Cord 2010, **26** (2)

Nurturing a Rural Community by Introducing Coconut Sap Sugar Technology in a Philippines Remote Location

Erlene C. Manohar[1], Irish Camela S. Valderrama[2] and Armylene B. Posada[2]

Abstract

The farm level technology of processing coconut sap sugar from toddy is a social enterprise which created a significant change in the livelihood of the people dependent on the coconut trees in Aroman, Carmen, North Cotabato. Technical skills acquired through training, appropriate facilities, capital and access to market are the key factors in developing a farm-level technology were used to emerge a commercially viable social enterprise. Indicators of change were gauged through change in income, equality of income distribution and preference in household expenditure. The increased income was disposed of by an increase in the cost of living and altered purchasing preferences. Significantly, the highest change of expenditure was on food and less in education notably 25.81 and 20.44 percent. In the case of income distribution, even with 2.39 percent increase on the percent share of the lowest 20% income group, there was an improvement in the income of the farmer-processor "after" the project implementation. But still, the community remains within the inequitable income distribution status group. It is expected that another year of business will have further favourable impact on income distribution among the respondents.

Keywords: coco sap sugar technology, social enterprise, income distribution

[1] OIC – Division Chief, Monitoring Evaluation and Documentation Division
[2] Science Research Specialists, Research Development and Extension Branch

Introduction

The plight of the marginalized coconut farmers for so many years is how to improve their livelihood from the unprofitable conventional copra processing and trading. The only logical solution in improving the livelihood of the coconut farming communities is product diversification and promoting new products and by-products of high market value. Hence, when the coconut sap sugar processing was introduced to their community as a budding commercially-viable technology in 2008, it triggered the hopes and aspirations of the rural community especially of the women's group in particular in Aroman, Carmen, North Cotabato where the PCA seed garden was established 20 years ago.

General Objective

To promote a coconut-based enterprise by bringing technologies to communities that will improve income security and equality in the farming household.

Specific Objectives

1. To determine the income benefits from the coconut sap sugar production as a farm based enterprise.
2. To assess the socioeconomic changes due to bringing technology to the rural community.

In an effort to help reduce poverty in coconut growing communities of the country, the Philippine Coconut Authority (PCA) collaborated with the International Coconut Genetic Resources Network (COGENT) to develop and implement sustainable income generating coconut-based technologies in selected poor coconut growing communities. Moreover, farmers revealed that a support system needs to be in place to support the introduction of a poverty reduction strategy which could make a coconut-based farming system sustainable. Hence, the following agricultural development components of a community-based support system were incorporated into the project: (1) establishment and strengthening of Community-Based organizations (CBOs), (2) access to appropriate technologies and affordable village-level facilities, (3) access to capital and markets and (4) training and capability building (Batugal *et.al*, 2008).

It was the COGENT agency of Bioversity International collaborating with PCA to initiate a Poverty Reduction project that supported and identified the use of coconut toddy/sap for village-level sugar production. The coco sap sugar technology, as one of the technologies that the PCA are transferring to the local communities, was shared through capability building activities, such as seminars and trainings, to encourage more coconut farmers to venture into coco sap sugar production and establish it as part of their existing coconut enterprise.

Methodology

Socioeconomic benchmarking

Data were gathered through structured interviews of the 24 respondents, obtained from the responses to the questionnaires regarding the socioeconomic status of the individuals interviewed. The 24 respondents are the workers/toddy tappers and members of the women's-cooperative which managed the coconut sap sugar business. Aside from the interviews, Focused Group Discussions (FGDs) from time to time were conducted to determine the problems and risks encountered in managing the farm-based enterprise. Two sets of surveys were conducted, a baseline survey in May 2008 and a post survey after 2 years of project implementation in April 2010.

Community organizing, skills trainings and capability building

The project was initiated by PCA in 2008 by providing the skills training to a group of toddy tappers and the women in the vicinity of the PCA Coconut Seed Production Center established in the municipality. Most of these women are wives or relatives of the contractual workers in the seed garden. The idea of establishing coconut sugar production in the seed garden is to make use of the existing coconut trees not being utilized for seed

production. This strategy was not only provided income to PCA but also generated jobs to the toddy tappers and to the women's group that was organized as an Aroman's Women Natural Food Producers Multipurpose Cooperative. Training was provided to the CBO members and the actual application of the skills learned the key indicator of building the local capacity of the community. A participatory approach was used in developing their capacity as skilled workers, managers and entrepreneurs. This strategy ensured maximum participation of the members of the community and enhanced their sense of ownership. This project was easily introduced to the community since no sophisticated equipment was needed to start the operation. This simple technology requires no mechanized process (as shown in the pictures below) considering that it only involves heating of the toddy to form into sugar granules. It does not require skilled labor thus, best adopted to a farm level or medium scale enterprise.

