

CONSERVATION AND EXPLOITATION OF BANG GRASS EFFECTIVE IN PHU MY VILLAGE, VIETNAM

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ABSTRACT: Phu My located in Kien Giang province, South of Vietnam is a small village with the majority of the population made of a Khmer community. The weather conditions are not encouraging for locals due to serious flooding months. The soils and water are comparatively acidic. Therefore, only *Bang* grass (*Lepironia articulata*) – an indicator for the wetland habitats and *Nang* grass (*Eleocharis dulcis*) – the main food of an endangered Sarus Crane (*Grus antigone*) can thrive. *Bang* grassland area decreased due to the housing problem. To overcome the decrease of *Bang* grass and conserve this species, the project “Restoration and sustainable exploitation *Bang* grassland in Phu My, 2004” conducted to help locals make sophisticated handmade products from *Bang* grass. It is a good way to help the locals to benefit and conserve *Bang* grass.

Keywords: *Bang* grass (*Lepironia articulata*), *Phu My*, *exploitation*, *conservation*

1. INTRODUCTION

Kien Giang Province is a diverse area of wetland ecosystems, including mangrove forests, brackish marshes, swamp and grasslands in Mekong Delta of Vietnam [1]. In Kien Giang, Phu My commune is a primitive wetland with heavy alum, organic soil and seasonally inundation. The main community in Phu My is Khmer people. Besides *Eleocharis dulcis*, *Eleocharis ochrostachys*, *Ischaemum rugosum*, *Melaleuca cajuputi*..., *Bang* grass (*Lepironia articulata*) is the main plant in Phu My [2]. Because of the alkaline soil, valuable food and agricultural crops are not taken. Therefore, *Bang* grass plays an important and essential role in social economic life of locals in the region. Cutting *Bang* grass to weave and make products and handicraft items is an important part for current revenues in Khmer community.

However, *Bang* grass is exploited significantly in a short time because locals transform land use into inappropriate agricultural models. It leads to the decrease of *Bang* grass area because of higher exploitive rate than natural restoration. The disappearance of *Bang* grass will affect enormously the socio-economy as well as ecological functions of environment and natural conservation. The model, which combines natural conservation with the participation of the community, is conducted in Phu My commune of Kien Giang province with the purposes: to preserve existing ecosystems, reduce financial burden for local governments in conservation and improve people's lives and to assess

the social and economic changes of the community involved in the project "Sustainable exploitation of grassland conservation *Bang* combining local trade village, Phu My commune, Kien Luong district" from 2004 to 2006.

2. METHODOLOGY

According to Pham Hoang Ho [3], the location of vegetation classification *Bang* is described as follows: Order: Cyperales; Family: Cyperaceae; Genus: *Lepironia*; Species: *Lepironia ariculata* (Retz.) Domin

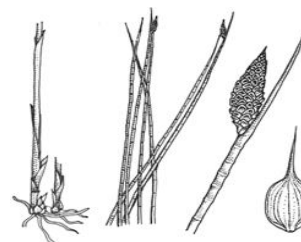


Fig. 1 *Bang* Grass (*Lepironia ariculata*) (according to Jackson and Jacobs [4]).

2.1 Research Methodology

2.1.1 Collect basic information

Collecting information, documents, maps, research data related to pre-existing problems and research areas, focusing on the study material of plants *Bang*, natural characteristics, socio-economic,

management and development of the local villages. The information was collected at the following agencies: Technical Centre of Natural Resources and Environment (Department of Natural Resources and Environment Kien Giang), the People's Committee of Kien Luong district, People's Committee of Phu My commune, Department of Science and Technology.

2.1.2 Construct the questionnaires

Based on the different groups in the community living around the project area, constructing the questionnaires:

- Form I: households interviewed in 2004
- Form II: households participating spit and weave products from Bang grass
- Form III: intermediate households purchase products from Bang grass
- Form IV: employees working in the project or working at home

The investigators interviewed each household and reported information in different questionnaire. Data recorded will be encoded in a common code table. Enter data stored in an Excel spreadsheet, and processed with statistical software SPSS.

2.1.3 Methods of analysis of economic efficiency

- The economic efficiency of a model is calculated by the formula: $\text{profit} = \text{total revenue} - \text{total cost}$
- Determine the percentage of income of each model contributes to the total income per household in the year.

2.1.4 Maintain and develop the traditional craft villages for the local community

Use the rapid assessment of rural people's participation by conducting quick interviews of households who weaved *Bang* grass about techniques, methods and material preparation.

3. RESULT

3.1 Exploiting Bang grass from the local community

According to the survey in 2006, more than 64% of participating households exploited *Bang* grass. Activities were taken year-round and mostly in the rainy season. On an average day, an anchor puller pulled up 20 bunch (1 bunch of Bang is about 1.834kg). Approximately 1% of people pulled up Bang grass every day and 42% pulled up after 10 days off.

