

# Product Chain of Tikog (*Fimbristylis Globulosa*) Mats in Basey, Samar Philippines

Janet R. Diaz  
Samar State University-Basey Campus  
Basey, Samar, Philippines  
savedtoserve@yahoo.com

## Abstract

*The study discussed the current status of the Tikog (Fimbristylis Globulosa) Industry in the Municipality of Basey, Samar as determined in its economic analysis. The analysis presented the areas of opportunity and constraints vis-à-vis its technological recommendations on how to improve the industry. Mat weaving is a household industry in Basey, Samar handed down from generations to generations, enhanced and improved through the years. The industry used the dried Tikog leaves to weave multi-purpose mats locally called as banig that is further used to form handicrafts and other functional products. Mat weaving in Basey is more than a century-old industry that became a tradition that revolutionized itself, yet its current status is seemingly diminishing. The possible factors behind the blossoming industry were by illustrating the technologies currently used in the mat industry and the assessment of technology processes in Tikog - based handicraft.*

Keywords: tikog mat, mat weaving, Basey Samar, handicrafts, local industry decline

## I. INTRODUCTION

Mat weaving is a craft that people has employed since the earliest times to make ground covers and other equipments. It is continuously being perfected. For most, this symbolizes nature, life, feelings, and peace of mind. This craft is worth preserving, as it would help the region economically as well as preserving its culture forever green land (Rustami 2002). Basey is one among the oldest towns in the Province of Samar where the mat weaving industry is a prime livelihood specially among women. The mats from this municipality have been indisputably acclaimed to be the most extensively used in the country. One could find the Samar mat in the markets throughout the country. This popularity stems from its attractive colors as well as its highly

affordable prices (Baradas 2004).

Mat weaving in Basey, Samar has developed in various centuries into an industry driven by the availability of raw material. While it became the culture for various generations, this industry is seen to have been seemingly diminishing through time. This status is almost comparable to a giant who woke-up from a very long nap which has difficulty to stand probably due to illnesses. This declining trend of mat industry in Basey already requires some intervention for its recovery. The government agencies have already attempted in going into some possible causes of this trend but failed to apprehend the root cause and mitigate.



Table 1.  
Name of Barangays and Number of Individuals Involved  
in the Mat Weaving Industry of Basey, Samar

Name of Barangays	Estimated No. of Mat Weavers	Name of Barangays	Estimated No. of Mat Weavers
Brgy. Anglit	9	Brgy. Mabini	100
Brgy. Bacubac	5	Brgy. New Sn. Agustin	6
Brgy. Basiao	30	Brgy. Old Sn. Gustin	12
Brgy. Binungtoan	5	Brgy. Panugmunon	7
Brgy. Buenavista	4	Brgy. Pelit	3
Brgy. Bulao	7	Brgy. Roxas	10
Brgy. Burgos	10	Brgy. Salvacion	16
Brgy. Catadman	10	Brgy. San Fernando	5
Brgy. Cogon	8	Brgy. Sawa	5
Brgy. Dolongan	20	Brgy. Serum	10
Brgy. Guirang	10	Brgy. Sugponon	5
Brgy. Inuntan	15	So. Rawis, Brgy. Guirang	20
Brgy. Loog	10		
<b>TOTAL</b>		<b>342</b>	

of the municipality, resides. The industry in Barangay Basiao (mostly visited by journalists), only shares about 8.77 percent (30 weavers), while both the Barangay Dolongan and Guirang share about 5.85 percent (20 weavers), respectively. Only a few mat weaving households are found in other barangays of the municipality. The workforce involved in this traditional craft in Basey is the women sector who are busy weaving mats. The educational attainment of those involved in mat weaving is only elementary grade level. On the average, most of the women involved in the industry have been in mat weaving for 28 years. Of the total, 32.45 percent (111 mat weavers) have been weaving for about 40 years or more while the remaining 67.55 percent (231 mat weavers) have been in this handicraft for 21 years. The data further reveals that each weaver can produce one mat, but the duration of weaving vary according to size and type of mat. They have been productively striving to survive by merely weaving

mats they would later sell in the town proper to augment their average monthly income of PhP4,000.00 of their farmer- or fisherman- husband. Mat weavers in Barangay Basiao usually sell their produced mats directly to tourists who visit the Saob cave. Those from other barangays of the municipality, oftentimes sell their produced mats to display center operators in the town proper of Basey, Samar where it is made into various tikog-based products.