The sap is collected after five (5) hours from tapping to avoid the fermentation required. A total of 800 liters of sap is to produce 100 kilos of sugar at 8:1 conversion ratio.

After boiling the sap until the liquid turns into syrup, it will be transferred to food grade stainless "wok" then, stir the syrup continuously to avoid burning and to guarantee granulation of the syrup in this stage of liquid to solid transformation. This is the phase that the liquid will change into solid form and the temperature change is critical. The stirring will allow the air to enter the sticky syrup that will cause the gradual cooling resulting to granulation. Then, the wok is removed from the fire and transferred to wooden trivet to continue the stirring until the sugar granules are formed.

After granulation, let the coco sap sugar cool off and continue pressing to break the lump. Sieve the sugar to have a uniform particle

size to produce quality product. After sieving the sugar granules are then laid out on a food grade stainless tray for one hour drying to lessen the moisture content.

After drying the coco sap sugar is collected in a big container and stored overnight and will be ready for weighing and packaging into one kilo pack using a polyethylene plastic bags.

Product development and market assistance

Initial market promotion was conducted through trade fairs and market matching locally and abroad. Local marketing was through local traders who did the packaging and labeling of the product. Samples of the product were introduced to the traders/exporters and market promotion through lecture-demos and flyers were used as extensive information dissemination tool to promote the product. Through the training conducted by the PCA, members of the cooperative who attended the training considered how to improve their packaging and the proper labeling that will suit their product as well as how to market their products. The cooperative was also linked to the export market through a trading system with the exporters in the USA and Canada. In this arrangement, exporters in the US and Canada will initially pay the cooperative 50 percent of the total cost of their ordered sugar to be used to cover the expenses in processing their order. The Poverty Reduction Project country project leader handles the market matching for the cooperatives product and to the prospective buyers. Moreover, the Good Manufacturing Process-Hazards Analysis Critical Control Points (GMP-HACCP) training was also provided in compliance with the quality requirements of the market.

Data processing and descriptive statistics

With the commercial-scale production of the coco sugar and increasing trend of product sales of the cooperative, an increasing household income was expected. Moreover, other social changes were also considered in this study. Descriptive statistics was used to analyze the socio-economic profile of the tappers and the members of the cooperative through the use of frequency tables and graphs. Income distribution as an indicator of economic change was analyzed through comparative means and the Lorenz curve was used to measure the improvement in the unequal income distribution.

Results and discussion

Socioeconomic profile of the respondents

The age of the tappers and CBO members ranged from 24 to 46 years with the average age being 36 years (Table 1). Eighty-three percent (83%) of the workers were female. The women of Aroman were the primary workers in coco sap sugar production. The majority of them are married (92%). Almost 46 percent of the interviewed respondents had attained only the primary and merely finished secondary education. Instead of going to school they end up working and helping in farm while some get married at an early age. Another reason for this is the lack of colleges and/or universities in the rural areas that are easily accessible and affordable. This is one of the indicators of poverty wherein most of them cannot afford to achieve their basic needs such as higher education.

The household size of the interviewed respondents ranges from 2 to 8 members with mean family size of five members while the average number of children in a household is 3.

Table 1. Socio-economic characteristics of respondents, Aroman, North Cotabato, 2009

CHARACTERISTICS	Percentage (%)
No. of Respondents	100
Average Age (years)	
Gender	
Male	16.67
Female	83.33
Marital Status	
Single	8.33
Married	91.67
Classification	
Head of the Family	33.33
Dependent	62.50
Both Working for income	4.17
Average Household Size	
Average Number of Children	
Educational Attainment	
Elementary	12.50
Some High School	33.33
High School	29.17
Vocational	8.33
Some College	8.33
College	8.33

Based on the data presented, 33.33% are head of the family and 62.50% are dependent. This is because most of the workers in the processing of the coconut sap sugar are housewives. It can be deduced from this study that this kind of enterprise involving food grade products requires women workers who are more patient and meticulous in their approach. On the other hand, the toddy tapping activity is for male workers, as it requires climbing the palm and sap collection every 5 hours.