Table 1 Exploitation of *Bang* grass in different months

Month	Exploitation level
1	**
2	*
3	*
4	*
5	*
6	**
7	**
8	**
9	***
10	***
11	***
12	***

Notes: (*) : exploit rarely
 (**) : exploit averagely
 (***) : exploit significantly

bad quality
 average quality
 good quality

Table 1 shows the level of exploitation of the grass Bang Phu My community changes seasonally. In the rainy season from September to January, water flooded grasslands, Bang grass had good quality (height > 1.2m), and people exploited Bang grass the most. In the dry season from February to May, exploitation levels decrease due to poor quality of Bang grass (body broken, dry, reaching heights not suitable to exploit raw material), and people exploited the least. From June to August, flood started up and people started exploiting again.

Table 2 Total bunches of Bang grass exploited from locals

	Number of household
Households in the project area (*)	80
Total household living around the project area exploited Bang grass	229
Total bunches of Bang grass exploited from locals per year	1,671,700

Notes: (*) On average, each household had one Bang grass puller, one person pulled 20 bunch /day (7,300 bunches/year).

Table 2 showed the total number of Bang bunches exploited from the local community (1,6717 million bunches/year. Compared with the findings of Tran Triet [2], the maximum number of total Bang exploitation 1,2992 million bunches/year. This showed that exploited activities Bang of the local

community after two years constructing the project increased to 372,500 bunches.

3.2 Impact Communities to Bang Grass:

3.2.1 Exploit Bang grass

The community exploited *Bang* grass numerously in rainy season when Phu My commune was flooded fully. Pulling out and cutting were two ways, which used to exploit *Bang* grass:

+ Deracination: using hand to pull out the roots, just select the high stem to exploit. This method was used by 95% of the local community to exploit *Bang* grass in flooded season.

+ Cut: About 86% outside the local community used knife and cut the grass, including saplings in the dry season.

In summary, the exploitive activities of locals inside and outside the community increased and made the area of *Bang* grass decrease and degrade gradually. The main reasons were inappropriate technical exploitation and over exploitation of people to overcome self-regenerating capability in the rainy season.

3.2.2 The other impact

In 2006, grasslands were under significant impact of digging ditches, encroaching agriculture or melaleuca, hatching shrimp farm and burning grasslands. The ground water level was decreasing deeper by digging ditches in grassland, the surface soil had exposed to the air and led to the alkalization. The soil properties changed had brought about the vegetational cover on the surface changed. Those species under drought and aluminous conditions would be replaced by submerged species. The agricultural encroachment of households to take place in the contiguous area of meadows and agricultural land reduced grassland area, which had invested a lot of effort and money to renovate. As a result, 5% of local people often burned grasslands, alternating *Melaleuca leucadendra* in the dry season to log rough timber. Grasslands were habitats of many different species of animals and plants. Burning pastures would affect pasture conservation objectives and the living creatures and might changed the flora and fauna here.

3.3 Impact of the project on the community

3.3.1 Raising awareness of community about Bang grass resources

In 2006, 64 of 122 households participated in *Bang* exploitation. Among them, 60 households knew information about the project and 44 households knew the boundaries of the project because the project set up landmarks and sentry - box. Collecting suggestions from community, 51% of people commented that *Bang* pasture would be forever and 49 % of respondents said that *Bang* pasture was declining by switching to farming, shrimp and over exploitation.

From the survey, there were 20 households recognizing the economic values of *Bang* grass. They built a dike and prevented strangers to exploit *Bang* grass. Technical exploitation of people changed more consistently, 64 households in the project used deracination method, selected the mature *Lepironia ariculata* with large diameter, height of 1m or more. Exploitable *Bang* grass time was different; only 3.1% of households exploited in rainy season when flooding occurred, around 6.3 % of households exploited all year around. Others exploited in freetime. Thus, after two years of project's implementation, communities living around understood the values of *Bang* grass (the economic and conservational values).

3.3.2 To create jobs for the local community

The project created jobs for the local community, especially for Khmer women. Total number of employees was 30 people; 26 people worked in 2005, 4 new people worked in 2006. Most products were made in the workshop of the project. They selected *Bang* grass and dried them to make handicraft items. Besides working at workshop, workers had worked at home.

Table 3 Income from production of the project

Activities	Capacity (product/day)	Income (USD/day)	Income (USD/month)
Weave cushions at home	2-3	0.71 – 0.85	21.20 – 25.44
Weave mats	8-10	0.94 – 1.41	28.27 – 42.40
Weave best color quality mats	2-3	0.94 – 1.41	28.27 – 42.40
Make baskets	7-10	1.41 – 2.12	42.40 – 63.60

From the result of socio-economic survey in 2006, who admitted into the project was local, encouraging

Khmer people. If they knew to sew, they would be trained to become weavers. Otherwise, they were trained to be dyers or do other activities in production line of handbags, briefcases, hats. In case workers did not have time to work at the workshop, they could make cushions or mats at home. Table 1 shows that the income of workers made baskets was highest 42.40 – 63.60 USD/month. Workers weaved at home received from 21.20 – 25.44 USD/month. If compared with other jobs, working in the project had more stable income, fixed working time, improved skills, learned new methods to produce many kinds of products.

