Eco-friendly apparatuses from arecanut sheaths (an alternative livelihood for impulsive weather and climate)

Climate-smart Agriculture (CSA)1

Abstract

SNV Bhutan and Chuzagang Agriculture Farmers' Cooperative (CAFCO) have jointly identified an income venture from use of fallen arecanut sheaths to make an eco-friendly, disposable, biodegradable natural textured plates and cups. The venture was inaugurated on 26 Feb 2014 at the CAFCO Chuzagang.

The vulnerability assessment training exercise on climate change organised by SNV has unbolted and expanded ideas to look forth an alternative income source for the farmers who might face low productivity due to climate change and CAFCO to generate an additional income. An eco-friendly, bio-degradable plates and cups out of fallen arecanut sheaths have been identified as a potential venture for CAFCO wherein almost 457 h/holds under Chuzagang Gewog grow arecanut trees. The fallen arecanut sheaths have been observed scattered indiscriminately making working conditions unfriendly besides the sheaths serving as water bowl making suitable breeding sites for the mosquitoes posing malaria threat to human health.

The overall costs for arecanut sheaths, manufacture and marketing estimated to be Nu.2.50 while one arecanut sheath can produce at least 2 plates and one cup equivalent to Nu 8.50 with a net profit margin of Nu. 6.

The machine for manufacturing the plates and cups from arecanut sheaths explored and the CAFCO members were then further supported for a study visit to Barpeta in Assam to learn more about the machine technicalities and products besides markets opportunities in India. The visit strengthened connectivity and rewarded with more ideas on setting up a plant and processing modalities to manufacture plates and cups from fallen arecanut sheaths which was just right alternative to diversify activities and generate income in the uncertainty of weather and climatic variability.

SNV Bhutan under Climate-smart Agriculture project has financed the cost of machine, exploration visit and in-house capacity development. The support was also extended for inauguration of the manufacture plant at Chhuzagang with the objective to provide adequate information nationwide to link with markets of the eco-friendly products.

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Introduction


P-1

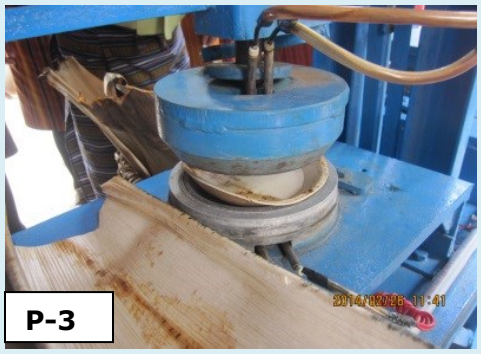
Areca nut also called as Betel Nut is an important cash crop grown profusely in the lower altitude Districts of Bhutan namely Samtse, Sarpang, Chukha and Samdrupjongkhar. Sarpang Dzongkhag comprises of 12 Gewogs and the 10 Gewogs grow arecanut (P-1, Table 4). Chuzagang Gewog under Sarpang District alone produces over 39,348 tons of betel nut per annum (RNR statistics, 2012). It is one of the main cash crops commonly grown by almost 457 households in Chuzagang. A total of 233491 arecanut trees in Chuzagang produce about 933964 sheaths (Table 4).

The raw material used for plates and cups is the Aracanut sheath which is an extension of the leaf, harder in nature with good strength and brownish in color. The raw material of Aracanut sheaths are not plucked but fallen naturally from the trees and collected from the ground once the leaves fall from the trees.


P-2

The leaves are scattered unused and thus decomposition takes time leading to environmental degradation, increase malaria spread and additional labor requirement to collect and stock these fallen sheaths from the fields (P-2).

The CAFCO and SNV after having identified the prospect of developing an arecanut sheath plates that use locally available materials by deploying low cost technology in a rural set up. The enterprise can earn to generate over 5 million ngultrum annually (Table 6) besides other social advantages through a waste to worth scheme in Chuzagang.


P-3

The cost of the machine (P-3) and in-house capacity development for making products out of the arecanut sheaths worth Nu. 160,000 approximately and the same have been supported by SNV Bhutan including the support extended for innovation and explorations visits and sharing of information through inaugural ceremony for creating market opportunities.

