a seed producing company had not the "raw" material to start with. The confusion continued, and it was not until some weeks later (when I was back in Norway) that I talked to the technician, and he told me that Mr. Gonzalez had only jokingly said that. Apparently he actually had something over 10qq of pure seed, which would be enough to multiply and provide for all. What this shows then is a lack of proper information on the assets of the cooperative and of

³⁸ This because the production from last year was basically null for all, and since he is the "father" of the JM it was rather natural to think of him for that.

communication between different committees. Moreover, it shows the discontent of Mr. Gonzalez towards the seemingly carelessly stand of the rest of the members about the collective work.

From the CMOCs drawn in figures 10 to 12 in the past chapter, one further condition has to be met firstly for any of the mechanisms to take place, and it has to do directly with the cooperative. Because for it to be able to sustain a supply for any of the options described there (from local to national), it would also have to fill in the organizational, technical, legal and marketing training gaps. For them to do it, and as was discussed in smaller groups on that same meeting (see Appendix II), they have to improve their knowledge in PPB, by involving more farmers and giving more training to the members. For this, alliances in the first place with INTA, and secondly with CIPRES and then other organisms (GOs, NGOs, other cooperatives, etc.) must be forged. These alliances will presumably get them closer to have access to more capacities, markets, aid and further expansion. Planning, including consideration of varying demands or markets must also be addressed carefully and thoroughly well before the planting seasons, and not at the last minute.

It remains unanswered how the farmers will solve the felt need for incentives, both for the farmers-breeders as for those who will be multiplying seeds. This is a crucial factor in order to keep the motivation of the group, and thus the collective action spinning. Since the seed provision for self-sufficiency does not seem to be acquired at all times, it may be important not to overlook the primal objective of PPB, which is to improve food security of those involved in it, and fostering collective action to achieve this should not be needing further incentives. After all, as a farmer admits: “today we don’t spend in (purchasing) seed, that is, we don’t win and we don’t lose”.

Chapter 6: Discussion

The previous chapters have hopefully given an accurate state of affairs of COSENU. In doing so, I have presented empirical data about the governed environment, the different interactions between the formal and local seed systems in light of a realistic evaluation; as well as the internal situation which conditions the work of the cooperative by linking it to collective action. All this to arrive finally at some potential responses to the question of upscaling, whether of seeds or of its development processes, by suggesting improvements in the mechanisms that would overcome the hindering forces.

This chapter also discusses on the ethnographic approach and data collected, the methodological shortcomings and other aspects. A brief recapitulation of some aspects will be necessary, however cumbersome. In doing this, I will draw from what I have found to be the most significant obstacles for mainstreaming. By trying to shed light on the proposed research questions (see page 21), the following sections will explain some of the complexities and the most appropriate options for the improvement of the seed system.

But first, I think it is important to start the discussion with the underlying cause of the new challenges themselves: the seed registry. Moreover, the seed registration involves deeper motivations, based on a form of ownership, entitlement and profitability of not only the work of plant breeders or farmers, but on the arising issues around liberated materials as well.

Proprietary regimes and national regulations on plant genetic resources

In chapters 3 and 4 I presented the scope of what the cooperative is pursuing: a varietal registry for the incursion in formal markets. As such, it has been clarified what are the obstacles for the cooperative, the costs and future obligations at this level. Nevertheless, perhaps little has been written in this report, and much

less discussed at the grassroots level, as to what are the legal, societal and perhaps even ethical implications of getting involved in a formal seed system.

Legislation for seed production and commercialization are particular to every country, though some international, not legally binding, agreements have been approved. Discussions about such projects, however, have taken many years - even decades- to become ratified treaties and still time is required for them to be locally implemented. Such is the case for the FAO's International Undertaking on Plant Genetic Resources (IUPGR), which includes the controversial "Farmer's rights" clause. It talks about the rights that can be understood as *collective* intellectual property rights, and recognize the "rights arising from the past, present and future contributions of farmers in conserving, improving and making available plant genetic resources, particularly those in the centres of diversity/origin" (Pistorius and van Wijk, 1999; FAO, 2007). The heated debates about the access and rights over PGR have also touched other important international forums, such as the Convention of Biological Diversity (CBD), the Trade Related Intellectual Property Rights (TRIPS) of the World Trade Organization (WTO), as well as the International Union for the Protection of New Varieties of Plants (UPOV).

Naturally, with a multimillion-dollar revenue business from seed sales worldwide, there are strong corporate interests in seizing control over such precious resources, as they are the beginning of the food chain. In this scenario, free market mechanisms can be associated with genetic erosion and small-farmer's lack of access to PGR, thus the importance of the topic and much more on alternatives such as PPB. Meanwhile, NGOs and farmers' groups worldwide have assumed a watchdog role in this controversy, while advocating for free access to farmers and researchers.

Although such tight forms of intellectual property regimes are not advocated for COSENUP nor donors or accompanying NGO, it is important to take into account parallel discussions and other important debates, because things are changing at a faster pace today than they seemed a few decades ago, especially with the widespread uses of new biotechnologies. UPOV legislation,

in its 1978 act, was approved in Nicaragua as recently as 2001, becoming its 49th country member. This act is the second to last revision of the international convention until today, and in general it seeks to “provide and promote an effective system of plant variety protection, with the aim of encouraging the development of new varieties of plants, for the benefit of society” (UPOV, 2007). This paradigmatic wording does not necessarily include resource-poor farmers, more specifically farmer-breeders. UPOV '78 grants the breeder rights *only* in respect to the commercial marketing, the offering for sale and the marketing of reproductive or vegetative propagating material of the protected variety (Singh, 1999). In this sense, it is a bit similar to the spirit of Law 280, which allows for farmers to save, exchange and even sell the seed (as long as not with the commercial denomination). However, urged by the negotiations and recent ratification of the regional Free Trade Agreement between USA and Central America and Dominican Republic (DRCAFTA³⁹), Nicaragua will have to change its adherence from UPOV '78 to UPOV '91 by the year 2010 (Julio Sanchez, Centro Humboldt, *pers. comm.*). The difference between these two versions is that the latest one has far more restrictive controls, extending the protection to the entire propagating material, not just its reproductive or vegetative part, and to the reproduction (conditioning the offering for sale, exporting, importing and stocking) (Singh, 1999).

However, that is only part of the contentious issue around UPOV '91. The breeder's exclusive rights extend also to the farmer's harvest, as well as to the products from the harvest derived from the protected variety. Moreover, UPOV '91 also grants ownership rights to essentially derived varieties; which means that, “unless major changes are made to the genotype, the new variety will continue to belong to the owner of the protected variety” (Singh, 1999). It can be easily derived that the right of farmers to save (or breed) seeds for their own or collective use gets significantly restricted under this regime, especially when farmers in informal seed systems tend to make use of any material they find suitable for exchange, testing, sale, sharing, or stocking.

³⁹ As a response to the lack of agreements in the FTAA (ALCA), the US government launched a campaign of regional FTAs, in this case with its closer regional partner. Costa Rica remains the only country to not ratify the agreement, as much controversy has meant a great civilian resistance.

Even though the Nicaraguan seed law (Law 280), does not specifically deepen on this proprietary “philosophical” controversy, but rather on the production and commercialization aspects of seeds, it is evident that the law does not make any exceptions or facilitates the situation for smaller-producers when it comes to breeding or commercializing their seeds. Mr. Eslaquit, on the other hand, reassured me that the proposed reforms do not pretend to make UPOV’91-compatible requirements for Law 280. Nevertheless, the *restrictiveness* of seed laws can be said to go “hand in hand” with intellectual property rights regimes (as for example UPOV) (GRAIN, 2005). From field observations and talking with the farmers and technicians, it was quite the case they wanted to have the recognition for their seed; they wanted their “patent”, as was the answer many times. Although it is by all means legit to want and deserve such recognition, the underlying causes for such award may contradict to a certain degree the initial objective this group of farmers set out with.

Let us look for a second at the PPB strategy. As a complement of formal scientist-driven breeding, it recognizes the lack of good planting materials for resource-poor farmers in developing countries, which is one of the causes of food insecurity. It makes sense, since “marginal, heterogeneous and remote environments are difficult to address through centralized formal breeding programs” (Almekinders and Louwaars, 1999). Thus, in order to counteract the negative effect of high-input plant breeding, the provision of PPB-bred materials should be unrestricted to groups of marginalized farmers. The controversy in my opinion, comes at the level of utilizing a market *imagery* to address the upscaling; because, after all, how do the farmers in COSENUP expect to sell their seeds at a premium price to their neighbors who are also poor farmers? It was suggested in several of the conversations held with them that marketing was the main component, but they would also try to benefit local farmers through seed credits. Nonetheless, there are no figures or formal agreements on that. It is true also that many farmers are already using not only the JM variety, but also the Santa Elena and Luisito⁴⁰ in the field; which may suggest

⁴⁰ This line was discarded from the PPB-MA project; but Santos Luis Merlo, thus the name, continued using it and it became spread in his village for its good growing characteristics.

that some varieties will be liberated without going through the entire PPB process, while the “better” materials would be marketed.