Skills training and capacity building

The introduction of technologies to the CBOs was coupled with the needed training to build the skills and knowledge of the CBO members on enterprise management and marketing. Farmers' training was geared towards empowering the socio-economically disadvantaged farmers and the women in particular, to be able to transform them from just raw materials suppliers to prospective entrepreneurs. The types of training, number of trained CBO members and the actual application of the skills learned were the key indicators of building the local capacity of the communities. A participatory approach the strategy used to develop their capacity as skilled workers, managers and entrepreneurs. This strategy ensured maximum participation of all members of the community and enhanced their sense of ownership of the coconut-based social enterprise.

Income changes and expenditures

The significant increase of the off-farm income as presented in Figure 1 can be attributed to the high income gained by the tappers from the sales of their toddy to the women processors of coconut sap sugar. Previously the toddy was just being sold locally as *"tuba*", a local drink of the rural people within the community or processed into vinegar - both low-priced products. This enterprise had an a stronger effect on the tappers' income, being fewer in number than the processing group. The productivity of the tappers affects the supply chain of the coconut sap sugar processing, and the quality of the fresh toddy determines the quality of sugar. Off-farm income can be classified as their extra income by working in the coco sugar processing. However, for some members this enterprise has become their major source of income.

Prior to project implementation, farmer-respondents sourced out their earnings from the sale of crop products as the household's primary source of income, while women in this community worked on a seasonal basis by helping in weeding the corn farm, drying the corn seeds in the adjacent corn milling station to source out additional income for their family. Work opportunities for women especially seem scarce in the area, with very little chance to have a regular source of income. Nevertheless, upon the implementation of the project, farmer-respondents who joined the cooperative have now a stable source of income. The women sugar processors are now receiving shared profit amounting to US$ 34 – US$ 78 per month while the tappers or "mananguite" received US$ 45 to US$ 89 per month.

Based on the income and expenditure data, the increase in their income gave rise to an increase in their expenditure. On the average, the annual expenditure of the respondents increased from US$ 1,861 to US$1,941 "after" the project. There was a notable boost in the respondents' expenditure for medicine and food, being 25.81 and 20.44 percent, respectively (Figure 2). It only indicates that because of their additional income, respondents have now improved access to basic needs such as health care, shelter and food.

Income Distribution

Table 2 shows the results of the income distribution analysis of the farmer-respondents. Disparity in the relative share of the income groups is small except for the lowest 20% farm income (2.15%). The lower 80% of the farm income groups had a share of 65.03 percent (US$ 24,175) of the total income (US$ 37,173) while the highest 20% farm income group had a 34.97 percent share. This indicates a relatively inequitable income distribution in Aroman "before" the project implementation.

After the project implementation, their farm income had significantly increased, due to earnings from tapping and coco sugar processing. Total farm income increased from US$ 37,173 to US$ 68,192 "after" the project. However, analysis on the income distribution "after" the project shows that there was a decline in percent shares to total income of the lower 80% income group declining by 10.03 percentage points from 65.03 percent to 55.00 percent "after" the project. The highest 20% income group did better with the new technology. but the others all increased the actual incomes.

Income as one of the impact indicators of this social enterprise is further demonstrated by the computed Gini coefficient 'before" and 'after" the project implementation (Figure 3). The Gini coefficient is derived from the Lorenz curve which provides an illustration of how incomes are distributed among the households of the community. It is calculated as the ratio of the area between the Lorenz curve and the 45° line, to the whole area below the 45° line. Its value ranges from 0-1 where the values closer to 1.0 suggest greater degree of income inequality while the value 1.0 means perfect inequality. Meanwhile, highly unequal distributions often range from 0.5-0.7, whereas, relatively equitable distributions ranges from 0.2-0.35 (Garcia 2004 as cited by Manohar *et. al* 2006).

