

10. KHANAP NAK COMMUNITY WAY: RESTORING DESERTED SHRIMP FARMS WITH NIPA PALM FOREST PLANTATION

1. General Information and description of best practice/technology

Introduction

It started in 2001 when Associate Professor Dr. Nopparat Bumrungrak, Professor of Faculty of Science, Songkhla Nakarin University, wanted to conduct research regarding utilization from nipa palm trees and was interested in restoring deserted shrimp farms to become land in use. Therefore, Mr. Kovit proposed areas at this location to be made as demonstration plots. Based on soil and water analysis, it was found that this area was suitable for planting nipa palm. The task started with the area of 3 rai to be transformed from deserted shrimp farms into nipa palm forests. There was extension of planting nipa palm trees more. After having planted for 7 years, yields from the nipa palm trees started to be collected.

Problem conditions of the area before taking actions

"Khanap Nak sub-district", Pak Phanang district, Nakhon Si Thammarat province is the area at the river mouth adjacent to the gulf of Thailand. There are natural water resources which villagers call "Hua Sai Canal" and "Na Kote Canal" which have been recently dug to connect with the seashore. This makes Khanap Nak sub-district have 3 kind of water resources in the same area, namely fresh water, salt water and brackish water. The traditional main occupations of the people of Khanap Nak sub-district are padding rice farming and upland crop farming. Since 1987, there has been a trend of raising sea shrimps in industrial ponds. As a result, areas used for conducting rice farming and nipa palm farming have been transformed into a large number of ponds raising sea shrimps. After farmers faced problems of failure in raising sea shrimps, water and waste from shrimp ponds were discharged into rivers and canals. Raising shrimps did not work out. Shrimp ponds were deserted. As a result, the problem of saline soil arises. Sea water intrudes into agricultural areas

Operating facility House No. 3, Moo 2, Khanap Nak sub-district", Pak Phanang district, Nakhon Si Thammarat province

Land user Mr. Kovit Chantarangsee

Geographical location

Latitude 100.236100 Longitude 8.212501

Operation Start Date

The operation started in 2001.

2. Approach, aims, and enabling environment**Objectives of the technology**

1. To change land use from deserted shrimp farms to sustainable nipa palm plantations
2. To conserve natural resources and develop touring routes to be used as an instrument in conserving resources from the strong point of the Khanap Nak community which is way of life related to nipa palm plantations
3. To conserve way of life in doing nipa palm forestry plantations

Activities and details of operation

1. Crop variety selection: Replanting nipa palm trees starts with crop variety selection by planting the variety of nipa palm which gives much juice. The method of selection is generally based on observing from the original tree which gives out more juice than other trees in the same plantation or plantations nearby. When it is obtained, its fruits are cultured to be planted further.

2. Nipa palm breeding: The method is to bring the selected fruits which must be mellow to be erected in line in marshy ground. The arrangement is done by sticking the rear part into the soil in order to make the shoot grow upwards. Nipa palm breeding takes 2 months until the shoot grows out. When the shoot puts forth fresh leaves of about 15 centimeters, it can be planted.

3. Soil preparation: Regarding soil preparation for nipa palms planting. In general, it is the matter of only clearing ~~other~~ weeds out of the cultivation area.

4. Preparing holes and planting: Planting nipa palms is conducted from February to March when water is dried out, which is suitable for preparing holes. Hoes are used to dig shallow holes to have enough width and depth to bury the young plant.

5. Method of planting: Regarding planting nipa palm trees, spacing between trees is 9 meters with planting by serratation because when the nipa palm tree grows up to the age of 2-3 years,

there is tillering expanding to all directions. This must be tailored to remain 3 trees per clump. The number cannot be more than this due to competition for food resulting in decreasing yields.

6. Maintenance: Planting nipa palms does not require much care, fertilizer and pesticide application are not used to apply. This is because nipa palm trees do not have insects or diseases as enemies. Therefore, this agriculture uses very low costs. For general maintenance, trimming leaves and covering weed removal are only required. In general, maintenance is divided into 2 periods as follows:

6.1. Early stage of planting to the stage of giving yields: Regarding maintenance, make sure that there are no creeping plants, grass and other weeds covering the tree. If the young plant dies or is incomplete, planting for repairing can be done.

6.2 When the nipa palm tree is at the age of 7 years up, more maintenance must be done. This must be done by clearing surrounding weeds completely. If the surrounding area of the clump has soil pushed up to protrude, a hoe is used to dig to lower it down. If the soil is left pushed up to protrude, the nipa palm tree will grow incompletely.

7. Yields harvesting: Nipa palm trunk at the age of 7 can give yields continuously for 3-4 months.

Procedures to produce sugar from nipa palm trees

1. Selecting nipa palm trunks for slicing off palm juice by counting the age of nipa palm trunks starting from having the palm cluster to the age of 3 months

2. Beating nipa palm trunks or so-called by villager as "beating palm". The trunk is stricken for 50 times when each "beating palm" is performed. This is performed every other day for 6 days. Then, a brake is allowed for a month followed by a process called "Prae Tan" is performed. In other words, do this again every other day for 3 days accounting for 50 times each.