- 2. Tikog Raw Material Suppliers** - Table 2 presents the mat suppliers of the Municipality of Basey which covers 14 Barangays involving 177 total number of raw material suppliers to the local mat producers. A total of 357 bundles of dried tikog produced are from these suppliers.
- 3. Marshland Hosting Tikog Grass Barangays**

The total land area of Basey is 57,272 hectares of which approximately 35% or 20,045 hectares is classified by

Table 2.  
Frequency of Raw Material Suppliers and Tikog Production in Basey, Samar

Name of Barangays	No. of Tikog Suppliers	Estimated Production/ Harvest (In Bundles)	Name of Barangays	No. of Tikog Suppliers	Estimated Production/ Harvest (In Bundles)
Balante	10	20	New Sn. Agustin	3	10
Balud	12	30	Old Sn. Gustin	9	22
Basiao	11	25	Roxas	5	20
Binungtoan	4	15	San Fernando	15	50
Dolongan	15	20	Sawa	5	20
Loog	7	25	Serum	10	20
Mabini	35	60	Villa Aurora	9	20
<b>TOTAL</b>				<b>177</b>	<b>357</b>

Table 3.  
Mat-based Handicrafts Producers and Level of Productions in Basey, Samar

Name of Display Centers/ MatBuyers/Producers/Dealers	Location/ Address	Production Level in Money Value (Php)
Delza Morales Native Products	Brgy. Palaypay, Basey Samar	2,890,000.00
Elvira Padoc's Native Products	So. Canmanaog, Brgy. Buscada, Basey Samar	2,890,000.00
Eva Marie's Arts and Craft	Brgy. Loyo, Basey Samar	2,890,000.00
Bacayo's Native Products	Brgy. Baybay, Basey Samar	2,890,000.00

the National Irrigation Administration (NIA) as irrigable areas. The same lands are also classified by the Department of Environment and Natural Resources as marshland and have plenty of potential for tikog plantation. The soil classification is hydrosol type of soil characterized as poorly drained, marshy or swampy found in barangays Sugponon, Balud (Nouvellas Occidental), San Fernando (Nouvellas Oriental) and Western part of Basiao.

Tingib Clay loam is the soil type of Canmanila, Tingib, Iba, San Agustin (Old and New), Burgos, Sawa, Serum, Magallanes, Binungtoan, Pilit and Loog. This soil type is characterized by moderately well-drained fine sub-soil and deep soil. Its land capability is moderately good and suitable for cultivation. (Source:

D.A., Bu. of Soil).

Tacloban clay loam is the soil type of San Antonio, Tinaogan, Basiao, Mabini, Sohoton and Bulao. It is characterized of being well-drained shallow soil.

**4. Mat-Based Producers and Production Level** – Table 3 indicates four mat buyers/producers with display centers located at the town proper of Basey, Samar and their respective production level which is shared equally as exact figures on its statistical data is not made available during the interview. However, figures generated in table 3 were from the DTI Samar's sales performance record per producer resulting from the marketing assistance the department has

Table 4.  
Government Agencies Providing Interventions and Support to Mat Industry in Basey

Name of Agency	Interventions Provided	Status
LGU Basey	Promotion and Marketing	Every town fiesta celebration
Department of Tourism (DOT)	Promotion and Marketing	Every town fiesta celebration & Tourism Travel Mart
Department of Trade and Industry (DTI)	Skills Training, Product Development, Promotion and Marketing	Regular activities of DTI in preparation to every trade fairs participated & by the Basey based producers
Department of Agrarian Reform Municipal Office Basey (DARMO Basey)	Organize and develop one hectare tikog production area and organizational development trainings.	Was not sustained by the farmer's organization in Brgy. Old San Agustin
Phil. Nat'l Oil Corp. (PNOC)	Development of a two hectare tikog production area and training for the weavers.	Was not sustained by the farmer's organization in Brgys. Old San Agustin & San Agustin
Department of Science & Technology (DOST)	Provision of equipments: High Speed heavy duty sewing machine & Roller press	On-going and used regularly.

extended for the year ended, 2012.

