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Nicaragua Sustainable Charcoal Production in the Chinandega Region

Emergency Project: Sustainable Charcoal Production in Posoltega Following Hurricane Mitch

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Abbreviations and Acronyms

ACDI	Canadian Agency for International Development
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza (Tropical Agricultural Research and Higher Education), Costa Rica
CIRAD	Center for International Research in Agriculture and Development, France
COMSONICSA	Compañía Combustibles Sólidos de Nicaragua, SA (Solid Fuels Company of Nicaragua)
ESMAP	Energy Sector Management Assistance Programme
FRM	Forest Resources Management, France
INAFOR	Instituto Nacional Forestal (National Forestry Institute), Nicaragua
IIZ	Institut für Internationale Zusammenarbeit (Institute for International Cooperation), Austria
MAGFOR	Ministerio Agropecuario y Forestal (Agricultural and Forestry Ministry), Nicaragua
Los Maribios	Project for Conservation and Natural Resources Management in Los Maribios mountain (Nicaragua)
NGO	Nongovernmental organization
Proleña	Association for Wood Energy Development (Nicaragua)
PMA	Programa Mundial de Alimentos (World Food Program of the UNDP)
PROCAFOR	Programa Regional Forestal para Centro America (Central America Regional Forestry Program)
PROFOR	MAGFOR Forestry Project (Nicaragua)
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
WFP	World Food Program (see PMA)

Executive Summary

1. The Charcoal Emergency Project took place from January to June 1999 in the Tololar community, Posoltega, Nicaragua. In partnership with the Agricultural Ministry, Proleña, a local NGO, executed the project with the financial and technical support of ESMAP/WB—in particular the technical assistance of experts from Forest Resources Management and the Center for International Research in Agriculture and Development (FRM-CIRAD). The objective of the project was to "harvest" (or collect) the logs and trees that fell and were washed away in the Posoltega area during hurricane Mitch and the flood it caused, and to use this wood to make charcoal. Consequently the purpose was to generate employment and income for people affected by the hurricane. Charcoal production took place using traditional earth kilns, and 46 Posoltega producers were targeted for the project.

2. The project was carried out in unstable conditions because the affected population had not yet secured homes, jobs, and sources of food. Legal questions remained as well: before using trees to produce charcoal, ESMAP experts had to be sure that they were allowed to move the trees and use them, free of charge, for charcoal production. This problem was solved, however, and soon the project was able to motivate people to produce charcoal and benefit from the resulting income and employment.

3. The project ultimately achieved a great deal. The generation of income and employment had a positive social impact: stability within families and communities. Another benefit was that the area was cleaned of loose timber in order to produce charcoal with the wood—a positive environmental impact for both agriculture and public health. The producers learned new technologies in charcoal production and a technical guide was developed.

4. From an economic point of view, the project produced 6,774 charcoal sacks and employed 46 people directly and 74 indirectly (by the end of the short-term project). Project activities generated a total income of US$24,454, meaning a monthly income US$110 per person. Finally, the producers came together to form the Posoltega Mitch Charcoal Producers Organization to produce and market the finished charcoal product.

1

Introduction

1.1 Nicaragua has charcoal consumers at the domestic, industrial, and commercial levels. The last assessment of total consumption was 10,000–30,000 metric tons per year,[1] which translates to 50,000–100,000 metric tons of fuelwood. A 1998 Proleña assessment, conducted with ESMAP support, found a total of 3,000 metric tons of charcoal for Managua, the capital. All commercial charcoal is still produced in traditional earth kilns and by traditional harvesting in natural forests without forest management. Since a state project carried out in 1983 by Solid Fuels Company of Nicaragua (Compañía Combustibles Sólidos de Nicaragua, SA, or COMSONICSA), the country has not had a project to promote or improve carbonization techniques and charcoal commercialization in order to generate employment and income for small producers.

1.2 The Charcoal Emergency Project was part of the last ESMAP/World Bank Emergency Mission (November 20 to December 6, 1998) in Nicaragua. This mission's purpose was to work with government agencies and Proleña to identify forestry-sector priorities to deal with the damage caused by Hurricane Mitch. The objective of the project was to "harvest" (or collect) the logs and trees that fell and were washed away in the Posoltega area during hurricane Mitch and the flood it caused, and to use this wood to make charcoal in order to generate employment and income for the affected people. The expected production project was around 0.5 percent of charcoal national demand, which meant the producers would have no problems selling their charcoal production in the national market.