Laws are not perfect; humans make them, and in a way they are a reflection of the time in which they were dictated. Beyond any discourse analysis or *pamphletism*, most seed laws in the world are supportive of Green Revolution agriculture schemes (high yielding varieties, high inputs, market oriented), thus they also dictate in favor of policies that guarantee seeds with certain quality standards mainly to yield higher volumes. Whether this was done for appalling hunger and feeding the world is another discussion all in itself. However, GRAIN (2005) argues about the *convenience* of this push for quality, saying that: “the marketing rules, that the FAO and the World Bank effectively pushed, came from Europe and North America, the very place where the seed industry is in place”. So, after all, there seems to be an intrinsic economical interest for the seed laws to suit a certain development of markets and industry, beyond its alleged protection to farmers; and in this sense the 1998 Law 280 is no exception.

As a consequence, centralized plant breeding uses seed laws to place strong regulations on “the procedures and standards for variety release, seed certification and quality control” leaving small space to maneuver for PPB or PPB-bred materials (Louwaars, 2005). This matters in the current context, as it has been reported that one of the main challenges for COSENUP will be to maintain the seed quality standards set by the law, in order to keep the register that will allow them to enter a formal market exploitation. In other words, the parcels will be supervised, and even though they may hold the registry for a minimum of 5 years, the lots may not pass the inspections on any given season due to low quality; this certainly will have further consequences in the offer and profit of the COSENUP. Therefore, it is valid to ask whether this market will render the benefits that justify the costs?

Quality control seems to be a contentious issue in itself. For example, there were mixed reports in the press and from some farmers about bad quality of many seeds handed out by the PLxL; even though the program only allows for

registered seed to be distributed. On the one hand, there could be flaws in the quality assurance for proper adaptation, and on the other there is the issue that these improved varieties require considerable inputs, many of which are not affordable to all farmers. In connection with formal procedures of seed laws in general, Louwaars (2005) argues that there have been biases regarding registration and testing of new varieties in order to make the process more cost-efficient, which may affect not only the final adaptation of certain seeds but talks of the breeding process itself.

Alternatively, one could think of other ways of controlling the quality of seeds, such as leaving it to the market forces, public institutions or even private organizations (Louwaars, 2005). These methods would effect different levels of control and thus quality on the final product. Nevertheless, legislations finally set the institutional framework to operate, so that a minimum quality, so to speak, would be implemented. In this regard, it is important to pay attention to potential legal *back-doors*, in aspects such as definitions and requisites. Interpretation of legal terms where there are poor or missing definitions may be potential gaps that could result in further restrictions to the use of on-farm saved seed. For instance, no definition of what activities constitute *commercialization* in the Nicaraguan seed law 280 could be an example of this ambiguity.

Finally, the point to be made, is that if the intentions of the farmer-breeders are to enter the national seed provision system and abide by the legislation, it is clear that they must be aware of the objectives, loopholes, options and spirit of the related laws. Legal counseling should be a starting point, so that the membership can build its own concepts and have its own reactions to them.

Gaining access to a seed market

It was made clear through the different interviews with NDF and CIPRES staff, as well as with COSENUP itself, that the organization wanted their seeds in a formal market, with legal certified seed. They have gone a long way, and have sorted out much bureaucratic difficulties that have translated as of April 2007 in

them holding a seed registry for variety JM-Pueblo Nuevo 12⁴¹. Nevertheless, this is only the beginning of other challenges.

Towards commercialization

As explained by Julio Molina (INTA), in the beginning they were seeking for ways to “obtain a turnover for the farmer (breeder) from the new varieties; first they thought of 2x1-exchange⁴²”. But now that they have gotten into formal commercialization he sees trouble, as “there is an excess of seeds⁴³, the challenge is to sell them”. Nevertheless, in following this trend, COSENUP obtained the support from INTA, which was essential in acknowledging before MAGFOR that the varieties were bred using PPB. Through an agreement between CIPRES and INTA, they helped the farmers comply with the requirements (genetic and basic seed, genetic and morphologic descriptors, field validations) (Julio Molina, *pers. comm.*).

The time it took to work on this data collection and presentation before the authorities was sufficient to make many of the interviewed producers lose a lot of their motivation, but none abandoned the organization. Needless to say, the legal and procedural mechanisms are, and will continue to be, a solid obstacle for future farmer accessions. There is no advocacy work at the moment to favor this sector, procuring a reform in the current legislation, which would facilitate the inscription by cooperatives or smaller groups. However, one of the positive aspects of the reform campaign led by MAGFOR is to shorten the validation periods (Xavier Eslaquit, *pers. comm.*). This would reduce the time for validations to one growing cycle, and eventually bring out the seeds faster into the market.

⁴¹ In the registry, the name that was entered was “Frijol-Pueblo Nuevo JM” (See Appendix III)

⁴² Exchange mechanism, consisting of giving a farmer 1lbs of seed, and getting in return 2lbs of grain

⁴³ He is especially referring to maize seeds, for which there are strong transnational corporate interests, and in which market the competition would be very strong. For beans only INTA is supplying seeds.

Taking into consideration that the registry has been granted only so recently, it is hard to predict what will be the outcome of the next two growing season's events of 2007 (the first one this May, the second one in October). Most of the farmers were not counting with this to happen this year, despite they knew the board and CIPRES were working on it. Even so, there has not been any meeting yet to strategize on what will be the next steps to take. In a recent telephone conversation with Mr. Herrera, he said that the cooperative has still to find whom to supply with seeds (find a market niche) and that perhaps this season would be dedicated entirely to multiplication of seeds. This is rather logical, after the episode told in the previous chapter in which it seemed there was almost no seed to plant at all. Parlevliet (2007) says that in cases such as those of common beans, and "depending on the demand for seed (...), it may be necessary to have more than one multiplication cycle to produce sufficient commercial seed". The most sensible thing to do then would be to ensure that there is going to be an offer.

According to Mr. Herrera, all the 38 active members of the cooperative will engage in the activity, registering at least one plot; so perhaps for the second growth season they will be able to either enter the PLxL or to have some offer for the market. This gives them still some time to define which market it will be then. Financial resources are another limiting factor, and though the organization has not had positive numbers, they are not losing either. They have nearly 70 000 cordobas (> US\$ 4000), which should be sufficient to cover this initial enterprise (Rolando Herrera, *pers. comm.*). Like it was mentioned in chapter 4, if all farmers engage in at least one Mz of beans, it will require an initial investment of at least US\$ 700, plus the cost of inputs (nitrogen fertilizer, irrigation if necessary), transportation, processing, labeling and bagging. In addition to this, Mr. Herrera also mentioned that the cooperative was considering to multiply seeds of commercial varieties, in addition to their own. With that, they would obtain a more secure market (and profit), but the costs would also increase.

Given such expenses, and that the capital is still a healthy one, necessary investments will have to be made as well, in order to ensure the appropriate

storage and handling conditions for the seeds (silos, humidity meter, etc.). Situations like in the account mentioned in the past chapter about the loss of seeds due to lack of infrastructure and knowledge about the content of humidity cannot be repeated. Individuals must know they should not deliver seeds of inferior quality, as it may risk the group's overall reputation and income possibilities. Yet, to my knowledge, none of these improvements have taken shape.

Moreover, it remains also to be discussed within the organization how they are going to address the issue of supplying seed locally, in what amounts and in what ways. This issue must be addressed promptly and clearly, in order to establish priorities and deal with them. Partly, one the concerns of this, as reported by Eikenberry and Kluver (2004), is that some organizations entering the for-profit realm tend have some of the following consequences, affecting the group they originally set out to serve: “shift from serving poor to serving those who can pay, imperative to weed out those difficult to serve, less likely to provide services that do not cover marginal cost, focus on client demands rather than community needs”. Though this threat is not evident at the moment, neither are the proposals for inclusion concrete. If it was the case the cooperative decided to include fellow farmers in their plans, whether gradually by setting credits of seed in exchange of grain for example or in other ways; it has to be formalized and foreseen that some conditions must be met (i.e. if they receive large amounts of grains they need to have appropriate storing structures, or plans for marketing grains).

Alternatives to the marketization of common-property seeds

Marketization, understood as “letting the methods and values of the market to guide policy creation and management” (Eikenberry and Kluver, 2004), is not necessarily the case for COSENUP, strictly speaking; but the elements of using formal market methods and strategies to generate a profit beyond other values is certainly an aspect that needs to be addressed in this report. Considering the ideas mentioned above about legislation, and especially around certification

alternatives, it is important to derive what is more convenient for the organization in the current context.

Another aspect to consider about certified seeds, as the planting material farmers foresee to be mainstreamed, is that it would be bound to meet the genotypic characteristics typified in the law. As such, all members of the cooperative must observe homogenous productive conditions and knowledge, something many claim to lack at this moment. Considering also that locally adapted materials such as these would have a limited utility to certain areas of the country, mobilizing *unused* genetic materials may be a more interesting niche to explore (Berg, 1996). For instance, materials that diverge from “finished” PPB-seeds (because they might be lines that lost the interest of the whole group but that some still find useful) could also be mainstreamed; however, not within the legal framework. This brings out the issue of quality as an important factor that has a direct relation with building credibility and marketing channels.