##### 5. Government interventions on the industry

– The six government entities that provided interventions and support to the development of the mat industry in Basey, Samar are indicated in Table 4. However, the Department of Environment and Natural Resources through its Ecosystems Research and Development Bureau (DENR-ERDB) Regional Office 8 based in Tacloban City conducted a study to determine the problem on the supply of raw material for the mat industry in Basey, Samar. The study showed a promising result toward cultivation of a tikog plantation in the municipality of the *genus Fimbristylisglobulosa* (Jasmin et al., 1993)

##### 6. Prices of Tikog-based Products

Prices and costs of tikog mats in Basey, Samar varied according to sizes and designs. Plain mat products are relatively cheaper than those embroidered ones, precisely

due to the additional costs of indirect materials and labor cost.

##### 7. Production technology process of tikog-based products

– The current production chain of tikog-based products in Basey, Samar varies with the vision of the owner/operator of each establishment. Only three of the establishments' owners disclosed their respective production flow charts. The three firms have their own in-house designers apart from the regular product development conducted by the Department of Trade and Industry - Product Development and Design Center of the Philippines.

Hence, the process of weaving mats is done manually which entails a lot of time and passion of doing the meticulous steps. From raw material preparation, it already demands keen eyes for the impurities in the stalks which are spoiled by insects and handling.

Normally, the product chain starts right after the harvest and is highlighted by sun drying. The detailed processes of the handicrafts production being practiced by the three producers of tikog-based mats and bags in Basey, Samar is shown in Figure 2.

- 8. Manpower Support and Threats of the Industry** – There are 14 barangays in the municipality that produces wild tikog grass for the industry that have become the source of the 177 farmers of their dried tikog for the 342 weavers in the municipality. However, there are three major threats that are silently affecting the productivity of the industry today. First threat is the negative attitude of the new generations in engaging in mat weaving. The second is the absence of technological support from the public sector to mechanize the production of tikog mats and third, the absence of a man-made tikog plantation in the municipality.

The industry is performing well in the market with an estimated sales of Php11,560,000.00 in 2012. However, it is also creating stiff competition among the industry players in purchasing these materials as the demand is steadily going up which resulted to a higher price in raw materials. Presently, four Basey-based producers compete in purchasing their raw materials sourced in Leyte, and this does not include the Taps Banig Handicraft of Leyte that is enjoying total advantages over the four buyers/producers of Basey.

The three major threats of the industry press the local players to limit its production capability as raw material supply is very unstable.

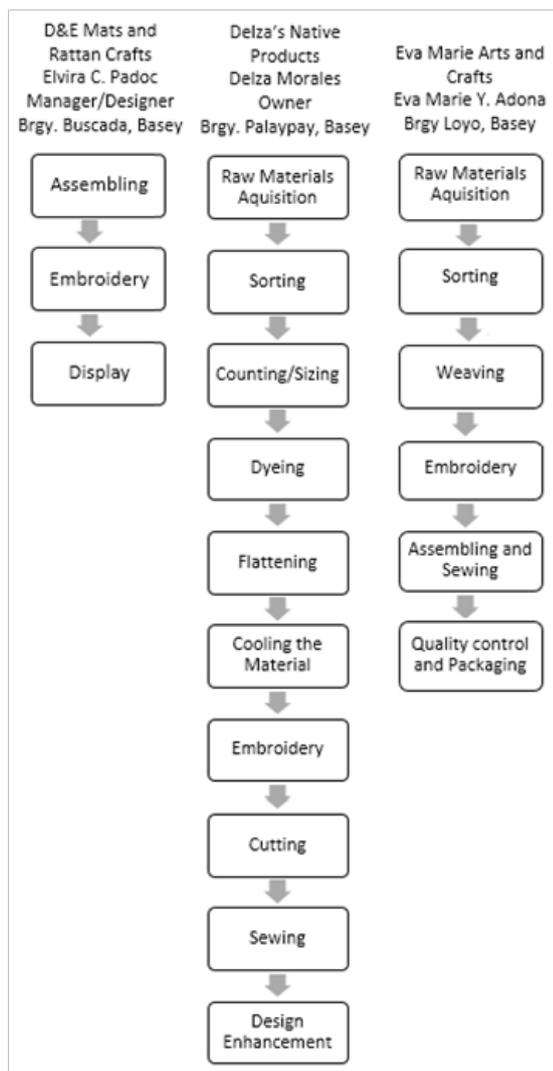


Figure 2: Example of production process of tikog-based products

Thus, they could not engage in direct exporting.