1.3 Proleña executed the project with the support of ESMAP/WB and technical assistance from Forest Resources Management and the Center for International Research in Agriculture and Development (FRM-CIRAD). The Project was carried out in unstable conditions because the people affected had not resecured their homes, jobs, and

[1] A. Van Buren, "The Woodfuel Market in Nicaragua. The Economics, Sociology and Management of a Natural Energy Resource." *Latin American Studies* 52 (Amsterdam, Netherlands: Centro de Estudios y Documentacion Latinoamericanos), 1990.

food supply. Despite this negative context, people eventually supported the project because they identified a source of income in charcoal production. Charcoal was made in traditional earth kilns and people were assured in food for six months with support from World Food Program of the UNDP (Programa Mundial de Alimentos, or PMA).

1.4 This final report describes the project development, the problems encountered, and the goals achieved over a period of six months (January to June 1999). Notably, the project met about 90 percent of its goals in production charcoal, employment, and income generation. This is particularly important because this is the first time Nicaragua has had a project to promote new techniques in an emergency context.

2

Project Context

Localization

2.1 Posoltega, a rural municipality located in the northwestern region of Nicaragua, is part of the Chinandega department. Posoltega has a total of 23 communities of which the main one is the town of Posoltega, 116 kilometers from Managua. Nowadays the town has a territorial extension of 124 square kilometers. To the north it borders on Chinandega; to the south, Quezalguaque; to the east, Telica; and to the west, Chichigalpa.

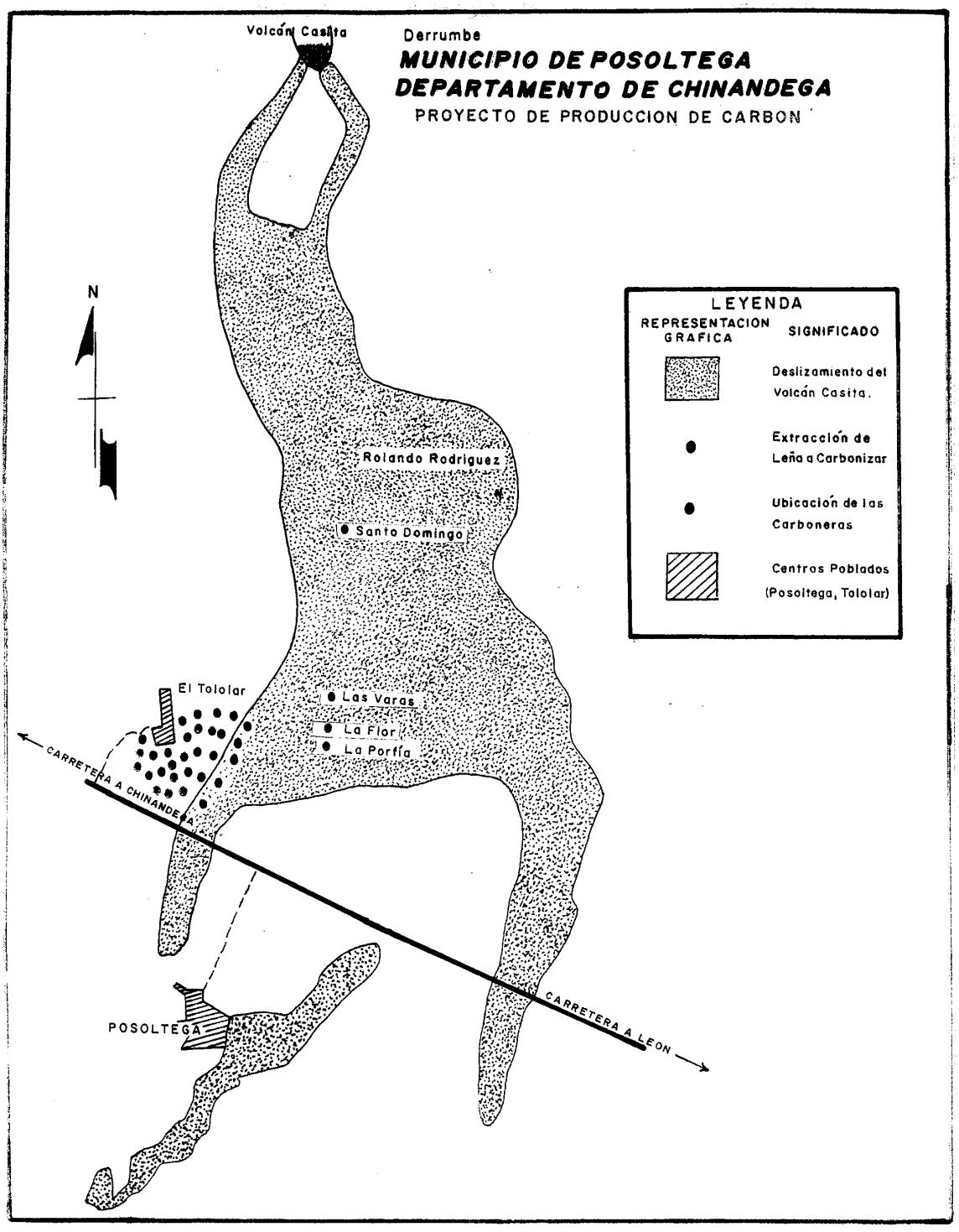
2.2 This project was carried out from January to June 1999 in El Tololar, a community two kilometers from Posoltega on the road to Casitas Volcano (see Figure 1). It benefited 46 victims and refugee producers of the hurricane Mitch.