As Louwaars (2005) explains: “seed certification and quality control are meant to help farmers who purchase seed, since both the variety and the quality of the seed can rarely be observed from a visual inspection of the seed itself”. On the other hand, recognition was said to be an important reason for many farmers to belong to the cooperative and to work in PPB, as an acknowledgment that they could provide good quality seeds, just like the scientific centers can. In the third chapter there was a quote from a 2005 NDF report that caught my eye, where the farmers themselves guaranteed 100% of seed of the JM and Santa Elena varieties. This statement suggests that employing *trust* as an element in generating credibility for their organization is valid. Trust, among other assets of social capital, is a feature not clearly legitimized by market forces; but it is on the other hand related to the facilitation of cooperation and coordination for the mutual benefit of groups (Krishna, 2004). On the other hand, Eikenberry and Kluver (2004), in their USA-based study on market-driven model of public management, assure that an approach of “entrepreneurialism (...) is incompatible with democratic accountability, citizenship, and an emphasis on

collective action for the public interest”. Certainly, mechanisms that propel collective action and stimulate a turnover must be sought.

In seeking alternatives for the decentralization of PPB, quality assurance must be a category to invest resources into. The “guarantee” extended by the farmers on that occasion may be worth considering as an option to explore deeper, by promoting mechanisms that create awareness within and among communities, as well as accountability on behalf of the cooperative. This mechanism, however, requires further alliances with other organisms, perhaps seeking a neutral partner (i.e. union of cooperatives, municipalities, NGOs) that would support such initiative at a regional scale. It remains to see whether this would be possible within the existing legal structures, though. Perhaps this approach, far fetched at first sight, would after all counter balance the market forces of a national seed system apparatus, and bring in some benefits to the cooperative as well.

The following diagram (Fig. 14) collects the past ideas, in an attempt to show how the combination of factors could make the situation viable for the cooperative. In the situation 1, the formal market is depicted for the PPB-seeds. Note that if the cooperative decides to enter the commercial-variety market (multiplication) the registry of the seed will not be needed, but still the parcels will have to be registered and maintained as the law establishes. Situation 2 depicts a normal farmer’s market situation, in which the seeds of COSENUP would be sold for a higher price than grain but not as expensive as certified seed. In such case, it would be exempted from the official registration’s quality requirements. Rather, an alternative guarantee would be issued, either formally or built through good quality human relationships. Finally, situation 3 would ensure that other farmers would be utilizing the material, perhaps not with the same quality as the seed coming from COSENUP, but yet with presumably superior utility than the material they would have on-farm. These farmers are potential new clients into the farmer’s market scheme.

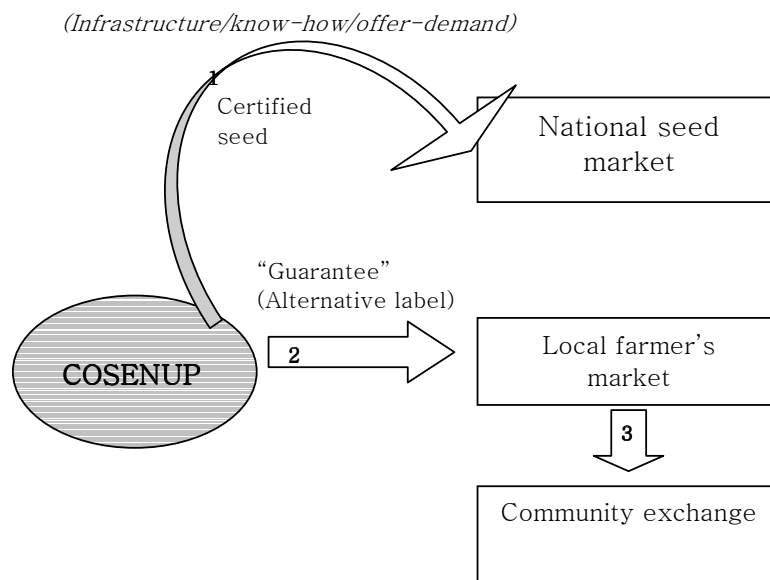


Figure 13. COSENUP as a supplier of seed for the market with certified seeds (1), or with alternative quality standards to the local markets (2) and thus facilitating community exchange (3).

Farmers' organization

COSENUP has been the object of this study, therefore it is important to start pointing out that collective action does play a crucial role in the outcome of the cooperative's activities. As such, collective action is not guaranteed by the mere existence of a well-defined organization, and the elements that enhance it must be acknowledged and fostered. Clearly defined rules of behavior and participation, as well as incentives for the different members and mechanisms to share the benefits of the common work are among such incentives.

On the other hand, free-riding is a natural consequence of the lack of certain mechanisms, such as lack of exclusion provisions, in which case some individuals could be benefiting from the collective work without contributing as much or negligently. Several instances of this report have depicted the situations in which this phenomenon seemed to be present, namely the situation of some collaborators and members of the cooperative, the lack of participation, and the sloppy manipulation of harvested seeds. Whether this

situation occurs purposefully or not, is not the point of these lines; but rather to address the felt need of information and concrete motivation.

COSENUP as a reference point

This section attempts to situate COSENUP at a privileged position in the rural development scheme of Pueblo Nuevo, since as a group they have been given the skills to provide quality-planting materials of staple foods such as beans, maize and sorghum. What will occur in the future depends on nurturing their capacities, increasing their knowledge and facilitating an environment in which collective decisions lead the organization a few steps higher. It was said earlier that one, perhaps smaller, objective of the cooperative was to be able to institutionalize PPB as one of its veins of work. For this reason a Research Committee was established in which the farmer-breeders who have created the current varieties and others participate. This committee is composed of people with high motivations to learn and experiment, and as such needs to have the appropriate conditions to carry on with their work. This includes solving collectively issues such as land pressure, inputs, time and rewards.

Systematization of the experience of the cooperative will allow for them to revisit their acquired knowledge and also to be able to construct a protocol, by which other farmers will be able to learn and benefit. This is essential if PPB is to be incorporated into COSENUP's everyday activities; and if in the future there is space for restructuring existing legislations. Alliances with other organisms, such as NGOs, INTA, universities, farmers' organizations and international research centers; will be important in allowing the exchange of knowledge, the participation in other forums and the innovation of technology. Human resources, reflected in wise leadership and active participations of the membership are thus elements that may define the success or failure of this enterprise.

Upscaling of the PPB process then can be visualized as a ladder (Fig. 15), in which several steps must be taken slowly, in order to achieve a full adoption of the *know-how* that such enterprise demands. It is worthy of mentioning that this

goal, though perhaps an iterating one in the sense that is a continual learning process, will most likely provide motivation to the membership, as well as gain of social status. In this manner it would add to the social capital, therefore providing the right conditions for collective action to take place.

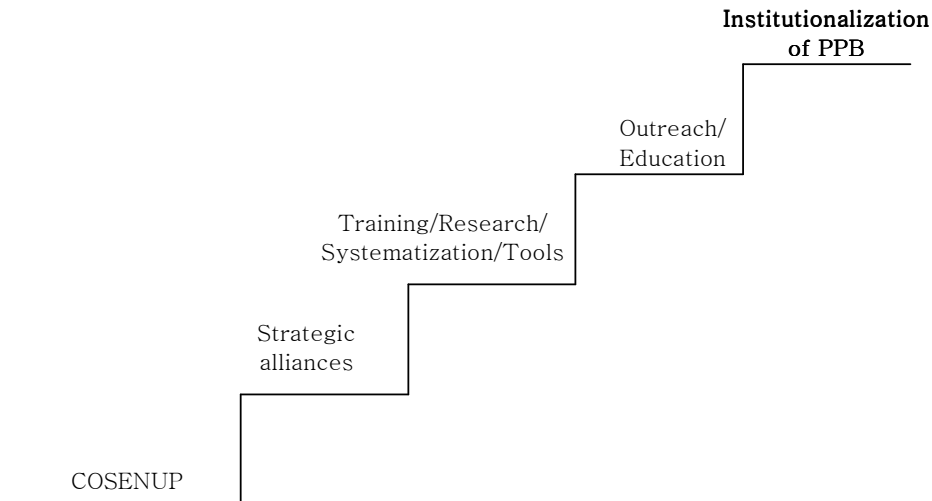


Figure 14. Upscaling PPB in order to position the cooperative as a point of reference in the region.

Spilling the beans: how to move further

It has been shown until now how the empirical data from the fieldwork yielded some insight on the conditions that mold the environment for upscaling, on account of what hindering forces may be contributing to its occurrence. These are by no means exhaustive explanations, as the reality proves to be more complex and dynamic than looking at bottlenecks in a certain time and space, as well as the collective action of a group in a particular moment. This paper reflects, so to speak, a rich picture of the system.