3.4 Economic Change

Income per year between farming and exploiting *Bang* grass were compared in table 4. Locals got about 3487.89 USD/year for farming while the income from exploitation *Bang* grass was 678.45 USD/year, about 5 times lower. This was the reason people changed to do farming and land use from pasture to rice fields. However, the lowest income might be -282.69 USD/year. Because farmers had a bad harvest, could not get the profits and got unpaid debts from buying chemical fertilizers and insecticides. Working in the project to make products from *Bang* grass, workers could get minimum 12.72 USD/year.

3.4.1 The cost for exploitation *Bang* grass

Community in Phu My commune exploited *Bang* grass without paying any cost. People often deracinated in wild *Bang* grasslands. Therefore, the costs were taken from travelling and eating. If people deracinated in project area, the cost would be 32.98 USD/basket. In case people made cushions at home, the material cost was 282.69 USD/mattress.

3.4.2 The profits from exploitation of the project

If people exploited natural *Bang* grass for sale raw materials and made cushions, the average profit per year would obtain 100.35 USD. Households with machine to press *Bang* had profits in the first year from 75.38 USD to 471.15 USD. The second year, profits rose from 84.81 USD to 1187.29 USD. The average profits were obtained from 33.92 USD to 376.92 USD. The project “Restoration and sustainable exploitation *Bang* grassland in Phu My, 2004” established in 12/ 2004, but until 12/2005 it has started a new business. The project purchased raw and dried materials to produce products such as mats, baskets books, briefcases and hats. The revenue

Table 4 Comparison of income from farming and exploiting *Bang* grass

	Income (USD/year)	
	Farming 2 crops	Exploiting <i>Bang</i> grass
Low average	188.46	100.35
Average	338.19	126.46
Low	-282.69	12.72
High	3487.89	678.45

from the raw materials of business had been documented and reported every year.

3.5 Maintenance and development of traditional village for local community

3.5.1 Handicraft villages before 2004

Weaving handicraft products was present in Khmer community anciently and inherited by the progeny and then it became the traditional industry of Phu My. In wartime, people weaved products such as cushions, baskets, hats, bags. Since 1990, only few items used and maintained until today.

3.5.2 Manufacturing processes

Every dry season, *Bang* grass withered. However, in rainy season, it began a new growth cycle. In harvesting time, people pulled up small handfuls, then bundled up bunches. After being dried, *Bang* grass had toughness, plasticity, sustainable strength and impermeability. Due to those characteristics, *Bang* grass was used as a raw material for weaving products. After drying, each stem was crushed on a small stone or a plank to flat it. Weaving instruments were a very sharp pointed piece of bamboo. First, using hands knitted a contour connecting the stems together. Continue knitting until the completion of the product. Hence, to complete a product people did not use any machinery. They only used hand to knit a product from raw materials.

3.5.3 The consumer market

Handicrafts products were mainly sold to locals, other cities in Vietnam and customers from Cambodia. Typically, most products sold in the rice season. Since the products were made from *Bang*

grass with many models, styles and colors, in 2005, products had expanded local markets and sold abroad. The baskets, mats, mattresses had been accepted in domestic markets, especially baskets had been exported to Japan.



Fig. 2 Steps to knit a cushion: A. crushing instruments (pestle); B. crushing Bang grass; C. knitting a cushion.

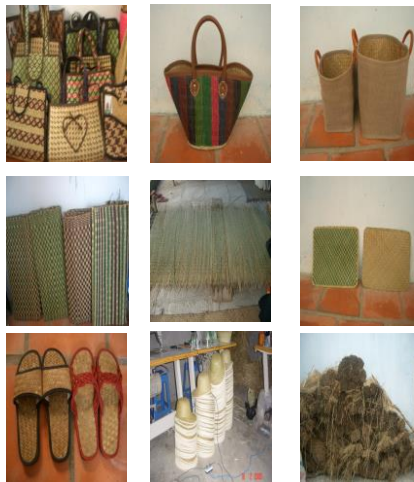


Fig. 3 Types of products: the types of bag; mats; pads; slippers; hats and dried materials.

From the mat and pad products providing by the local community, the project designed new products with multiple patterns, colors, different sizes.



Fig. 4 The equipments used in the production Bang grass: Bang squeezer; looms; sewing machine.

The project maintained traditional ways of community that was weaving cushions by hand. However, there were improvements in machinery and equipment in production to save labor, save time and increased the capacity. Bang squeezers replaced hand

tools. Looms used for weaving mats was shorter time than knitting by hand. Sewing machines used sewing baskets, contours in order to improve design and fit with current markets' demands.

4. CONCLUSION

Handicraft village of the project had positive impacts on the local villages. Currently, productive technology and machinery used in production has been improved to help people reduce labor save time. From one model of product, locals expanded to develop about 20 types of baskets, mats, cushions and hats. Consumption of products was also expanding in domestic markets and international markets.

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