Disasters Caused by Hurricane Mitch

2.3 By the end of October 1998, hurricane Mitch had wrought havoc in Central America, Nicaragua and Honduras being the most seriously affected. The hurricane broke many records: wind speed reached 285 kilometers per hour, atmospheric pressure rose to 906 hectopascales, and it rained more than 1,000 millimeters in 7 days.

2.4 Although much of Nicaragua was affected, the damage was concentrated in the Chinandega Department of the Pacific region. Flooding killed about 3,500 people, created many refugees, and destroyed much agricultural land—as well as forests, homes, and infrastructure. Within Chinandega, the Posoltega zone was worst hit near the Casitas Volcano, where about 1741 hectares of agricultural land were affected. The flooding claimed 2,513 lives.

Figure 1. Map of Posoltega



Posoltega Producers Profile

2.5 Before the hurricane, Posoltega was a typical, traditional agricultural municipality, where the main products were sugar cane, coffee and soybeans, and other grains. Charcoal production had never been an important activity.

2.6 Following the hurricane, charcoal producers were refugees without home or means of investment and not motivated by any productive activity. They had no experience in charcoal production. Following the project, charcoal production became a relevant activity in the Posoltega communities, with refugees, authorities, and private tobacco companies taking interest.

Wood Resources to Carbonize

2.7 The trees and wood used to produce (carbonize) charcoal came from the south side of the Casitas volcano. This area was covered by a dry natural forest containing different types of trees of widely varying sizes—up to 1.5 meters in diameter and 30 meters tall. The flood carried trees and other pieces of wood down to agricultural zones, where they mixed with the soil and rocks (see Figure 2).