3. Slicing off nipa palm trunks to get palm juice should be performed at about 3.30-4.00 p.m. Put about 10 flakes of craib wood into a bamboo flask used to receive palm juice in order to prevent the palm juice to become sour. Leave everything until 6 a.m. of the following day. Then, slice off the trunk again. This procedure is called "wash the face of the palm". Once again, leave everything until 10 a.m. and put away the bamboo flask used to collect the juice for simmering further.

4. Simmering the juice

While the juice is being simmered, scoop "sludge of the juice" or white stain resulting from simmering. This part is scooped to be put in a jar to make vinegar for consumption further.

Simmering the juice in a pan takes about 3 hours to get liquid sugar about the size of viscous. After that, remove it from the stove to be drenched by using the palm-drenching stick to batter and press it in the pan with sugar. The reason of doing this is prevent the sugar from coagulating. Drenching the palm takes 30 minutes. Put the obtained sugar in buckets, which is the final step. Fresh sugar of 6 buckets is simmered to get a bucket of sugar.

Benefits of nipa palm trees

Parts of nipa palms to be utilized as follows:

1. Pond Jak (Leaf sheath) of nipa palm or is called locally as "Pong Jak" which is used as a buoy to hold on to during swimming. It can be used as a lot of toys such as ships, guns or swords. The part a little above Pond Jak can be cut to be used as a stick to beat spine of fish-fin for fishermen. For dry Pond Jak, it can be used as firewood in making nipa palm sugar.

2. Palm leaf: The back of the palm leaf can be used as a sheath to row a boat which is better than nylon sheath in terms of being tougher except for the disadvantage which is not being durable. The most benefit used mostly of palm leaves is making pieces of a tap thatching (bamboo silver to which nipa leaves are sewn to make thatch). Dry palm leaves can be used well as firewood.

3. Nipa palm crown: nipa palm leaflets are sewn to be hats used well as an umbrella for rain protection or sun protection. These hats are similar to ngob (a farmer' hat shaped like an inverted basin) of the central region but different in shapes. People in the southern region call this "Piew".

Old nipa palm leaves are sewn to make pieces of a tap thatching (bamboo silver to which nipa leaves are sewn to make thatch) or house partition.

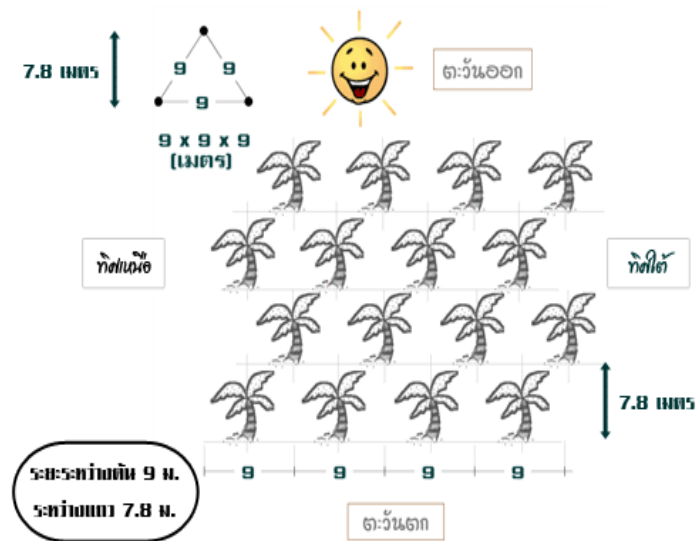
4. Nok Jak (inflorescence) is part of the flower stalk sprouting from the stem under the soil surface at the leaf base. When the white flower coat is peeled, it can be boiled and eaten with chili sauce or cooked as coconut milk curry.

5. Young nipa palm trunks can be made as brooms or insect-repelling whips.

6. Nipa palm fruits: Young nipa palm fruits can be cooked as curry for eating or if they are appropriately young, they can be eaten as fruits in syrup or candied as desserts or eaten with ice cream.

7. Juice of the nipa palm tree or nipa palm sugar and palmyra palm sugar have similar taste. The difference is that nipa palm sugar is a little bit salty. This is due to the fact nipa palm is a plant growing in brackish water and nipa palm sugar can be simmered to make nipa palm honey or can be fermented to make nipa palm vinegar. In fact, nipa palm sugar can be made as distilled liquor. Moreover, when nipa palm sugar is simmered, nipa palm honey is obtained and then palm sugar is obtained.