A total of 233491 arecanut trees produce 4 sheaths per tree per annum that totals to 933964 sheaths. One sheath can produce at least two plates worth Nu. 7 & one cup worth Nu. 1.50 totals to Nu. 8.50 while the cost of one sheath with operational cost comes to Nu. 2. A net profit of Nu 6 per sheath.


P-4

SNV has supported the CAFCO for a study visit to explore possible economic venture on arecanut sheaths from the bordering Assam state of India. The visit rewarded with the idea of setting up a machine to manufacture plates and cups from fallen arecanut sheaths which was just right alternative for diversify activities and income generation in the context of climate change. SNV Bhutan under Climate-smart Agriculture project has financed the cost of machine, exploration visit, in-house capacity development of CAFCO members and marketing scope through inaugural session.

Table 1: Resources requirement for business set-up

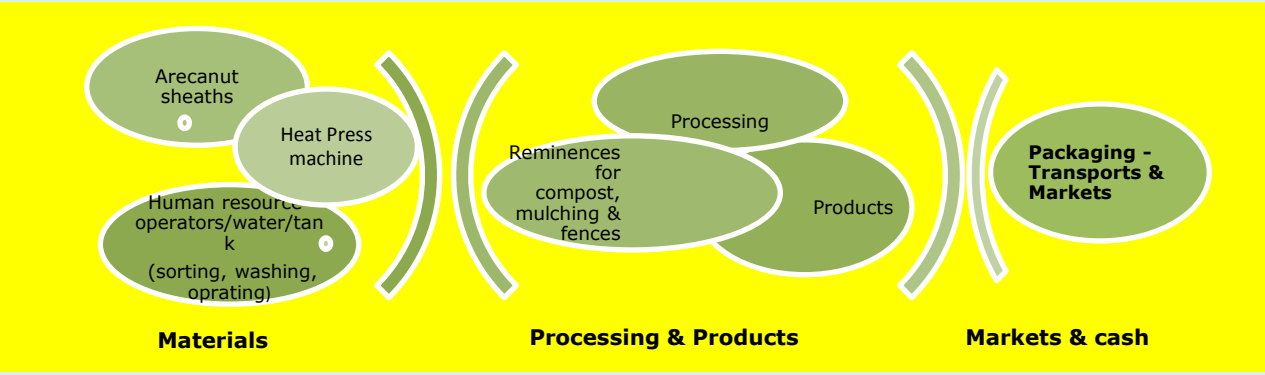
Particulars
1. Land area of about 5 decimal to accommodate space/shade for machine set-up, working, processing, stockings of raw materials and sale counter
2. Heat press machine: plate making machines, automatic with three dices, frames and spares frames of different sizes
3. Arecanut sheaths
4. Electric connections/gadgets
5. Trained human resources (operators, helpers…)
6. Washing tank Concrete cement + pipes
7. Storage racks for product display and stocking
8. Weighing scale
9. Branding + packaging materials
10. Marketing arrangements (Transportation) 11. Book keeping

Materials and Methods

The betel nut leaf plates and cups (P-4) are biodegradable and eco-friendly and this kind of eco-friendly manufacturing industry has to be promoted to keep our country's environment clean to minimize impact to human health and enhance rural income. It is handy, leak proof, clean and natural looking products that come with different size and shape of disposable leaves plates; these can be used in social gatherings, *moenlam-chhenmos*, marriage parties, hotels, fast-food centers, tourisms and office caterings, even at homes during rituals and ceremonies. Therefore, setting up of a micro enterprise of this type has become important to generate additional income and to engage unemployed school dropped out youths in productive avenues.

Through waste leaves of betel nut, an extra income will be generated by the betel nut growing farmers. At least two school dropped out youths could be employed in the industry as regular staff at the initial stage of the project. Indeed entrepreneurs (220 members of Chuzagang Agricultural Farmers' Co-operative) will be benefited from the income of this small scale- industry. The consumers will be benefited by using chemical free and non-toxic bio-degradable leaves plates. The materials and process are furnished as in the Table 2.