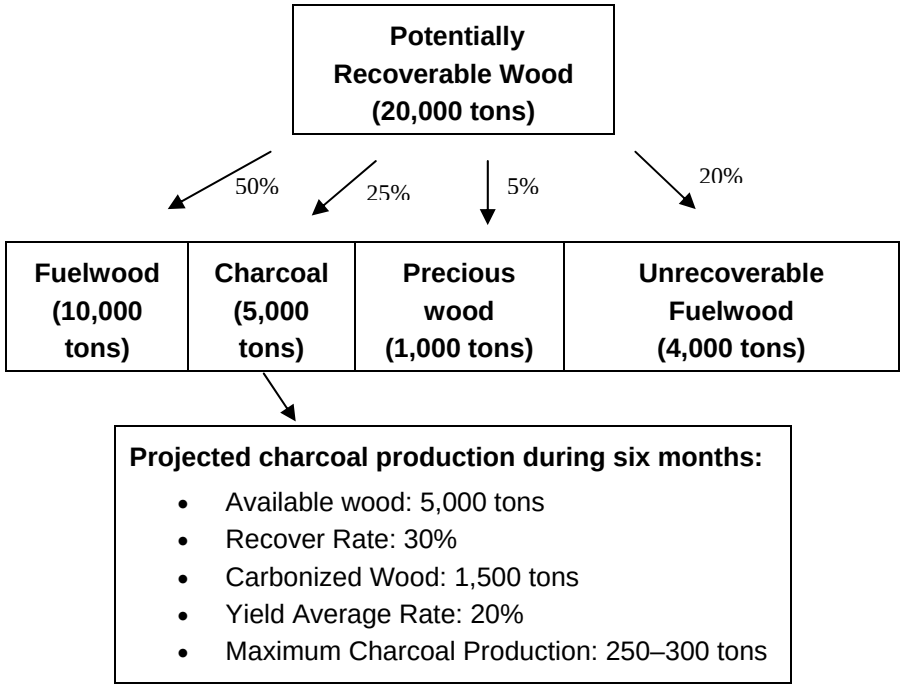
Figure 2. Flood Damage in Posoltega

2.8 The fallen wood varied in type (density, diameter, and species), state (broken, bent, and curved), and situation (partly submerged in the soil or mixed with other vegetation). Consequently, harvest and transportation were very difficult.

2.9 With support from the National Forestry Institute (Instituto Nacional Forestal, or INAFOR), Proleña carried out an assessment of fallen wood in the Posoltega zone. The assessment results pointed out that not all the wood could be carbonized because locals were using much of it for construction or fuel.

2.10 As shown in Figure 3, the mission identified different purposes for different kinds of wood. The project identified around 1,500 tons of wood to be carbonized. This meant a production of 250 to 300 tons of charcoal or 8,300 to 10,000 sacks of charcoal.

Figure 3. Possible Uses for Available Fallen Wood



Source: FRM-CIRAD Mission Report, January 1999.

3

Project Implementation

Objective

3.1 As already mentioned, the project objective was (1) to "harvest" or collect the large quantity of fallen wood created by Hurricane Mitch and (2) to transport the wood and carbonize, produce, and market charcoal in order to generate employment and incomes for the refugees of the Posoltega zone.

Project Organization

3.2 The project had the following steps:

1. Proleña coordinated two meetings with Posoltega's mayor to identify areas where the fallen wood was concentrated. Project staff worked with 55 producers from the communities of El Tololar, El Torreón, Ojochal, Las Varas, Santo Domingo, and Trianon.
2. As mentioned earlier, Proleña, in coordination with INAFOR/MAGFOR, carried out a Fallen Wood Assessment to determine how much wood was being used for construction, fuel, and other purposes. The project's charcoal production goals and work areas were then defined.
3. The project started with a training cycle lasting 15 days (January 1999) with 60 people: 55 from Tololar and Trianon communities, plus 4 technicians of Proleña and 1 from INAFOR. The FRM/CIRAD mission, with the support of Proleña, carried out training in the theory and practice of charcoal production. Of particular importance were three techniques involving different types of kilns: traditional, Suprifosa, and Casamansa. (See the Carbonization Guide in Annex 3). Table 1 shows the number carbonization cycles completed during the training period.

Table 1. Carbonization Cycles Completed During Training

Proposed Techniques	*Number*	*Number of Cycles*	*Total Cycles*
Traditional (earth) kiln	2	1	2
Suprifosa	1	1	1
Casamansa	1	1	1
TOTAL	4	3	4

Note: Only 4 earth kilns (three techniques) were built up during training, because people were not motivated at this time they were worried about their home and their future food.
Source: FRM-CIRAD Mission Report, January 1999.

4. The final step in training was a question-and-answer meeting. Participants were organized in two groups of charcoal producers, with one project delegate at each group.

5. When the training cycle was completed, Proleña assigned to the Posoltega zone a permanent forest engineer who had participated in the training, to ensure the technical assistance and marketing for the charcoal producers groups.

6. To guarantee the project's normal development, the tools and equipment used during training were given to the producers for their work use.

7. Proleña ensured that landowners, institutional authorities, and charcoal producers signed written contracts regarding the tree removal and charcoal production.

8. Finally, Proleña contacted national merchants, charcoal buyers, and consumers (tobacco companies). The export market was explored in El Salvador.

Carbonization Techniques

3.3 The Carbonization Guide (see Annex 3) summarizes the experience of two weeks' training in the Posoltega zone and explains the different carbonization techniques. Following are the relative advantages of each:

Traditional earth kiln

- It is a traditional technique used in Nicaragua.
- Producers can adapt kiln size to resource size (i.e., tree volume and diameter) and work capacity (e.g., number of workers, time available for work).
- There is little need for material transportation.
- Little investment is required.
- It can be built anywhere.
- Partial training is enough.