Although there was an apparent improvement in the Gini coefficient from 69.47 percent to 63.63 percent and the total farm income "after" the project implementation, still the income distribution among the respondents

Figure 1. Comparative income source in the farming households in Aroman, Carmen, North Cotabato, before and after project implementation, 2010

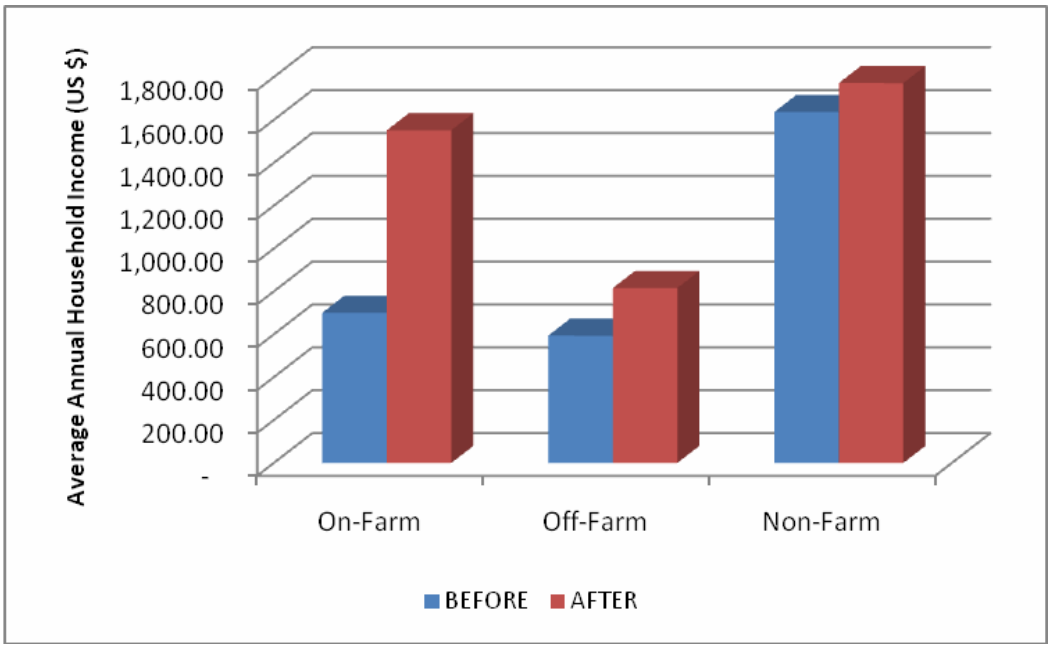


Figure 2. Comparison of respondents' average annual expenditure "before" and "after" the project implementation, 2009