In its cost and return analysis, the Technology Transfer Series, ERDS Region 8 calculated the industry's three-year average yield is Php293,238.33 per hectare per year. However, this figure is meaningless if the local government unit of Basey will not establish a man-made tikog plantation to support its tikog mat industry.

## B. Production technology process of tikog-based handicrafts

- 1. Harvesting of wild tikog grass** - As the municipality has a vast area of



Figure 3 – Harvesting of tikog grass in Brgy Serum

wetlands tikog *Fimbristylis globulosa* naturally growing everywhere, harvesting is done randomly by the farmers every after three months. The harvested stalks are dried either at the multi-purpose drying pavement of their barangays or at the roadside which is the common sight at tikog producing barangays.

2. **Drying** - The loose tikog stalks are sun dried. By instincts, the farmers estimate the allowable moisture content of the raw materials which is estimated at 10% before it is being weaved.
3. **Sorting, classifying, scaling and bundling** - This process involves the cutting of roots of dried tikog using a sharp knife. This process is simply accomplished by sorting manually and classifying according to the thickness and lengths of the stalks.
4. **Flattening, dyeing and weaving** - Before the raw materials are being weaved, every tikog stalks are being flattened either manually or by the use of a roller press. Majority of the weavers in Basey weaved their mats at shaded places like the famous Basiao Cave, the home of the Basiao mat weavers. Some of them weaved mats first hour in the morning while the temperature is very low. The

scientific explanation for this activity is that during this situation, it could not break the physical property of the material as it is very delicate that it easily brittles. For colored mats, after the stalks have been scaled and classified dyeing goes into four processes:

- a. **Water boiling** – Under normal weather conditions, boiling of the water is usually done at the backyards with the use of tin can container and firewood. The water is placed in a container and heating over the burning firewood until it boils.
- b. **Dye and water mixing** – After the procedure, the dye is mixed to the water while it is boiling. The usual practice is at the ratio of the mixture one spoon of dye for every gallon of water. It was revealed by weavers that the ratio produces the desired color for the tikog stalk that has good dyeing properties making it the most suitable material for weaving quality mats. Along this line, the color of the dye used varies with the desired colors of the mat.
- c. **Soaking** – After 2-5 minutes of boiling the mixture, the bundle of tikog is submerged into the mixture in a container for 1-2 hours and allow the tikog to absorb the dye color. After which, the materials are taken out of the container.
- d. **Drying** – After 2-5 minutes of boiling the mixture, the bundle of tikog is submerged into the mixture in a container for 1-2 hours and allow the tikog to absorb the dye color. After which, the materials are taken

out of the container.

**5. Storing of Raw Materials** - Tikog stalks that are not weaved are stored in a room temperature and shaded place. Normally the farmers hang these materials to avoid breaking in case there is a change of temperature in the vicinity. For freshly dried tikog materials, these are unbundled and hanged in a cool, dry place.

**6. Weaving** - The weavers weaved their mats flattened on the floor or directly to the earth with appropriate padding mats. These weavers normally weaved their mats in cool places just as those popularly known as the Basiao weavers of Basey, who weave their mats in caves. Some weavers weave mats first hour in the morning as the temperature is low. The scientific explanation for this activity is that during these situation while the temperature is low, it could not break the physical property of the material as it is very delicate that it easily brittle.

**7. Mat designing** - This is an essential phase in mat production which makes the woven mats more attractive and colorful. The technology of mat designing involves the finishing touches adding more value on the product for customer's preferences. Among the mat weavers in Basey, Samar only very few are highly trained to do the embroidery wherein designs are being executed. These works are manually performed by the highly skilled workers.