Suprifosa earth kiln

- This is a high-yield technique; it is easy to use. There is no need to keep watch at night.
- The carbonization cycle's duration is reduced.
- Wood debris and residues may be used, as may large pieces of wood.
- Little investment is required.
- There is a low degree of wood transformation.
- Due to colder temperatures, charcoal extraction is easy and fast.
- The charcoal produced is clean.
- It can be done in all seasons time (rainy season included).

Casamansa earth kiln

- This technique is useful for carbonizing small and homogeneous pieces of wood.
- The carbonization cycle's duration is reduced.
- Residues and wood debris may be used.
- Little investment is required.
- It can be built anywhere.

Legal Arrangements for Charcoal Production

3.4 Determining the legal status of the wood resources was a key problem during the project: the floods left the fallen wood in areas with different landowners and different legal states. These sites were La Porfía, La Vara, Santo Domingo, and La Flor (see Figure 1). As mentioned previously, Proleña made an important effort to ensure the legality of project activities by playing a referee role between landowners, charcoal producers, and such institutions as INAFOR and the municipality. By writing agreements between landowners and charcoal producers, Proleña obtained the institutional permits required to collect wood and trees in many sites and communities, and to guarantee that the areas in question would be cleared.

Problems Arising During the Project

3.5 Concerning People

- The population was in an agitated psychological state.
- The charcoal producers maintained a paternalistic attitude.
- Land security and legal possession was uncertain.
- People lost all their possessions, and after nine months continued be homeless.
- There was a lack of goodwill among producers.
- The people lacked knowledge of the carbonization process and its benefits.

3.6 Concerning Resources

- There were problems in the harvesting, collection, and transportation of wood.
- Access to the fallen wood was not clearly established.
- Harvesting the wood required transporting it over long distances.

3.7 Concerning the Social Context

- Most of the producers were refugees lacking economic resources and homes, so they were moved place to place.
- Few jobs were available.

4

Project Achievements

Training Charcoal Producers

4.1 The project carried out five events with the new charcoal producers, who were organized into groups of four persons each. The project also trained two local leaders for technical assistance in about 20 events. With Proleña's support, these technical assistance leaders trained a group of charcoal producers in different carbonization techniques.

4.2 The project twice exchanged experiences with producers from projects taking place in other departments: a PROCAFOR project in Nueva Segovia and a Proleña-IIZ project in Nagarote (San Pablo). Project participants visited other earth kilns and one half-orange kiln.

Charcoal Production

4.3 Proleña monitored and supervised the application of the carbonization techniques by the charcoal producers, ensuring high volume and quality of charcoal.

4.4 Most of the charcoal was produced in traditional earth kilns because this technique was the most popular, cheapest, easiest, and most adaptable. By project's end the charcoal producers had established their own earth kilns near their settlement sites. Each earth kiln produced 38 sacks of charcoal per month, each sack weighing 30 kilograms. As shown in Table 2, 46 charcoal producers produced 6,774 30-kilogram sacks of charcoal (339 *fletes*).[2] The amount of charcoal produced was estimated at 250 tons.

[2] One *flete* = 20 sacks of charcoal.

Table 2. Reaching Charcoal Production Goals

Type of goal	*Amount of goal*	*Charcoal production*	*% of goal*
Number of earth kilns	20	37	185
Number of producers	60	46	77
Charcoal (tons)	250	226	90
Sacks of charcoal produced (and *fletes*)	7,500 (*375*)	6,774 (*339*)	90

Note: Production average was 1,354.8 sacks per month; 37.63 sacks per earth kiln.

4.5 The species of trees used to produce charcoal were Ojoche, Tempisque, Guasimo de Ternero, Guanacaste Blanco and Negro (see Annex 1). In order to obtain the wood to be carbonized, US$10 per volume of travel was paid to each group to transport the fallen wood.

Marketing and Organization Support

4.6 As mentioned previously, Proleña contacted merchants in Chinandega, Leon, and with Tobacco Nicarao Company, generating a link between the final consumer and the direct producer. A high price to charcoal was obtained—US$3.75 per sack, more than in other zone in the Pacific Region, where the prices were US$2.50–3.00 per sack.

4.7 In addition, the project investigated the charcoal market nearby in the capital of El Salvador, San Salvador, because the profits to be gained were important (the retail price was twice the production price, so profits were at least 100 percent). Two types of customers were identified: supermarkets and private merchants. These markets represent the best opportunity for promoting charcoal production in Nicaragua and for organizing charcoal producers. They are also important for the promotion of proper forest management and forest plantations.