This section addresses the proposed research questions in the first chapter, which guided the study of the LSS in Pueblo Nuevo. The answers however, can be found scattered through the report, in the data presentation, and the idea here is barely to summarize them under the realistic evaluation scheme.

What mechanisms would trigger upscaling?

The empirical data and field observations permitted to identify the major bottlenecks for the upscaling of PPB-bred seeds through the different perceptions and attitudes of the actors in the system, on the one hand. Such perceptions were important, especially when they came from the cooperative, because it has to have adequate stimuli for collective action in order to set in motion the goals of its members. This collective action would help trigger further mechanisms for the upscaling.

In light of this, the bottlenecks for the upscaling of the seeds are presented first, followed by an explanation suggesting alternative improvements that could overcome them (mechanisms). For the ease of visualization they are shown in the following bullet points:

- ❑ *Seed registry*: until a few weeks after finishing fieldwork it was the biggest obstacle for the commercialization of seeds. Although they have obtained one registry for one of the varieties, attention must be paid on the procedures and legislation changes for future accessions.
- ❑ *Market access, market selection*: a lack of agreements and exploration of where the seeds could be sold, as well as how to enter whichever market are pending tasks.
- ❑ *Technical knowledge, maintenance of the varietal quality*: ensuring the quality of the product is as important as finding a place to sell it, especially under the premise that the priority right now is the national seed system. An alliance directly with INTA is the first logical step in this direction.
- ❑ *Anticyclical demand*: though little experience on seed commercialization, the cooperative has already faced a drawback regarding this aspect. This

should not be expected to be an isolated phenomena but rather a dynamic process in which the climate, the market prices and offer-demand interact. Thus, alternatives to avoid considerable losses during such periods must be addressed.

- ❑ *Organizational structure of COSENUP*: lack of experience as a cooperative, as well as managerial aspects of running a business are important for the sustainability and operationalisation of the upscaling process, and even for applying to external funding.
- ❑ *Post-harvest management*: technical and infrastructural resources are needed to maintain the seeds (or grains) once harvested. Aspects such as humidity control, bean size, transportation to storage and processing need to be properly addressed.
- ❑ *Infrastructure (land pressure, irrigation, inputs)*: this can be associated to financial resources as well as individual situation of the members of the cooperative, nevertheless having an effect on the final seed production.
- ❑ *Different production conditions among farmers*: incentives (or their absence) to different farmers to improve their respective conditions will also affect their performance in the production of quality seeds.
- ❑ *Limited financial resources*: building a fund to improve their conditions is a limiting factor, though not a desperate situation at the moment. Some suggest production without irrigation to lower the costs, but this has not been widely contemplated.
- ❑ *Tobacco/silk-red bean or other cash crops*: farmer's attention to other more profitable activities may drive them away from producing seeds.
- ❑ *Biotechnical conditions*: dry winters have been a limiting production factor in the last years, and will contribute the overall farmer's motivation to continue in the enterprise.

- ❑ *Seed adaptation*: this feature, although not recognized by the farmers directly, does represent a challenge, and as recommended by Mr. Eslaquit (from MAGFOR), testing in different sites will be prudent before selling to other regions.

Referring to the upscaling of the technology development process is perhaps a more abstract topic, because it is more complex to measure and needs a deeper understanding. However, some of the key issues that were visualized include:

- ❑ *Limited knowledge about PPB and quality maintenance*: although this may be associated with lack of infrastructure for production, it is also a fact that many farmers (especially those only involved in multiplication of seed) want to have more knowledge about breeding. On the other hand, quality-breeding expertise is not their strongest asset at the moment.
- ❑ *Appropriate tools for systematizing their experiences*: in order to be able to share their knowledge with other farmers, and establish PPB as an institutional practice, a learning curriculum would be useful in creating a collective memory in the farmer's language.
- ❑ *Institutional alliances*: beyond market partners, COSENUP needs to build alliances with organizations that have experiences in technical and organizational matters. This would facilitate exchange and will prevent the cooperative from becoming isolated.
- ❑ *Breeding incentives*: farmer-breeders were clear in declaring their need for more incentives to keep them motivated and breeding. It is important also because the process does not end with one or two new varieties, but requires a greater commitment from all the farmers.
- ❑ *Members motivations / collective action*: connected to all the previous aspects mentioned above, a clear set of objectives and rules will facilitate

the work of the organization and will also not create false hopes so that the motivation to participate actively will endure despite the initial difficulties. Needless to say that participation is, by definition, a vital component of PPB.

What mechanism affects the context?

The previous bullet points summarized the interplaying forces present in the system. The contexts in which mending such bottlenecks would render a positive outcome for the organization were presented in figures 10 through 12, and the current state of affairs in the governed environment was presented in figure 9.

In the event that the commercialization of the seeds would focus on the national seed system, the context that would be favorable to the mechanisms proposed above must include an explicit support from governmental institutions, especially MAGFOR in relation to the seed registry as well as some marketing channels (i.e. PLxL) (Fig. 10). On the other hand, if the upscaling was conceived within the LSS, then the appropriate context for the upscaling would necessarily include a prior acceptance of the planting material by the users, as well as support from NGOs in securing distribution and informal market channels (Fig. 11). What is left to characterize then, is what this “new order” would look like for the LSS, and what role would COSENUP play in it (Fig. 16). Note that the solid colored arrows imply a strong control of the cooperative over their resources, and also the strong relation with INTA and other NGOs denote a greater level of independence.

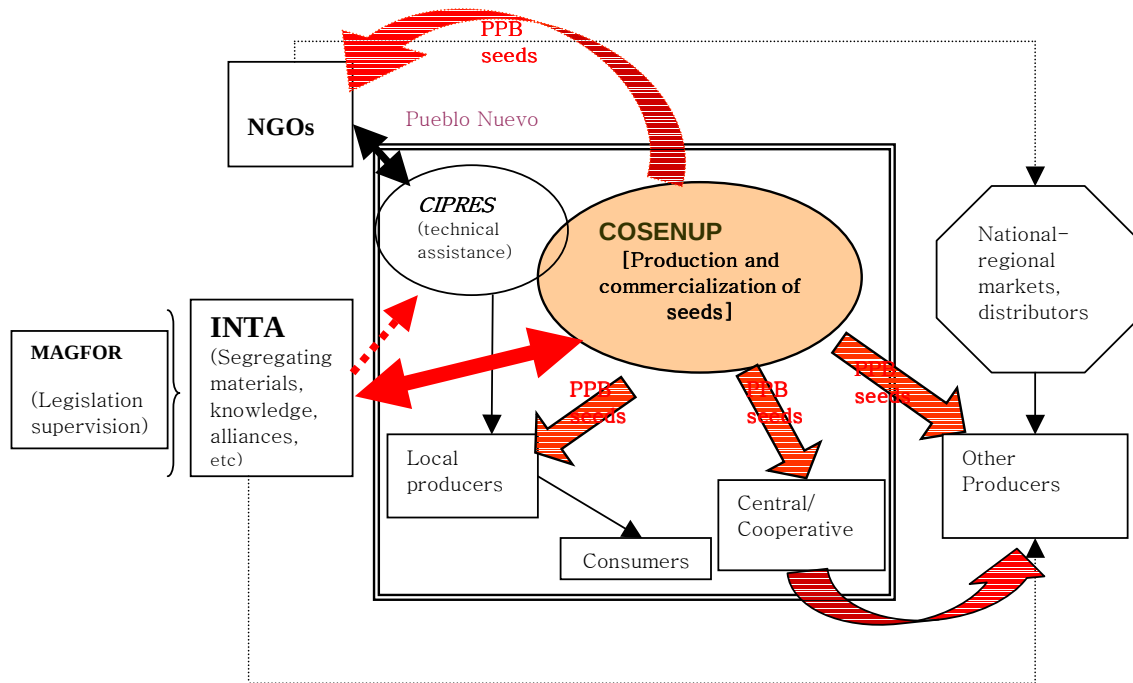


Figure 15. Potential new scenario in the governed environment, in which COSENUP becomes a successful provider of seed for local producers and the market. It would be useful to compare this figure, with figure 9 (pg. 54)

Participation paradigm, development paradox

Finally, some observations about the issue of participation are presented here, although they may be more related to the project as a whole and not so much to answering the research questions. However, the issue is important as it may condition the collective action of the group and the effectiveness and dynamics of the upscaling. It is not simply like the old Chinese saying went anymore: “give a man a fish, and he will eat for a day; teach him how to fish and he will eat forever”. This top-down approach conveys the idea of the old paradigm, in which teaching the tools was perceived as sufficient while cooperation was presumed to be an intrinsic asset of communities; until many development projects began to fail. The participation paradigm, which came about from the shift of development practice from ready-made solutions to involving the stakeholders in making them, started to look closer at internal resources, understanding that participation and sustaining collective action were crucial if any change was to be affected (Pretty, 1995; Meinzen-Dick *et al.*, 2004).