**8. Product packaging, storing and transport** - Finished products are individually packed and stored in a cool, dry place. For small items such as a coin purse and souvenir items these are contained in plastic packaging material by 20's to 50's



Figure 4: Women of Brgy Basiao, Basey weaving their mats in cave



Figure 5: Round mat and handbag are some of the finished products of the technology process

according to the size of the items. Finished products scheduled for deliveries are meticulously packed individually.

### C. Gap, Raw Material Outsourcing and Technologies Used in Tikog-based Production

**1. Gap** - The dried tikog production in Basey is only 357 bundles which is equivalent to 71,400 stalks every three months. This supply is very small amount compared to the existing demand of 2,792,000 stalks or 13,960 bundles of dried tikog requirement every three months of production of the four producers of mats and bags in Basey. The traditional practice of producing mats and bags are dependent on manual weaving, slowing down the production of finished goods. Using machineries such as the loom-

weaving machine or heavy duty sewing is also not recognized as a prerequisite in this type of industry. The technology in dyeing tikog materials is also not considered critical resulting to inconsistencies in the concentration of dyes in the physical properties of the material.

Human factor is very crucial in this industry as it demands careful attention to every detail of the craft. Attitude and values of the workers affect the productivity of the industry as it is an admitted fact that it requires human labor from start to finish. Thus, application of appropriate technology answers this gap and may farther enhance its capacity.

**2. Raw material outsourcing** – The local production of tikog materials in Basey is not enough to supply the total requirement of the identified producers of bags and mats in the municipality. Thus, the local producers are outsourcing their materials in the municipalities of Dagami, San Miguel, Sta. Fe, Alangalang, Pastrana, Tanauan, Palo, Tabon-tabon, Mayorga and Abuyog all in the province of Leyte.

**3. Technology used in the production of Tikog-based products** – The

producers of bags and other functional products out of tikog materials are currently using high speed sewing machines, roller press, organic and synthetic dyes and application of product mix.

#### **D. Cost and Return Analysis of One-Hectare Tikog Plantation**

Presented below is the economic analysis of the Tikog production for 1-ha plantation as the determining factor and basis for future decisions of this particular business.

##### **Basic financial assumptions:**

- a. For a one-hectare Tikog plantation with a 25 x 25 cm spacing, a farmer needs PhP122,962 (for plantation establishment and maintenance).
- b. Forty-eight percent (48%) of the amount (or P59,216) is spent on (1) harvesting, (2) bundling and (3) drying.
- c. Forty-three percent (43%) of P52,568 is incurred for (1) site preparation, (2) planting stock preparation, (3) collection, (4) planting and (5) maintenance activities.

Table 5  
Tikog Production Cost Analysis

Items/Descriptions	Year 1	Year 2	Year 3
Sales on production	193,231.40	338,154.94	845,387.37
Less: Expenses			
Site preparation, planting stock preparation, collection and planting	52,873.66	52,873.66	52,873.66
Plant maintenance activities	11,066.58	11,066.58	11,066.58
Harvesting, bundling and drying	59,021.76	59,021.76	59,021.76
Total Expenses	122,962.00	122,962.00	122,962.00
<b>Net Income</b>	<b>70,269.40</b>	<b>215,192.94</b>	<b>722,425.37</b>

- d. The total number of seedlings (suckers) planted per hectare is 156,048 plants
  - e. During the first year, one hectare Tikog plantation with a spacing of 25 x 25 cm can produce an average of 9,932,455 stalks.
  - f. On the second year, the yield is expected to increase by 75% from the previous year.
  - g. On the third year, when the clumps have grown and expanded, the yield increased to 250%.
  - h. When the harvested stalks are sorted and bundled, it is assumed that 70% of the harvests are long stalks, and 30% are short ones.
  - i. 1.9 One bundle of dried Tikog about 3 inches diameter constitutes of 200 long stalks.
  - j. One bundle of dried Tikog about 3 inches diameter constitutes of 220 short stalks.
  - k. Each bundle sold is at P4.00 at farm gate price.
2. Attitude and values of the people especially those involved in the project is too dependent on the government's aid and do not help themselves to work for the project;
  3. Vast area of marshland is totally unutilized for commercial tikog production;
  4. The farmers who have high potential for commercial tikog production prefers rice production rather than tikog production as they are assured of their income from rice farming, and
  5. Technology application for enhancement of the finished products. (e.g. mechanization in the embroidery process, mechanical dryer for tikog).