4.8 Two months into the project, the Posoltega Charcoal Producers' Association was founded, with 46 producers. There is a secretariat with a president, vice president, secretary, and treasurer. The secretariat is charged with storing and marketing the charcoal produced. Proleña is sometimes called on to advise on business matters.

4.9 The Posoltega charcoal producers also participated in the Managua Producers Trade Fair (March 11 and 12), where they jointed other charcoal producers offering their product for sale. This kind of event strengthened the producers' motivation.

4.10 Each sack was sold at US$3.75 per sack, or US$75 per *flete*. At 339 *flete*s (see Table 2), this amounted to a total project income of US$25,402, or a monthly per-person income of US$110.

Coordination and Management

4.11 Project coordination and management may be summarized as follows:

- Project coordination with the Posoltega municipality made possible the permit to harvest the fallen wood in damaged areas.

- Coordination with INAFOR ensured the forest permit to harvest wood and transport (free of charge) charcoal produced during the six-month project period.
- Coordination with the Maribios project involved training that project's target producers.
- Coordination with the WFP made it possible to supply food to this project's 46 charcoal producers from February until June. Food distribution was coordinated with a Save the Children project.
- Although the project was asked to coordinate with MAGFOR's PROFOR project to consider the affected area as an additional target area, that project did not begin until July 1999.

Dissemination

4.12 The project was visited by number of other projects and donor agencies. Los Maribios, MAGFOR, PROCAFOR, CATIE, AID, ACDI, and IIZ visited the project because it was the only productive project that generated income and employment in the Posoltega zone.

4.13 In addition, as mentioned previously, a *Technical Guide to Carbonization* (see Annex 3) disseminated at the national level to help train other producers. This guide was a resume of two weeks' worth of training with the Posoltega producers and advisors from FRM and CIRAD.

5

Project Impacts

Social Impact

5.1 The project helped solve familiar problems of the affected people by creating permanent jobs and helping reorganize refugee families. Project activities generated 46 direct, permanent jobs and 74 additional jobs.

Environmental Impact

5.2 The project had an environmental impact in affected zones where the trees and wood were harvested for charcoal production. It thereby contributed to public health by decreasing the risk of disease among the refugees.

Economic Impact

5.3 The project generated employment and incomes for many people. Total project income was US$25,454, which translates to a monthly per-person income of US$110.

Technical Impact

5.4 To ensure the continuation of charcoal production and income generation, the producers learned carbonization techniques and are continuing to improve them.

6

Lessons Learned

6.1 A “Lessons Learned Document” (see Annex 4) was prepared to explain how this type of emergency project for destroyed-wood valorization should be designed and launched in the future under similar circumstances.

6.2 Briefly, the following lessons were learned in the field during project implementation:

- A small project can have a significant impact in the population and the economy—when it is timely and of immediate relevance.
- Without adequate training it is impossible to introduce new productive techniques and technologies
- Charcoal production activities must be supported by training and research in the commercialization and marketing of charcoal.

Annex 1. Forest Species Most Commonly Used in Charcoal Production

Species	Scientific Name
Almendro de río	*Andira inermis*
Cortez	*Tabebuia chrysantha*
Espino de playa	*Pithecellobium dulce*
Guanacaste negro	*Enterolobium cyclocarpum*
Guanacaste blanco	*Albizia caribaea*
Guacimo de ternero	*Guazuma ulmifolia*
Guapinol	*Hymenaea courbaril*
Genizaro	*Pithecellobium Saman*
Laurel	*Cordia Alliodora*
Mango	*Mangifera indica*
Madero negro	*Gliricidia sepium*
Mora	*Chlorophora tinctoria*
Ojoche	*Brosimum alicastrum*
Roble	*Tabebuia rosea*
Tempisque	*Mastichodendron capiri*
Tiguilote	*Cordia dentata*