Table 2: Flow diagram of products to markets



An eco-friendly, biodegradable natural and hygienic plates-cups products (P 5) from arecanut origin demands for quality sheaths with desirable quantity and table certain logical steps to produce good products for the markets:

The methodology comprise of dedicated members to work for the venture. In-house capacity building and marketing of products are considered important in order to ensure smooth operation, quality products and sustainability. A highly interactive training course for 3-5 days required to develop skills on operation and manufacturing process. The training is required right from the installation of the machines, maintenance, processing and maintaining quality products. The arecanut sheaths need to be sun dried and stored before processing. Just before starting the production process, the sheaths are carefully cleaned and washed in the water and dried. The products shall be channeled on affordable price and discounts to the retailers and whole sellers' at all strategic markets in the country.

Results and discussions

The plates and cups are hygienic, eco-friendly and biodegradable. It has good presentations and texture with strong hold for both solid and liquids when served in it unlike the imported paper plates available in the markets. One experienced operator can produce minimum of 100 plates and 60 cups per day which is worth Nu. 440.00.

SNV has supported to set up the facilities and to help build capacities of the farmers/CAFCO members (Table 3) besides the rural enterprise development that has relevance to their livelihoods in the context of changing production ecologies.

Table 3: Minimal expenditures to prepare operators and set up of one manufacturing unit

Particulars	Date	Amount
Machine + Transport cost	23 Jan 2014	113, 240
Study visit by CAFCO staff to Barpeta in Assam	14-15 Feb 2014	15, 140
Capacity building (TOT)	21-25 Feb 2014	21, 620
Inaugural/Opening Ceremony	26 Feb 2014	10, 700
Total Expenditures	-	160, 700

Table 4: Qty. of raw materials available under Sarpang for plates & cup

Potential Gewogs	No of Arecanut trees	No. of fallen sheaths/Yr.	Total available fallen sheaths/Yr.
Chuzagang	233491	4	933964
Dekiling	59182	4	236728
Gakidling	4276	4	17104
Gelephu	44297	4	177188
Samtenling	22507	4	90028
Senge	21356	4	85424
Sershong	74629	4	298516
Sompangkha	140906	4	563624
Tareythang	145049	4	580196
Umling	197501	4	790004
Total	943194	4	3772776

Data source: Agriculture Statistics, 2011, DOA

The availability of raw materials in Sarpang Dzongkhag potentials for arecanut plates making (Table 4) with socio-environmental benefits to the community at large under climate change context (Table 5); and computations and comparisons of economic prospects besides alternative livelihoods (Table 6, Graph 1).

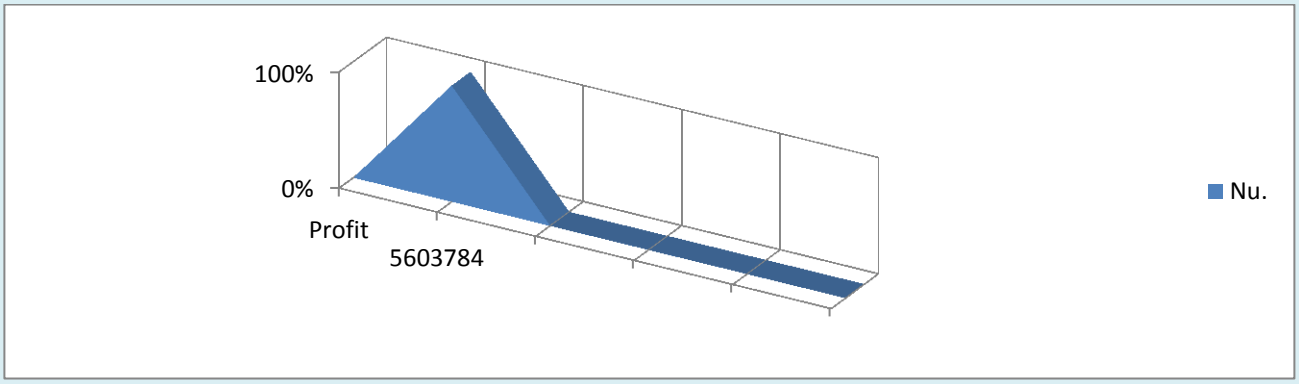
Table 5: Socio-environmental contributions

Sl #	Contributions
1	Alternative livelihoods when crop failures under climate change
2	Creation of rural employment
3	Maintain field sanitations
4	Deprive mosquitoes to breed in water collected in the sheaths
5	Sheaths after use, the tops with leaves can be used for mulching and fencing purposes
6	Plates after use can go for making compost