#### **IV. CONCLUSIONS AND RECOMMENDATIONS**

##### **A. Conclusions**

Based from the results of the study, the conclusions derived were:

1. The tikog plantation project initiated by the Phil. National Oil Corporation and the Department of Agrarian Reform Municipal Office of Basey did not sustain due to unreadiness of the project beneficiaries in Brgys. San Agustin and Old San Agustin;

##### **B. Recommendations:**

In order for the tikog and mat industry to become sustainable, the following initiatives are hereby recommended:

1. The LGU of Basey must be pro-active in the campaign for commercial tikog plantation;
2. The church must assist the public sector in the value formation activities with the farmer and women sectors;
3. The LGU of Basey must require the local School District Offices in the promotion of local handicraft as part of their teaching in the industrial arts and home technology subjects;
4. DSWD and DAR must require 4P's and CARP beneficiaries to engage in tikog plantation;
5. The public sector must regularly

conduct trainings relative to the development of men and their moral values;

6. Adoption of appropriate product labeling for bags and other related products, and
7. Application of technologies developed by the academe (e.g. post-harvest facilities, production system development).

Development Bureau – Department of Environment and Natural Resources. Retrieved April 12, 2014 from <http://erdb.denr.gov.ph>

Doydora U, B Urbano & E Bautista. (1988). Studies on the cultural management and growth performance of tikog in RRDP site, The Science and Technology Information Network of the Philippines (SCINET-PHIL). Accessed January 16, 2013 from <http://scinet.dost.gov.ph>

## REFERENCES

Baradas, D.B. (2004). Banig: The Art of Mat Making. National Commission for the Culture and the Arts, Retrieved May 5, 2013, from <http://www.ncca.gov.ph/about-culture-and-arts/articles-on-c-n-a/article.php?subcat=13&i=45>

Bautista, E. & Bernardo, J. (1991), Tikog (FimbristylisglobulosaKunth) pilot plantation establishment in Eastern Visayas for Research and Development, Study 1: Tikog planting density and harvesting. Ecosystems Research and Development Bureau-Department of Environment and Natural Resources, Retrieved April 30, 2013 from <http://erdb.denr.gov.ph>

Chen, T. B., & Chai, L. T. (2010). Attitude towards the environment and green products: Consumers' perspective. *Management Science and Engineering*, 4(2), 27-39.

Diwata, C. (2010). The Mats of Basey, Retrieved May 5, 2013 from <http://gomestic.com/homemaking/the-mats-of-basey>

Decipulo, Myrna S. (1990). Management scheme for natural stand and man-made tikog plantation in region 10, *Ecosystem Research and*

Escoda, A. (1953). The Mat Industry of Basey, Samar (Philippines), *Folklore Studies* Vol. 12, 1953. Online at <http://www.jstor.org/pss/1177418>

Jasmin B., E Bautista, R. Sambilon, & N. Ligan (1993). Tikog plantation established in Eastern Samar. *Ecosystem Research and Development Bureau – Department of Environment and Natural Resources*

Krause, D. (1993). Environmental Consciousness: An empirical study, *Journal of Environment and Behaviour*

Lapis, A. M. Uy & A. Faraon. (2001). Tikog Weaving in a Cave, *Canopy International, ERDB-DENR Volume 27(1): 2*

Martin, B. and A Simintrias (1995). The Impact of Green Product Lines on the Environment: Does What They Know Affect How the Feel? *Marketing Intelligence and Planning*, 1995

Rustami, Mustafa (2002), Mat and card weaving. Retrieved December 12, 2012 from [www.caroun.com/Research/carpet/matcardweaving.html](http://www.caroun.com/Research/carpet/matcardweaving.html)

Shamdasami, P, G. Chan-Lin, and D.

Richmond. (1993). Exploring Green Consumers in an Oriental Culture: Role of Personnel and Marketing Mix. *Advances in Consumer Research*