Annex 2. List of Tololar Producers Who Participated in the Project

Adrian Flores Gómez
Adrián Flores Reyes
Andrés Espinales Obregon
Angélica Avendaña Santeli
Carlos Hernandez
Carlos Vicente Rodríguez Flores
Cristóbal Solano Gravi
Cruz Quezada Silva
Daniel Varga
Felix Solano Flores
Francisco Soto
Francisco Hernandez Fletes
Francisco Solano Santana
Gabriel Munguia
Guillermo Quezada Silva
Gustavo Mendoza Flores
Genaro Zapata Pérez
Humberto Cortedano
Ilduvina Corrales
Juan Talavera Pérez
Juan Rizo Pavón
José Luis Mendoza Rodríguez
José Alfonso Espinales
Julio Flores Delgado
Laureano Aguilar
Luis Fletes
Leyla Avendaño Santeli
Mario Gómez
Manuel Cortedano
Manuel Munguia Silva
Martín Quezada Silva
Martha Alvarez Corrales
Marcelino Silva Rostran
Matilde Salgado Mendoza
Mercedes Canales Avendaño
Orlando Alvarez Corrales
Ramón Quezada Gutiérrez
Ramón Quezada Silva
Roberto García
Roberto Ulloa Gómez
Rosendo Solano Santana
Santo Fausto Cortedano Rostran.
Tony Ulloa Gómez
Trinidad Muñoz
Virgilio Solorzano
William Flores Munguia

Annex 3. Guía Técnica de la Carbonización

(Technical Guide to Carbonization)

Annex 4. Lessons Learned Document

1. This document summarizes what has been learnt from this particular experience, but also from other, similar experiences, of emergency projects to valorize large quantities of fallen wood after a natural disaster such as Hurricane Mitch.

2. The lessons described here are presented chronologically, from the preparation to the implementation of such a project. Constraints are numerous and need to be clearly addressed so that the preparation and the implementation of the project fulfill the immediate expectations of refugees and funding agencies without compromising the future or creating new problems (deforestation, for example).

Tasks During Project Preparation Period

3. A visit of the damaged site should be quickly arranged to evaluate the intervention—ideally in the weeks immediately following the natural disaster, and at the latest within three months. This point is of particular importance for the valorization of trees since they fall very quickly into disrepair like timber. It is useful for coordinating the project with other aid programs, which are usually numerous in such cases.

4. The evaluation of technical solutions for wood valorization, and of the means to carry them out, is a stage of paramount importance. The job should be undertaken by a team of forest and wood specialists with extensive field experience. Various types of technical assistance should be provided: a wood energy specialist, a forest logging and haulage specialist, and, if necessary, a timber specialist. Two persons should be enough.

5. At this stage, it is very important to assess (1) job conditions on the site, (2) the nature and volume of wood to be valorized, (3) local capabilities (human and technical) to be committed, (4) trade outlets, and (5) access conditions to the resource (wood ownership).

6. The choice of technical solution should go to the one easiest to implement. Firewood or charcoal production is particularly well adapted because it ensures outlets and it is of interest for the greater number. Actually, timber valorization (even construction wood) would of course allow the valorization of a part of the wood but, being too heavy to implement, will also affect few if any refugees.

7. Public information sessions should be held before and at the beginning of the project to increase public awareness and to identify interested persons. These sessions should involve local, regional, and even national authorities.

Technical Solutions for Valorizing Recoverable Wood

8. In this type of post-flood situation, wood resources are very heterogeneous in species, qualities, and dimensions. Only the firewood and charcoal sectors can use and valorize a great part of the available wood, and it is also highly labor-intensive. In nearly

all cases there is a high local demand, even in the area of intervention. Having a local trade channel eases the development of sales channels.

9. Generally speaking, the available wood is highly damaged and its valorization through a means other than fuelwood cannot be considered. Since the wood industry demands high-quality product (no mold, no wood in shreds, etc.), such a solution is impractical.

10. Field experience taught that (i) it is important to give way in the project area to other initiatives, often individual ones, for valuing wood for suiting individual wood needs (rebuilding of houses, paling, etc.) or for taking any tree which can be valued and sold as timber (for example case of wood cutting craftsmen), and (ii) the volume of wood that is actually recoverable is very low compared with that which is available in theory.

Choosing a Local Operator

11. Choosing a local operator to implement the project is sensible because of that operator's (1) good knowledge of the area, (2) ease of contacts with suffering populations, and (3) knowledge of administrative channels, local authorities, and staff, which is very useful in such a situation. Choosing a local operator also ensures a permanent presence throughout the life of the project.

12. Local operators can also help determine the ownership of wood in sites where wood is collected or charred and also in sites that must be passed through when transporting wood. This problem makes essential the commitment of local partners, and even related ministries (MAGFOR in this project) to address these difficulties with as little delay as possible. The commitment of local representatives should also be a priority. It is advisable to choose a local operator such as an NGO with significant experience in field interventions (Proleña was the NGO partner in Nicaragua). Experience in forestry is advisable but not essential. Attention should be paid to field experience and representativeness or recognition at the local level.