Table 6: Economic prospects of arecanut plates

Particulars	Qty.	Rate	Amount/Nu
No. of h/holds in Chuzagang Gewog	457	-	-
No of arecanut trees/household	511	-	-
Total numbers of areca nut trees	233491	-	-
No. of fallen sheath per tree per year (average)	4	-	-
Total No. of sheaths available /year	933964	8.50	7,938,694
One sheath can produce 2 plates + 1 Cup	1,867,928 plates + 933,964 cups		
One sheath worth (2 plates @ Nu. 3.50= Nu.7 + 1 cup =Nu.1.50**: All total Nu. 8.50**			
Operational cost (Nu. 0.50 for one sheath + Nu. 1.50 for making charges + Nu. 0.50 for labeling-packaging materials & transportation/plate)	933964	2.50	2, 334,910
Profit per annum			5, 603,784

Graph 1: Presents expenditures and profits from less than 933964 arecanut sheaths per annum



CONCLUSION

These products of eco-friendly plates and cups will increase good market in Bhutan due to the fact that there are year round social gatherings of varied types and at all levels in Bhutan where such products are looked forward for serving to the gatherings since it is chemical free biodegradable and manufactured at home with reasonable price and can be bought using our own local currency. The demand can also go high if we could jointly promote in the tourism industry of Bhutan. The CAFCO in collaboration with the Department and SNV will continue to promote markets by commercials, exhibitions and attending the trade shows. Meanwhile, there is a huge and assured market for these products in our good neighboring country, India. Though, no market study has been done, the CAFCO and SNV believe that the demand for such hygienic plates and cups will shoot up primarily looking at the use of huge quantity of imported paper plates during various social gatherings in Bhutan.

The usage of disposable plates such as synthetic, plastic, paper, aluminum sheath plates are increasing in our country due to increasing population and these products come from outside the country costing foreign currency while such products could also pollute natural environment. The betel nut leaf plates and mugs are biodegradable, eco-friendly and keep our country's environment clean. The sheaths of betel nuts are the main places where mosquitoes breed and malaria disease spread to the humans. This project will therefore not only promote cash income and employment of the rural people but also reduces malaria outbreak in the operational area by using the betel nut sheaths for bio-degradable products.

The availability of adequate capital fund and technical support for setting up micro and small scale industries at the local level will play a pivotal role in transforming the livelihood of the rural people. The Aracanut Leaf Plate Manufacturing Project not only provides a viable employment opportunity for the unemployed youth but also facilitates attainment of self-reliance and socio-economic growth in the community. This project may exhibits tremendous potential for capturing both the national and international markets with its unique environment friendly (biodegradable) products.

The Chuzagang Agricultural Farmers' Co-operative will play vital role in manufacturing and marketing of the biodegradable plates in order to avoid sales through intermediaries or brokers that would lead to high cost for the products. Nevertheless, the venture requires additional working capital fund especially for Plant and Machinery and for capacity building. In order to ensure smooth operation of the units, the highly interactive training course for minimum five days may be required and study visit to India is necessary to develop skills on operating and manufacturing process of the areca nut leaf plate.

The initiative of such micro level manufacturing plant will certainly find an alternative income source for the small farmers who are at greater risk due to uncertain climatic conditions for viable crop production, and thus it may be looked into as one of the Climate-smart ways for the farmers for a sustainable livelihood.

Acknowledgement

SNV Bhutan, Climate-smart Agriculture (CSA) project and CAFCO would like to acknowledge support and cooperation of the Department of Agriculture, District Extension service, and all valued farmers' beneficiaries of Chuzagang, Gida, Sershong and Umling pilot sites who have always been committed and have real interest to forward CSA in their respective pilot sites.

CSA, SNV Bhutan strongly believes in sharing information and closely working with all relevant partners towards serving our farmers for their improved livelihood.

Appendix 1: additional photos on the activities


P-6


P-7


P-8


P-9


P-10


P-11

P-6 to P-11: depict the inaugural session of arecanut sheath making and the unit operations:

P-6: Gup (Geog Headman) Chuzagang addressing the gathering, P-7: farmers participants at the inaugural session, P-8: Rik van Keulen, SNV addressing the gathering, P-9: manufacture process, P-10: CSA Sr. Advisor with the farmers resource persons & with the resource persons from India, P-11: final product from arecanut sheaths