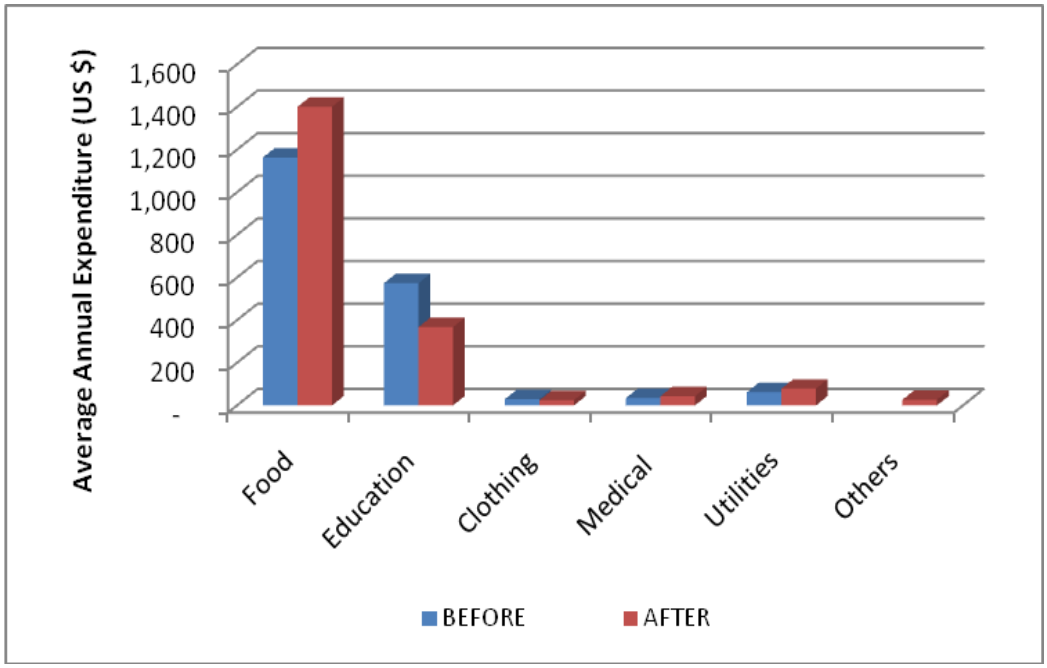
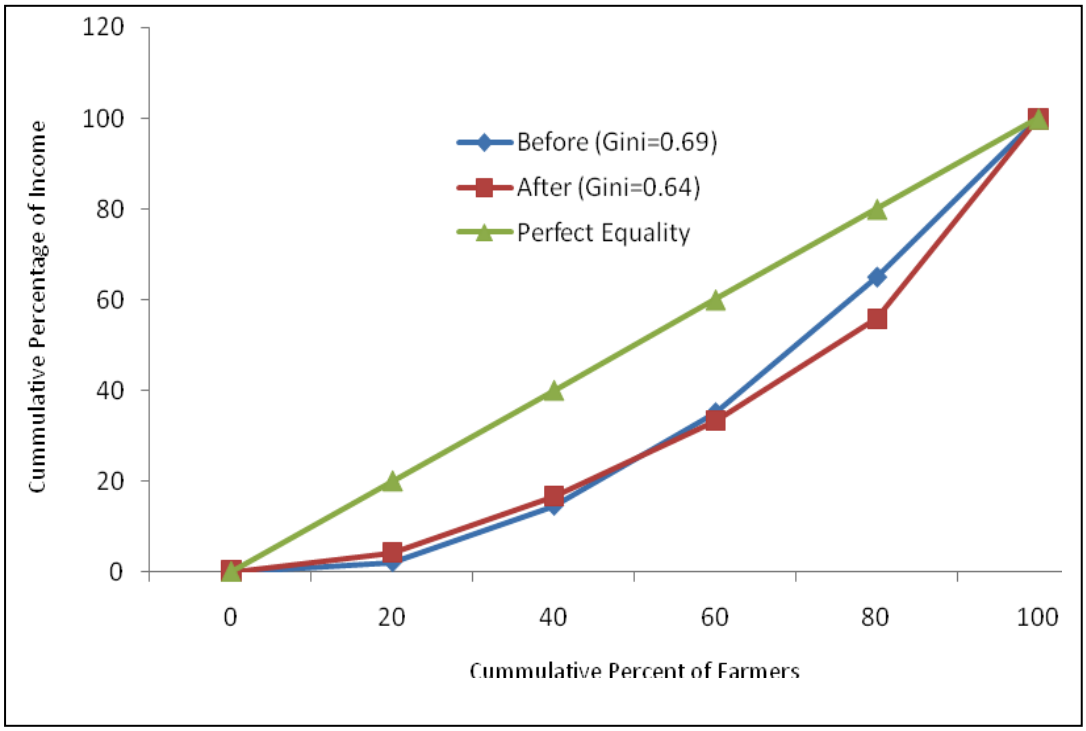


Table 2. Income distribution analysis "before and after" the project of 24 farmer respondents, Aroman, North Cotabato, 2010

Group of Farmers by Income	Total Income (in US$)	Share in Percent	Cumulative Percentage of Income	Cumulative Percentage of Farmers
Before				
Lowest 20%	800.00	2.15	2.15	20.00
Second 20%	4,633.65	12.47	14.62	40.00
Middle 20%	7,598.88	20.44	35.06	60.00
Fourth 20%	11,142.22	29.97	65.03	80.00
Highest 20%	12,998.00	34.97	100.00	100.00
Total	37,173,09	100.00		
After				
Lowest 20%	3,098.84	4.54	4.54	20.00
Second 20%	8,669.00	12.71	17.26	40.00
Middle 20%	11,719.00	17.19	34.44	60.00
Fourth 20%	14,019.88	20.56	55.00	80.00
Highest 20%	30,684.66	45.00	100.00	100.00
TOTAL	68,191.40	100.00		

Figure 3. Lorenz curve of farmer-respondents of the rural community of Aroman, North Cotabato, 2009 - 2010



is considered to be highly inequitable (Figure 3). It is in the upper 60% of the farm income groups where the income inequality can be observed. The Lorenz curve "after" the project, as clearly depicted in the graph, bowed out starting from 60 to 95 percent of the farm income groups as it declined by 10.03 percentage points. Another reason of this disparity in income distribution can be attributed to the income of the tappers as compared with the women workers in the processing aspect. Also, the women are getting lesser share because of their number as compared with the tappers. However, it is expected that another year of this enterprise would provide a significant improvement of the income distribution.