It has been said that participatory approaches are more suitable than top-down approaches, in the sense that it is possible to “achieve more appropriate technology design and faster adoption by ensuring that research builds on farmers’ knowledge of local environmental constraints, plant genetic resources, their own capabilities and their consumer preferences” (Ashby and Lilja, 2004). In view of this, participation is not thought as an end or goal of development projects, but rather as the “means to an end” (Morris and Bellon, 2004). At this point is where the paradox comes about. As a continuing process, one is left with the question of how it will be possible to encourage an active participation of the beneficiaries of development projects? Almekinders et al. (2006) lay out a very important set of questions, referring directly to the COSENUP experience, which are worthy of exploring. On the one hand is the issue of how to maintain the motivation in a longer-term relationship with the formal breeding sector (i.e. INTA, research centers); and on the other is whether it will be possible to maintain the farmers working on further breeding if no additional incentives are provided besides self provision of seeds in the long run, as a turnover for their investments (i.e. land, time, irrigation, etc.).

Morris and Bellon (2004) question whether PPB approaches have yet showed their proposed effectiveness, and some important aspects of costs and benefits have to prove beneficial first of all to the farmers. At this point is where COSENUP comes in, as it is through this commercial experience that a breakthrough in moving this pilot project to a sustainable seed micro-industry has been envisioned. Though the shortcomings of this experience have been exposed in the previous pages, yet I find it relevant to place for a moment research and development policies and aid under the spotlight, as they seem at times to be rather distant from key issues that would lead rural communities into a real betterment. What I mean by this is that one only has to take a quick look around in rural Nicaragua to see that there is a “universe” of NGO and international cooperation -to say the least- and in this scenario there is no guarantee that many of the beneficiaries are not going to be people who have been made *addicted* to live within projects, so to speak; trapped in a sort of vicious cycle between needing and wanting to receive (or “gift culture”,

colloquially speaking). In this scenario, it becomes hard for the people to move forward, thus making cooperation more necessary (and here the circle begins again).

It is worth to reflect on which elements in the broader context will translate into real changes in the country side, such as poverty, legal limitations, credit access, land and water pressure, etc. In this sense developers should consider defining participation in terms of the 'who, what, where and how' aspects of involvement, as well as to why people participate and what would be the outcome of their involvement (Hayward *et al.*, 2004). So, one can say there is indeed participation in rural development projects, yet its quality and associated features are perhaps not sufficiently understood and stimulated -as time and budgets are limited-, and the complexities of the day-to-day may be more overwhelming than engaging in action-research or other tools of investigation. After all, as Biggs and Smith (1998) put it: "enthusiasm for participatory methods should not blind us to their limitations, particularly where their application has become a routine".

Methods: a critique

Although the reality in the setting and project context was rather diverse, it was imperative to reduce these complexities, in order to obtain a researchable problem that could be addressed in the established time and with the available resources. As such, there were indeed shortcomings to my approach as a researcher towards the challenge of the whole. These shortcomings can be traced back to the design of the thesis proposal itself, in which concrete problems might have been addressed rather vaguely, and which in light of the progress of writing became insufficient for obtaining more reliable answers.

As such, some of the flaws I found in my methods for this micro-ethnography were realized in the way the information was collected. In this manner, the unstructured interview guides were perhaps lacking a concise map towards finding concrete answers to the research questions, which resulted in obtaining

much sideline information. Of course this was important as well, but made it harder to skim through once the data analysis took off, though easier to lose the focus of the key informants.

In addition to this there might have been other tools to quantify collective action, by means of measuring detailed yields data, input expenditure, amount of credits and paid loans. Only organizational documents were requested, but not available. A well-organized, statistically correct, survey would shed some light on aspects such as cohesion or aspects of social capital, which could have brought out stronger and comparable data. Yet, since the work also covered a small part of the technographic realm, and other institutions were to be involved, the tasks were somehow diverse.

Another aspect that was a bit contentious was the access to the setting and sampling. In doing so, I relied greatly on the CIPRES technician for finding and talking to the farmers of COSENUP. Though I would have preferred to do more of a snowball sampling, so that I could use an initial group to establish contact with other relevant actors (Bryman, 2004). This proved to be difficult in the conditions of the location, where many farmers were a bit isolated and had little knowledge beyond their own village. In Managua it was sort of natural to adopt the snowball scheme, though. The gate-keeper strategy was useful in Pueblo Nuevo, but it carried along a certain bias that is ineludibly imprinted all through the paper, in the sense that all the interviewees were recommended by the technician, through his interpretation of my selection criteria, and also because he has a lot of agency inside the organization. They trust him very much and to a certain degree see him as a member of the as well; by which he sometimes talks in the name of them, sometimes without prior consultation. Nevertheless, I have hardly ever seen such an enthusiastic, committed person; so it is hard to tell whether his agency is more negative than positive to the cooperative.

Lastly, there is another aspect that might carry negative consequences in the data collection: my role as a researcher itself. Though I believe I managed to have very cordial relationships with most of the people, because I am from the neighboring country and speak the same language and even sat down to have

drinks and joined their baseball games sometimes; there was the fact that everybody knew I came there for a reason. When I presented myself as a student, and described my relation with the NDF project, many people reacted as if I was coming on behalf of the donors, despite any clarification. It was very clear in some interviews when people said things like “thanks to your help”, “we need to receive more help from our brother-countries, like Norway” and phrases of that sort. This surely added some extra positivism to the answers of the interviewees as they may have wished to paint a very bright picture of the PPB and the cooperative thinking it would please the donors.

All in all, I believe that a part of the research experience involves acknowledging the gaps left by the approach taken in the field, and the reflection on the available data to recognize the important aspects and where they become limited. In this sense, it is only doing research in the field that one experiences the richness of the social tissue of development projects’ beneficiaries; or that one sees the complexities of running the local office to meet the demands of programs; or that one talks to high authorities of NGOs or government dependencies. The cultural differences from my country gave enriching opportunities to understand a reality so close geographically, but sometimes so far in other aspects.

Conclusions

This report will not try to set a definitive list of conclusions, but would much rather leave the door open for a few other topics that need to be investigated in order to understand the situation for upscaling pilot PPB experiences elsewhere, where it applies. In relation to the development paradox mentioned above, it is clearly necessary to be successful in this scaling mechanism, if only to be able to formulate custom-made strategies in other places or to realize that its impossibility invites to the search for new options.

It is my impression that the upscaling of seeds and the PTD process are two things that do not need to be mainstreamed hand-in-hand, however they are

obviously complementary and the lack of one will affect the other. Furthermore, upscaling does not depend on large market economies to be successful, which means there is always an option for the materials to be widespread, if only there are the appropriate incentives to continue the breeding activities.

There are two main trends for upscaling the PPB-bred seeds: through the informal market (LSS) and in the national market. Creating appropriate channels for commercialization is not an easy task, and cannot be done by COSENUP alone. Networking and parallel working with governmental institutions such as INTA and FUNICA may be important in finding resources to complement their work and facilitate the upscaling.

The upscaling of PPB is certainly a slow process because the farmers still lack sufficient knowledge and need tools to be able to keep the knowledge and spread it. Additionally, it remains to be considered what would happen in a scenario where many farmers were involved successfully in the activity; would it overflow the markets? Would it be economically viable?

COSENUP is right now at a point where it does not have much independence, nor can it really get it, from its accompanying NGO. Moreover, it needs to acquire important assets in order to increase its social capital, as well as to acquire a momentum for collective action. There are certainly elements of collective action present within the organization, expressed mainly in the formalization of the cooperative and its structure, but there is still a lack of agreements in many core points related to incentives, commercialization and long-term vision. Substantial funding for PPB operationalisation is still necessary in order to strengthen the cooperatives' seed portfolio, among other things.

Coalition building is a very important aspect that the members of COSENUP have so far neglected. This will be important in order to deal with their seeds in the market, but also for their independence and to promote the exchange of knowledge and expertise among other farmers' organizations, NGOs, cooperatives, academics and even donors.

Seed markets for beans are perceived as a convenient entry point for the commercialization of PPB seeds, because at the moment only INTA is releasing bean varieties. The case for maize will be much more contentious, in the event that COSENUP would obtain a seed registry for a corn variety, because the market will be much more competitive. Strong corporate interests want to control the hybrid maize market, which also opens the door for the introduction of GMOs. Control for genetic contamination should be taken into account when relevant, for the preservation of their materials but also of rural landraces in general.

The registration of the seed will prove to be a sort of practical experiment, from which the farmers and NGOs will conclude if it is worth pursuing that path or looking for alternatives to quality control and maintenance. In this sense it would be important to systematize the experience carefully; that is, the difficulties as well as the advantages of having this registry. Related to this, it would be very important to attempt to compare the costs that entail having the registry against the benefits obtained thereof.

In a similar vein, an economic evaluation of PPB (perhaps even for the PPB-MA) is necessary not only for gaining more credibility to the methodology, but to strategize on possible mechanisms that could enhance the benefits for the farmers. This would be enriched by market analysis and ideally a seed-movement study (i.e. GIS mapping). Exploring possibilities such as COSENUP entering a formal market with commercial varieties, while breeding their own seeds for self-sufficiency or informal markets is another interesting possibility to explore. Measuring the latter is perhaps the most challenging task, but it would yield very interesting information that would allow to estimate also how many people benefit from the PTD besides those involved in the cooperative.