Project Duration

13. This kind of project takes place under uncertain conditions, and contingencies are frequent. By the same token, because the resource in question (wood) is finite and subject to swift degradation, the project need not last longer than nine months. Although an extension may be planned to organize forestry reclamation for the affected area, this type of effort lies outside the framework of an emergency program.

Training for Project Activities

14. Because charcoal production is particularly well suited to emergency operations, training must focus on this channel. Any technical solutions chosen should remain simple and easy to control—and, if possible, based on techniques traditional to the area. Efficiency is not a priority because of the large quantity of available resource and to its quick degradation.

15. Implementation constraints require that three weeks of vocational training take place at first. During this time, project staff can integrate into the training charcoal trading techniques and support to the local partner on that topic.

16. As the project progressed, new individuals will begin to show interest in participating. Thus, two to three months after the first training session, a second, complementary training session should be scheduled for new trainees. This should last for one week, with at least one person doing the training. In Nicaragua, Proleña was the local partner contracted to carry out both training sessions.

17. The support of a local professional is essential if the new techniques are to be accepted. Charring is tiring and dirty work that will be better accepted if trainees see that it can support a business or a family.

Using International Expertise

18. In Nicaragua, ESMAP's decision to use the services of two international (in this case, French) experts was a good one, not only because of the complementarity of their backgrounds, but also because of the difficulties inherent in such a mission: numerous decisions were easier to make because the experts were able to discuss them with each other. Moreover, the variety of tasks and types of intervention sites (many different surfaces were affected by this climatic phenomenon) meant that one person would not have been enough, even if he or she had devoted additional time to the effort. Furthermore, because the training sessions needed to be organized very quickly and were very intensive, two persons were often required.

19. Considering field experience is essential when choosing experts for the project. Depending on the circumstances, the experience can be in the fields of forest logging, wood industry, or wood handicrafts.

20. In general, experience shows that a unique intervention at the beginning of the project is too limited. In Nicaragua, the presence of a professional team used to working with the World Bank allowed the project to achieve good results with only one intervention of technical assistance. Generally speaking, the best solution is to plan two interventions—one at the beginning, and the other about three months after. This allows the team to be more precise and adaptable when giving technical advice, finalizing the work plan, and completing training sessions).

Project Administration and Financing

21. Administration of the Chinandega operation was very efficient in two respects: (1) the quickness of the intervention, including the clear and permanent identification of a person to head up the project; and (2) the streamlining of procedures, which allowed for quick reaction to events.

22. It is obvious that having a World Bank mission resident in Managua significantly facilitated project funding and implementation. Without this, the project might have considered working with other large international NGOs present in the country (unless the overall budget could be managed by the international consultant).

Definition of Objectives

23. Project objectives should remain modest. Wood valorization should not be the main goal; instead, efforts should focus on using the work to help refugees return to the affected areas.

24. Establishing ambitious objectives for charcoal or firewood production could have two significant negative effects: (1) it would discourage workers as they encounter predictable difficulties in the field, and (2) in case of success, it would perpetuate a level of subsequent charcoal production not recommended for the environment in some cases.

Participation by Affected Populations

25. The target population—the producers—comprises individuals suffering trauma and stress who may have difficulty undertaking sustained activity over a long period of time. As a result, training sessions should be as short as possible, and standards of punctuality and diligence should not be onerous.

26. Public information sessions (see paragraph 1.5) are essential. They should be scheduled to occur during project preparation and launching.

27. After training is completed, some trainees may soon be displaced from the site, resulting in absenteeism and a dwindling work force. For this reason, training large groups of 60–70 people is recommended.

Coordination of Project Activities with Other Support Programs

28. Whatever the project's efficiency, several weeks will necessarily pass before any income results from the sale of project products. Coordinating such projects with other intervention programs, particularly with the WFP, is essential so that trained persons can immediately provide for their families' needs. This was negotiated and realized in Nicaragua with the aid of the WFP.

29. Finally, the project team should recognize that, although such programs have significant social and environmental impacts, they cannot solve all problems. It is thus recommended that the team anticipate the end of the project and take actions to bring a sustainable solution to the affected population. Over the course of the project, the population should be informed of opportunities on future reconstruction projects, including training. In Nicaragua, by project's end the charcoal producers had formed an association and were planning to continue production; the eventual settlement of charcoal producers in the affected area should also be anticipated and organized.