Technical plan of the technology



SLM Categorization of the technology

Main objectives of the technology

1. To reduce, prevent, restore land degradation (soil, water, plant)
2. To conserve the ecosystem
3. Maintain or improve biodiversity

4. To build economic impact which is useful (Opportunities to increase incomes or employment)

Incomes from selling products and net incomes

The period in planting to harvesting nipa palm sugar from the first time takes about 6 years. Therefore, in this first period, farmers do not have incomes from nipa palm plantations and will start having incomes from the 6th year on. Regarding the period in producing nipa palm sugar, yields can be given for 4 months in a year.

- In an area of 1 rai, yields of nipa palm sugar can be harvested for 300 kilograms per rai per year.

- The selling price is 1.76 USD per kilogram. Therefore, the total income: $300 \times 1.76 = 328$ USD.

Besides making nipa palm sugar, farmers who grow nipa palms can create income from other products such as sewing nipa palm leaves for palm leaf thatch roofing, nipa palm vinegar, nipa palm leaves used to make cigarettes, making distilled liquor and making Nam Tan Tuoy (cup sugar).

Property characteristics of the natural environment

The mentioned area, the Annual Mean rainfall is 2,778.30 mm., which is at the moisture level.

The area is flat and 1 meter from the mean seal level. The soil is very deep with the depth more than 120 centimeters. The top soil texture is fine clay and the bottom soil texture is clay. The level of soil organic matter is high (>3%). The ground water cannot be utilized. The water at the soil surface is at the level which is more than enough. Regarding the water quality (not treated yet), the water can be used for agriculture only. The salinity value of soil is between 2-8 dS/m.

3. Environment

3.1 Impact in the on-site from using the technology

1. Economic and social impact

| Aspect | Impact | Before | After |
|---|------------------------|--|--|
| 1. Plant production | Positive | Planting was conducted a little and natural nipa palm forests were encroached to conduct shrimp farming. | Areas have been increased more than 50% in the Khanap Nak district. |
| 2. Diversities of products | Very positive | No diversities | Nipa palm sugar has been produced mainly and other products are also obtained, namely nipa palm vinegar, nipa palm honey, distilled liquor and wickerwork. |
| 3. Areas for production | Positive | A little | When farmers receive knowledge transfer, the area of production has been expanded more. |
| 4. Expenses of agricultural factors of production | Greatly reduced | Shrimp farming required high costs. | Low costs |
| 5. Diversities of income-producing sources | Positive | One-way income of raising shrimps | Nipa palm sugar has been giving incomes mainly and other products are also obtained, |

| | | | |
|--|--|--|---|
| | | | namely nipa palm vinegar, nipa palm honey, distilled liquor and wickerwork. |
|--|--|--|---|

2. Social and cultural impact

| Aspect | Impact | Before | After |
|---|----------------------|---|--|
| 1. Food security and self-reliance | Positive | One-way income of raising brine shrimps | Nipa palm sugar has been giving incomes mainly and other products are also obtained, namely nipa palm vinegar, nipa palm honey, distilled liquor and wickerwork. |
| 2. Recreational opportunities | Very positive | Not being tourist attractions | Being used as tourist attractions and social and cultural learning sources |
| 3. Institute of the community | Very positive | Having little interaction | Unity of people in the community has been brought about more. |
| 3. SLM or knowledge regarding land degradation management | Positive | The knowledge was not propagated yet. | The technology has been accepted and the knowledge starts to be propagated more widely. |

3. Ecological impact

| Aspect | Impact | Before | After |
|--|----------------------|---|---|
| 1. Water quality | Very positive | Having problems of waste water | The problem of waste water has been reduced greatly. |
| 2. Mulch | Very positive | Being areas used for raising black tiger farm | Utilization has been changed to forestry plantations for more than 50% of the area. |
| 3. Animal diversities | Positive | None | There has been an increase of young aquatic animals more. |
| 4. Types of the variety giving benefits (predators, earthworms, insects doing pollination) | Very positive | A little | More increase |
| 5. Carbon and greenhouse gas release | Very positive | - | There are more trees and there has been less release. |

3.2 Off-site impact from using the technology

| Aspect | Impact | Before | After |
|--|-----------------|--|---|
| 1. Occurrence of pollution in ground water or rivers | Positive | Waste were discharged from the system of shrimp culture greatly. | Due to the fact that utilization has been changed to planting nipa palms, problems of waste do not occur. |

Acceptance of the technology and application

There is acceptance among farmers and they implement the technology. This accounts for 476 households. A total of areas used for planting account for 4,576 rai. The technology has been used for a long time whereby the form has been adjusted to be compatible with the current age.

Activities Pictures



Fig.1 Problems at first of areas used for shrimp farming. Currently, they become deserted shrimp farms.

Fig.2 Current conditions are complete nipa palm forests.



Fig.3 Preparing cultivation areas in the form of serration with planting spacing of 9 x 9 meters

Fig.4 Nipa palm seedlings with the size ready to be planted



Fig.5 Complete Nipa palm trees and they give yields



Fig.6 Products from Nipa palm sugar (Photographer : Kulvadee Sutthawat)

VDO LINK : https://www.youtube.com/watch?v=W_mgulCTyHI