Finally, ample recognition by governmental authorities would help, reflected in possible changes in the current legislation or in facilitation into the PLxL. This would create a better environment for upscaling, and more credit to the farmer-breeders and networks such as PPB-MA. Attention must be paid to what occurs with the current changes to the seed law, as the global tendency is towards

tighter control on PGR and less protection to small farmers, in the context of such controversial commercial agreements as the DRCAFTA.

To conclude, global efforts aiming at reducing poverty and hunger in rural areas of the world are generally needed. Escalating a pilot project such as COSENUP's will bring positive elements into the experiences and body of knowledge, not forgetting the very important role of maintaining and increasing agrobiodiversity, for the betterment of human kind.

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Figure 1. The formal and local seed systems: two complementary systems that need to be interlinked (from Almekinders and Louwaars, 2002).

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Figure 4. Schematic representation of the actors with which the object of the study is likely to interact with.

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Appendixes

Appendix I: Interviews with COSENU

This table presents excerpts from the different interviews with the farmers who belong to COSENU, from which I extracted their perceptions relating to various topics related to the cooperative, their goals and aspirations as a group, PPB, elements of collective action, and others. Their names are kept in anonymity. The ideas are written as descriptions and as quotes.

1

Farmer →	1	2	3	4	5	6	7
Aspect ↓							
PPB							
Objectives, importance	• Has rediscovered things and learnt others. (<i>It's not that the beans married, but it mixed</i>) • Admits is not an easy task... • Gain knowledge	• He discovered the life of maize... • Acknowledges that improved seed yields better • Has learned how to breed • Better flavor and nutritious value	• "We have learned and we continue learning" • "We don't buy seed, and plant our own criolla" • "We have adapted our seed to the local conditions"	• "The seed we've been given it's better than what we plant here" • Yields better	• "The seed has improved, before we had to buy it and it wasn't fertile" • "Now it's better in the flavor and in the pockets" • Resistant to golden mosaic, drought and higher yielding	• To have diversity of seeds, different colors, different environments	• "Very good project because it gives us training and materials"
Motivations	• Before, he didn't know what it was to make a crossing • Highly motivated • "We are used to projects coming in and giving us seed... but we sell it or eat it, why don't we preserve what is good?"	• He was explicitly thankful to CIPRES for including him in the project • He calls the maize seed he produces MY SEEDS, he is very proud, and says he yields over 50 qq, and before 20 qq. • "Thanks to Julio Molina for his assistance"	• Become a cooperative and not an anonymous group • "Now we achieve things and we share equally"	• To have seed • "They have taken us to workshops"	• "It's super important, because now she knows a lot more how seeds are bred" • "It's a matter of asking for material and doing it, perhaps" • Flavor, smell, color are better • "To keep improving on and on!"	• "The flavor matters more than the nutritional value of the beans"	• "We acquire better seeds and we adapt them to our local conditions"
Technology development	• Has learned a lot, and would like to continue breeding new varieties from segregating	• "We still have a lot to do, it's a never ending process..." (positive about it) • Has had problems	• Not much participation, but maize yields better in that area, so they should be	• She gets the seeds but it's her husband who grows the crops • Would like to learn more about how to	• Has followed essays and has seen crossings, but hasn't done any yet	• How to dry the seeds • Storing conditions	• "I have more knowledge in beans, but we were assigned to work with maize"

	materials • The work has been among equals (CIPRES, INTA and them)	keeping his seed pure... animals ate parts and he has no silos and it got bugs	experimenting more there • Problems keeping the seed and not losing it	select better seeds			• “We still do visits to the bean breeders to learn from them” • “One thing is to harvest seed, and another one grain”
Capacities	• He developed the JM variety	• Has some lines of maize... • Although the INTA technician told him they wouldn't work he continued validating one of the lines	• Has followed a few plots for validations only	• Not really active in the field	• Has followed essays	• He has followed evaluations and such, but not too active since he is the president	• Has been given training • Has been doing mass selections in maize
Knowledge	• He has a lot of confidence in the work he has done	• Has learned a lot about the life of maize, and will continue learning even if outside the project	• Would like to experiment more with maize	• It's good to receive training from the members who know the most to the others	• “One never stops to learn”	• By breeding the capacities of the farmers are increased • But, not many are practicing, only about 15...	• “I don't consider this a finished thing, we keep discovering things” • “It has been a good experience; people change, knowledge changes too”
UPSCALING							
Seed production	• Has the best production of seed (especially after the last winter made all yields low)... 10qq of genetic seed now.	• He thinks he has a very good production... he has water and good soil... • High yields in maize	• Maize yields well 40qq/mz • 100% buenisima	• Doesn't know about yields, her husband does the work	• If the winter is good, the production is good • About 12qq/mz of beans • Good land for beans b/c of tobacco	• Last winter (2006) was very bad, and they had almost no production of seed	• With beans, on a good season, about 25qq/mz, and with maize 60qq/mz, very good production
Motivation for commercialization	• Producers usually plant grains, and are not used to buying quality seed • Big incentive for members, now we are “asleep”, we need to get on it...	• More follow up is needed, he feels abandoned and does not want to lose the work of 5 years • We need our office, our seal/logo • Also that we can explain others	• We solve our problems within the organization • Have been planting the Luisito beans, and it tastes better, doesn't go sour	• “I don't know much about that”	• high expectations... national or international! • The idea is to sell quality seeds	• They could supply an export market of beans, they have heard of the demand of Nicaraguan beans abroad and want to be a part of it	• To prosper a bit, we have many needs

		(farmers and scientists...)					
Markets	• Agreements with organizations • “The further the seed goes the better, it has already moved, but with a legal register it would go beyond” • “Give 1 arroba and get 1,5 back...” (as a possible commercialization)	• “I don’t have a problem with whoever wants to take the seed” • Wants to know from others if they like it (proud) • “The bad thing is to sell it to a middleman” • Individual farmers best niche, then cooperatives	• Would like to sell to consumers (not clear if as grains) • Second cooperatives and lastly to PLXL	• She doesn’t know, because it’s them who know about that, and at the moment they haven’t given us seeds	• “Whoever wants it” • Cooperatives or NGOs	• Export, NGOs • Aside from the market, he talks about the issue of how the seed has moved thanks to CIPRES, since there have been over 300 producers planting their seeds in the year 2006.	• “It is a problem” • We have good potential for production • NGOs and cooperatives are his priorities
About certification	• It is better, it is legal • We can then sell it	• Thinks that is far until it happens • More follow up is needed for the pedigree and more... • And \$\$\$	• He says it was explained in December • with it they could offer about 1000qq of seed • we have to get the brand to our name (the cooperative) and not to JM or SL		• The last time, the president told us he was negotiating that... • We can sell it legally, guarantee that it is original and legit	• He says CIPRES has been in charge of that, and that they collaborate with information and with INTA • “We have been jealous that someone appropriates of our seed, but with this register we would have author’s rights”	• “It is important because we are recognized nationally as ‘seed producers’”
Limitations	• To maintain genetic seed he would need land (min. 1 mz) and a cold room	• Because of the registry the project has stopped for almost 2 years • But he has continued, though he is abandoned • Lack of financing to improve our technology and grow	• Better organization • Storing conditions • Credits • Tobacco growing in the area makes it hard to plant beans • “Short winters are limiting if they don’t have the seeds at hand”	• “Sometimes it doesn’t rain here”	• Winter • The papers of the cooperative and the legal register	• Maintain purity of the seed (before it was no problem because they sold everything, so they did not need manage anything) • Irrigation • Not much knowledge on the legal part	• The winter, access to water • The market, being able to sell seeds (the register) • Difficult to hire an agronomist (breeder)

Anticyclical demand		• "Sometimes one keeps the seed trying to find a better price, and then the seed is lost... there is lack of culture..." • "It's a mess in Nicaragua" • "We should learn from the Hondurans... they sell or eat everything, but buy pure seed"	• Most of the farmers sell all their seed and grain...		• "On the one hand the commercialization committee should find a place to sell the seed" • "On the other we should produce more"	• The prices when there is no demand have made them lose a lot of the worth of their seeds, and end up selling it as seed, for much lower.	• "This thing with grains is like that... one year you have 1000qq to sell and nobody wants to buy, the next year the contrary"
High demand-low offer (vice)		• "It might be better to get organized and that people come and buy our seeds"	• "In May everybody is running trying to find seed, because they sell it" • Good opportunity for COSENU			• "With the help of the commercialization committee in the central we negotiate the prices with other clients" • The weather severely affects the offer on demand (last year they had an order of 400 qq, but could not deliver)	• "If we plan well the time for planting, etc., we could do very well"
Legal issues	• He knows they are soon to defend the variety, and that CIPRES has had troubles with the registration of the varieties		• "INTA is jealous and that is why we don't have the register yet, they know it's going to hurt it"		• Still in process	• Not handled by them • The cooperative's legal status is not clear yet, and that is needed for the register	• MAGFOR is asking for small detailed information
If a profit is earned	• Back in the farm	• Back in the farm, increase land, etc.	• Reinvest on the farm (Taiwan grass)	• "In something that is more"	• "Savings, for an emergency, you never know"		• Better production conditions