Perception on the Project and Social Change

Expectations and perceptions of the respondents were also incorporated to measure the impact of the project to the interviewed members. Primarily, for some members, the main reason for joining this coconut sap sugar processing is to have supplementary source of income. The poverty status of most of the respondents explains why joined in coco sugar processing. Others reasoned out that they wanted to alleviate their poor living condition and wanted to have a stable source of income. This can also serve as guarantee when they avail credit or loan, thus, increasing their purchasing power. It is interesting to hear from them that one of the reasons why they joined is that they wanted to develop their skills which is a good indication that they are not only after the additional income rather they wanted to learn new things as well. In general, the additional household income as well as skills development motivated most of the respondents to join the cooperative as coconut sap sugar processors.

These expectations and reasons for joining the group were realized through the shared profit they are receiving monthly and enhancement in their social values and skills such as cooperation and teamwork, self-discipline, unity and camaraderie and entrepreneurial skills. This can be further demonstrated by the social change that this successful enterprise brought to the community as a whole. It created jobs and boosted cooperation among the members of the cooperative and the tappers. The visible changes in the members of the community and their growing confidence and self-reliability as well as team work and self esteem have not gone unnoticed.

Conclusion and recommendation

Bringing this simple and farm-based technology of processing the coconut sap into high value, healthy and natural sugar to rural community not only improved their livelihood but also developed the skills of these women in producing the best quality coconut sap sugar in the country. As such, the three classes of the coconut sap sugar can only be produced by the group and was the basis in product classification which was considered in the National Product Standards. Based on this case study, with the right technology, product quality improvement, training, access to capital and marketing assistance, community-based products can be market competitive and commercially sustainable. Expansion is underway to be able to comply with the increasing market demand locally and in the export market. It is worthwhile to note that women in this case of social enterprise proved to be the key factor in sustaining the business and assuring a quality product. Furthermore, this intervention not only provided income security but also resulted in food security of the people who were deprived earlier of the chance to have a better quality of living conditions and sustainable livelihood in a coconut farming community. The cooperative partnership, as experienced in this coconut sap sugar production enterprise, together with technology application and adoption by local communities was a powerful factor in developing the farmer groups' self-confidence to deal with their concerns in production, processing and marketing. in addition, it also encouraged farmers to integrate and closely follow the set technology protocol for assured quality produce and strongly supported self-reliance and empowerment of farmers as they pursued new challenges in this agribusiness.

References

Aquino, M. 2009. Rural Cooperative Partnership exploits potential of coconut sap sugar production. Bar R&D Digest. Volume 11. No. 2. pp22-24.

Batugal, P. and Oliver, J. (eds). 2005. Poverty Reduction in Coconut Growing Communities. Volume III. Project Achievements and Impact, Serdang, International Plant Genetic Resources Institute, Regional Office for Asia, the Pacific and Oceania (IPGRI-APO).

Batugal, P., E.C. Manohar and M.L. George. 2008. 'Good Practice for Poverty Reduction in Coconut Growing Communities in the Philippines' in Agriculture and Rural Development for Poverty Reduction. United Nations Development Program.

Bickel, G., M. Nord, C. Price, W. Hamilton and J. Cook. March 2000. Guide to Measuring Household Food Security, Revised 2000. US. Department of Agriculture, Food and Nutrition Service, Alexandra VA.

Hart, T. December 2009. Exploring definitions of food insecurity and vulnerability: time to refocus assessments. Agrekon, Vol 48, No 4. Series of 2009 Available at www.ageconsearch.com

Jacobs, P.T. December 2009. The status of household food security targets in South Africa. Agrekon Volume 48. No. 4. Series of 2009. Available at www.ageconsearch.com

Manohar, E. C. A. A. Garcia and L.V. Sancha. 2006. Socioeconomic Assessment of the Poverty Reduction in Coconut Growing Communities Project in the Philippines: An IPGRI-PCA-CBOs Partnership.

Manohar, E.C. 2006. Socioeconomic Assessment of the Poverty Reduction in Coconut Growing Communities Project in the Philippines, IPGRI-PCA-CBO partnership. IFAR Fellowship report, Rome, International Plant Genetic Resources Institute (IPGRI).

Manohar, E.C. and Sancha, L.V. 2005. 'Impact Assessment of the Poverty Reduction in Coconut Growing Communities Project in the Philippines' In: P. Batugal and J. Oliver (eds) Poverty Reduction in Coconut Growing Communities. Vol. III: Project Achievements and Impact, Serdang, International Plant Genetic Resources Institute, Regional Office for Asia, the Pacific and Oceania (IPGRI-APO).