COLLECTIVE ACTION							
Cohesion	• (1) Believes the all have the same vision and are very united	• “(1), in my opinion it has a lot of both” • “Better to do things in groups, but there are some of us who don't give much importance to the organization”	• “(1) we are together and have vision for the future..” • “One invites people and they come”	• “(1) we are very united of course, and work well together”	• “(1), but the more the better”	• “(2) similar vision, more or less united...”	• “(1) Folks are united”
Independence	• Talks about how CIPRES is going to include them in the future breeding in other zones, and how they handle issues of the varieties, and get them financial inputs		• For him it is important to be in a group • Admits they need more financing	• From what she is saying, it seems she is waiting for the seeds and more to come to her	• Need other cooperatives or organisms for capacity building	• They have been talking about having an emergency fund to be able to be more independent from CIPRES	• He thanked CIPRES and other donors for the help and “still we need more” • He thinks once they have the register they will be able to be more independent
Pros / cons cooperative	• P: the organization, they give them inputs to produce • C: not the best management of the bank account; he told the board but was not taken in	• P: “very good organization, though I don't go since a long time” • C: “no weaknesses, or maybe lack of money”	• P: “We have kept organized; we have learned to live as a cooperative” • C: “filling out the official books, doing the taxes, we need younger people”	• “I don't understand your questions” • She thinks the people who are there are doing a good job, and they know what to and how to do it well... • She doesn't want a position because then she would have to be responsible with it	• P: the organization • C: “there could be, but I don't see any” • “It works well as it is”	• “We have weaknesses”	• P: the organization, the support from CIPRES, the knowledge of the farmers • C: lack of financial resources; unequal production conditions (“some have water, others don't”)
Organization-planning	• The cooperative is trying to attract more people to participate • No need for a manager yet, maybe Rolando in the future		• Involve younger people who read and are motivated, etc • No planning is a weakness	• She says she is new to the organization (<i>although she appears as a founding member</i>)	• “Only two meetings a year is too little, perhaps we should meet even more” • Maybe there is no planning due to a lack of interest	• Participation in other places, like the central, RCA network • He would like the cooperative to participate in other spaces so they	• “We just met last December and almost all the members went” • We will probably make our annual planning the coming Saturday

						publicize themselves • They don't have a year's plan because of the problem with the commercialization • Each farmer would plant 1-2mz, but without an established demand it is hard	
Participation	• They easily get along without much discussion	• Has hardly participated but thinks is important	• "For me it's good to participate"	• She doesn't participate too much, the meetings are too early and too far	• She has been in the board, first as secretary and now as a vocal • She left the other position because was afraid of the books	• They encourage members to participate, and welcome others who have been involved in validations and so on • There is a selection process	• Many participate • Perhaps they should assess every individual farmer to see how their productive conditions are and to see how they can be helped • The social part is very important: "don't think I am over others, but we all look at each other at the same level"
Gender issues			• Said how women who participate in the board don't even know the o from a circle (no saben la o redonda...)	• She told me to go visit other female neighbors of hers who do participate more	• Says that normally the role of women is to watch over the family, but she feels much better learning, etc • The more spaces the better • If the cooperative was with other things women could do better (i.e. poultry)		
Incentives to belong to the cooperative		• People need to have more interest			• Help with irrigation	• They request members to carry out essays	• Organization= power, voice, strength

						voluntarily	• Also the social part, you participate and you feel you are worthy
Committees	• Right now they are somehow stalled, although the research one meets informally (he goes to others fields...) • He thinks joining the project with INTA will help reactivate them (Refresh knowledge)	• Does not formally participate	• He doesn't think they are too strong, but doesn't participate in any	• They function well and that's why the Assembly kept them in their charges	• They are not functioning so well yet, maybe because the lack of commercialization...	• Thinks that the committees should work better, with perhaps more training	• He belongs to the commercialization committee: "it has been hard and things have been managed by CIPRES, as CIPRES and not as COSENUP, let's be clear on that"
Need for training?	• He doesn't think so	• In financial/ managerial matters	• "To not lose the seeds"		• Especially for the board, about the different roles	• Accounting • Technical things	• "Where are we going as a cooperative?"
Role of CIPRES	• Apparently very big, close supervision and planning with them (Rolando especially)	• "CIPRES is the best organism in all of Nicaragua, with that I tell you everything..." • Says he likes all of them, even though they don't visit him much	• He thinks that CIPRES should organize for them more training on keeping the seeds		• Mentions unconditional support from them	• They owe CIPRES to be known and feel less small	• They are doing all the commercialization for them, because they have the resources... so they let them.
ASPIRATIONS							
10 years from now...	• "If we continue like this we can prosper a little"				• "We would be very well, if we know how to get along"	• "To grow, have an office... cold room, humidity device"	
Observations	• Likes the visits, both sides learn something • Appreciates the help from agencies	• One of the least participating members • Wealthy farmer Contradictory answers	• Seemed to be referring to the tobacco cooperative and not COSENUP most of the time	• She was quiet most of the time She seems to just belong to the cooperative because there's nothing else	• She's very open and easy going • Very sincere and enthusiastic about the cooperative	• He is of the board, Strong personality	• He is very positive and what he said about the cooperative

2

Farmer → Aspect ↓	8	9	10	11	12	Board of directors (2 members)
PPB						
Objectives, importance	• Before she had no knowledge, then she started to learn • Beans taste and yield better	• He has made a couple of varieties that are not the main focus of the cooperative but that are successful in his village • He thinks the continues process of breeding is important • Also the social impact of PPB • "Seeds, knowledge and people breaking the ice of participation"	• It all started with the PPA program, and after that came the PPB, and they felt it was nice as women to participate	• "The seeds help us in solving some problems we've had with disease, drought" • The beans have a nice color and taste good • "I participative because we share it with other farmers and people"	• Produce quality seed	• To have a diversity of seeds • Also to have infrastructure: an office and storage facilities • Increase farmer's income by 10%
Motivations	• To learn	• He feels taken into account in the process • Joint efforts of scientists and farmers are important (put together the rings of a chain)	• She says they have great motivations, to participate and learn, so as not to abandon the project and so on	• "It's our seed adapted to our own area" • "We don't have to buy seed anymore"	• Concrete something that has an impact	• Many families in 3 different municipalities have been benefited
Technology development	• She (and speaks for the women) now knows how to handle maize and beans seeds	• All the materials we had been given we have delivered them until the end	• She has been reproducing beans seeds	• Has worked mostly in multiplication of seeds	• He has been working on improvement on sorghum, and a new variety is almost finished (BF)	• They think that in order to preserve the quality of the seed they cannot have too many farmers working on that
Capacities	• We have learned a lot, and also we have gotten (women) a package (referring to the PPA) • She would like to carry on with essays herself	• He has been very curious since little • Luisito variety is very successful (maize)	• Before she didn't have a clue about how to get varieties, and mix and classify different plants	• He was trying to put himself a bit down, like he hadn't done as much		• Know what to look for: flavor, color, etc
Knowledge	• Wants to learn more	• "The virtue of the project is in the sharing of knowledge between	• Has learned a lot about breeding and getting better seeds	• He wants to learn all kinds of breeding, besides that for basic		

		farmers and scientists" • "We have to try to continue with it, because the weather changes, and varieties change, etc."		grains		
UPSCALING						
Seed production	• They use a credit system, so they get inputs for their production, and when storing, they started with 5qq, but then it was 10qq	• Tobacco is becoming bigger and bigger and drives people away from bean production		• His production is regular, not very good yields • 15qq/mz maximum, because he has no possibilities to use machines	• Agrees that about 20-25qq/mz is the average for beans • All can be taken in by the cooperative if there is a demand	• From 10-12 to 20qq of beans, it's a big increase
Motivation for commercialization	• Have a better market for their seeds • Without the register we only get 25% of its value in the market	• So they can maintain the quality of the variety and to keep breeding new ones	• "We want the seed to have its commercialization, because we know it's a good thing that we've made"	• Improve his life and his family's	• It would be good to have the market before having the seed	
Markets	• Primarily local cooperatives • Maybe PLXL	• First the PLXL • Local cooperatives • Alliances with Costa Rican farmers • Also thinks of giving credit to poor farmers (1qq of seed for 2qq of grain)	• Commercial houses and individual farmers as well • At all levels, the bigger and longer (markets) the better, because it has been a huge effort for us	• NGOs and export	• Mainly NGOs, or other cooperatives (i.e. COSERME) involved in seed production and distribution • PLXL only if there are the right conditions	• Mostly through the central of cooperatives • Also mentions the possibility to produce grains for the local and international markets
About certification	• She doesn't think it will affect the access to them by poor farmers	• He hasn't been involved in that process	• It's a difficult process that they (CIPRES) have been dealing with • "I don't know when we are going to be able to get it"	• Supposedly, the INTA is jealous of them • "It will give me the possibility to sell it as seed and not as grain" • "We'll sell more than 1qq bag, and it will have the logo and label and all, and we'll get more money for that"	• Concerned about being able to keep the registry	• "It's more of a technical thing, so we let CIPRES and INTA take care of it... we cooperate"

Limitations	• Land is limiting • Dry conditions • Seed storage	• Drought, flood, no rain, too much rain • Conditions for seed storage and maintenance		• Mechanization • Credit (with 4000 CBS he would be able to produce more...) • Winter (if it's dry)	• Maintenance of the varietal quality • Dry conditions in the lower areas are limiting factors of production	• The (revolving) fund • Infrastructure • Climate • The label/brand • Land (mention the case of JM, who has to use his land to supply all with seeds)
Anticyclical demand	The would have to think about it carefully	• Long story about their previous experience (account in the text)		• "Perhaps diversify on the products"	• "We had that situation last year, when we had seed that we could not sell"	
High demand-low offer (vice)	She thinks they would have to think about getting into the PLXL to ensure moving their production, but they need land	• Involve other farmers to cope with the demand		• "I would try to get a loan from the cooperative to hire more land and produce more to cover that demand" • Maize or non-traditional crops for lack of demand	• "We had a loss, because had to sell seeds as grains"	
Legal issues			• It is not them dealing with that	• "Now with new administration we could have more possibilities" • "CIPRES has been helping us with that"	• Has had something to do with the committees not being active	• "It has been very hard to obtain the label"
If a profit is earned				• Capitalize his farm		• It is hard to measure the 10% increase in income, but at least many farmers don't have to go out and buy the seed, they already have it
COLLECTIVE ACTION						
Cohesion	"(1) we are very close and we look out for anything to happen"	• "(1) We've survived even with losses" • "As long as we know where we are going we are fine"		• "(1) Because we have had almost no desertion among members"	• "(1), absolutely"	

Independence	She thinks in the future, even without CIPRES, they will continue breeding	• The way he talks about CIPRES is as if they had the obligation to cater for them • “The day we have researchers who can ensure our project's sustainability, then we will be independent and sovereign”	• CIPRES has told them they need to learn and stand on their feet, because one day they will be by themselves	• Still counting on CIPRES	• Mentions his participation in events organized by other NGOs	• Still rely on CIPRES, and to some extent others
Pros / Cons cooperative	Need to learn about accounting books	• He thinks that the people who are there are the ideal, they are just inactive because “there is not much to do...”		• P: “we are in good in the organization; when u can get a loan it's paid back” • C: when loans are not paid back to the cooperative; not having a commercialization of the product		• Lack of financial resources to give bigger and better credits/loans to farmers
Organization-planning	• Perhaps they need to push for a meeting for planning the production of the year • They have also talked about hiring a manager, but need the consent from the assembly	• There is time still to organize themselves this year, as the sale planting begins in May • “I think we should go BIG, because if we are going to keep it small and go begging around for people to take us, then it's better to just grow the seeds for ourselves and our food”		• “We need to have a planning like a few months before, depending of the movements of the cooperative” • “I think the cooperative can finance with seed and a little money”	• Thinks the cooperative should help the farmers who have worst production conditions • They have not had a yearly planning • Last December they held a meeting to assess the work so far • Does not think they need a manager just yet, but in the future probably • Would like to advertise the seeds in broadcasting media	• Some of the members left to other cooperatives, but new members came • Initial 200 CBS for the fund
Participation	She is in the board	• He is in the research committee • He also motivates many people in his	• Seed reproduction, no role in the board	• Multiplies seeds. • Came to the meeting on that next Saturday	• He is in the board, and before was in the surveillance committee • “Hundreds of people	

		communities and other places • Participates in many different activities, as well as the Mesoamerican network • Worried about the issues of migration to the cities			have benefited"	
Gender issues	• "We have felt very supported" • She thinks there is enough space for women, but would like more support (i.e. tubers)		• She feels she participates as an equal in the cooperative • She feels more training for women is necessary			
Incentives to belong to the cooperative	• Better conditions of production and storing (together)	• As there start to be good prices and better demand, more people will likely want to join us • There are rules for those who want to join		• "When we are there, together, we solve our problems together (i.e. financial, family, cooperative problems...)" • Also to have a better economic development		
Committees	• Although not all have been active, she thinks the way they are it's fine • Problems with the accountable books	• Perhaps the organization is working at half speed		• Only the credit and education ones are functioning • "They are fine the way they are"	• The committees have been rather inactive, and in December some people were changed within them. • He thinks they will work well once the work gets into motion	• Not all have been active • There is an overload in some, and others do nothing
Need for training?	• Accounting books • Anything else	• "Where do we want to go?" • Cooperativism • More socio-political issues, about the individual in society and the like	• Cooperative stuff	• The members should know about administrative stuff, in case we are chosen for the board one day • Also the board can get deeper into things	• Especially in cooperativism, and understand more what their organization is about • Suggests to promote exchanges with other	• A good secretary, who can take good acts

		• On quality maintenance		related to their positions	cooperatives	
Role of CIPRES	• PPA • Support	• They have short-term views, but processes are long	• They have taken them to where they are today	• Still counting on their support		• Training, accompanying in the work
ASPIRATIONS						
10 years from now...	They would be even better: "with the cooperative we will increase everything we have"	• Look for funds for storage, humidity control, etc	• "We would be that much better" • "We would have our own business and the cooperative would grow and we with it" • "Our families would have better quality of life"			• An office and storage room • An agronomist, hopefully the son of a member
Observations	• She seemed evasive to respond, or not so interested	• He is like the political activist of the group, always keeping in mind the bigger picture • Very motivated and motivating as well	• She was sort of an easy-going person, using the "right" words • She seemed grateful to be participating	• Very nice man • He had a lot of insights of what it was with the sandinista's cooperatives and then when it changed • A bit shy about his own capabilities	• I don't feel he opened up, although he was very well versed, or better than the others • His views on the cooperative seem very hopeful	• Meeting was more the president's views, the other member present was just nodding to everything

Appendix II: Working groups

Group work activity with COSENU, on the 27th January 2007, in the offices of CIPRES, Pueblo Nuevo. The questions asked for each group were: 'what priority steps must be taken this year?', 'what resources do you have, what do you need?' and 'how do you see the situation in the short, medium and long run?' Each group addressed the same aspects, focused on different topics.

	Group 1: COSENU	Group 2: Commercialization	Group 3: PPB institutionalization
Priorities for this year	Technical knowledge, PPB	Legalize the varieties to avoid fines and sanctions from MAGFOR; plan the growing areas based on demand (?) and storage capacity; seed bank and agreements with other organisms	Better PPB knowledge for all the members; training workshops (through INTA or CIPRES)
Resources: haves and needs	<u>Have</u> : financial resources prior a production plan <u>Need</u> : cold room, more financial resources	<u>Have</u> : capable personnel; available technical assistance; tools; limited financial resources; seeds; silos <u>Need</u> : funds to maintain varietal quality; storage conditions; incentive to farmers; administrative training	<u>Need</u> : training before april; coordination with other organisms (GOs and NGOs)
Short/medium/long term visions	<u>Organization</u> : participation from all the members in PPB and production; solve legal problems of the cooperative; forge alliances	<u>Short</u> : would not be able to fulfill all needs <u>Medium</u> : with a good management the commercialization and legality of the cooperative would be achieved <u>Long</u> : cooperative with capacities/knowledge; more members; more financial resources; more breeding materials; more up scaled varieties; soil preparation tools, silos and agrochemical storage	Alliances with other organizations; improvement in registration of seeds (faster)
Observations	Depends on the seed registration		

Appendix III: Seed registry

This registry was granted to one of the red bean varieties just in April 2007. Scanned from a copy of the original, provided by NDF.



GOBIERNO DE NICARAGUA
MINISTERIO AGROPECUARIO Y FORESTAL
Dirección General de Protección y Sanidad Agropecuaria

CERTIFICADO **NO 0213**

El Ministerio Agropecuario y Forestal, a través de la Dirección General de Semillas y en base a las facultades que le confiere la Ley de Producción y Comercio de Semillas No. 280 publicado en **LA GACETA**, Diario Oficial No. 26 del día 09 de Febrero de 1998 y su Reglamento y habiendo comprobado toda la información emitida en la solicitud No. 79, otorga el presente:

CERTIFICADO DE INSCRIPCIÓN DEL CULTIVAR
(Se escribirá nombre del cultivo y cultivar)
FRIJOL-PUEBLO NUEVO J.M.

A: (Nombre del Suplidor en el extranjero).
COSENUP, R.L. (GENERADA LOCALMENTE)
Inscrito por : (Nombre del Importador o Razón Social que inscribe la variedad)
COSENUP, R.L.

Fecha de Registro : (Fecha de ROC.)
12 ABRIL 2007

Dado en la ciudad de Managua a los **18** días del mes de **ABRIL** del **2007**.



ING. RICARDO VALENTE
(Nombre completo)
Director de Semillas
Dirección General de Semillas
DGPSA - MAGFOR