

Development

February 2014

Monthly Development update from DHAN Collective

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Feature

Developmental issues in Jawadhu hills



Jawadhu hills, the tribal block in Thiruvannamalai district though very backward in respect to education, livelihoods and health, recently face the effect of modernization, but in a negative way. While the basic amenities are lacking, more problems are also created because of wrong guidance of youth and non availability of proper livelihood opportunities locally. The issues like alcoholism, lack of proper education, unutilized potential in agriculture and tourism are presented in the article.



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From the Editors' Desk

Dear Readers,

Greetings from DHAN Foundation.

The Feb, 2014 issue of development matters contain an article on watershed development works carried out in Orivayal, Ramnad district which enabled conjunctive use of water resources. Small millets cultivated by farmers reach the consumers after intensive processing through a complex market chain which was explored through a study conducted by Kalanjiam thozilagam limited, which also is featured in this issue. The selfless contributions of Mr.Gomathinayagam to the farming community and farming is featured in the article 'Icon of puliyankudi'. Jawadhu hills, the tribal block in Thiruvannamalai district, faces many developmental issues which was shared in another article 'Developmental issues in Jawadhu Hills'.

The readers are welcome to give their suggestions and feedbacks on the articles featured in the development matters. They can send their mails to dhancdc@dhan.org

Happy reading!

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Making Rainfed farming viable

An experience of Orivayal watershed in Ramnad

Vellaiappan U*

Integrated approach to combat risks in rainfed farming was done by DHAN Foundation in Orivayal watershed of Gundar river basin, Kadaladi block, Ramanathapuram District, Tamil Nadu, India. Nearly 718 families, relies on this watershed which extends to an area of about 1040.63 hectare. Farm ponds, field funding with grass seeding to avoid the erosions, continuous contour trenching, percolation ponds, land development by taking measures on leveling and clearing the Prosopis juliflora jungles, renovation of drinking water pond, provisions of inlet structures to farm ponds for conservation of soil and water were done. Two hundred farm ponds created, 95 with NABARD-WDF assistance and 105 with EU assistance was a tremendous achievement, which resulted in increase in cultivable land, productivity and also the ground water table. Farmers who constructed farm ponds were able to reap good results by cultivating paddy and chillies, while other farmers suffered due to monsoon failure. Drip irrigation technology was also adapted by few farmers for raising Chillies and Cotton, with 100 % grant support from National Horticultural Mission through the State Horticultural department. This integrated approach to combat the risks in rainfed farming can be replicated in other areas

Background

Orivayal watershed of Gundar river basin is located in Drought prone area of Kadaladi block, Ramanathapuram District. Four hamlets M.Saveriyar pattinum, Maranthai, Panaikulam and Orivayal lies in this watershed area which extends to 1040.63 ha. Agriculture is the main source of livelihood to majority of the 718 families residing in the above hamlets. The area receives only 450 to 750 mm of rainfall annually. The soil type is black cotton soil, in which Paddy, Chillies and Cotton are cultivated. This paper narrates the intergrated approach done by DHAN Foundation to combat and reduce the risks in rainfed farming through various approaches.

The funds from National Bank for Agricultural and Rural Development- water shed development fund (NABARD-WDF) and European Union were used for watershed development activities. Apart from this drip irrigation scheme of National Horticultural mission rooted through the State Horticultural department were rooted to farmers for this purpose.

Orivayal Water shed Association

Watershed development in Orivayal was implemented after enabling and organizing people to form Village water shed association which comprised of User groups (the beneficiary farmers were organized into different small groups), Self help groups (women SHG members who are either landless or marginal farmers in the watershed area) and Panchayat ward members.

The Orivayal Village watershed Association (OVWA) has played a vital role in successful implementation of watershed program. This association contains members from four hamlets M.Saveryar pattinum, Maranthai, Panaikulam and Orivayal. Currently six user groups were formed which has the membership of 240. Apart from this seventeen self help groups were formed in these villages which has member strength of 255. The Orivayal Water shed association was governed by fifteen executive members, having village wise representation from User groups and SHGs on demographic basis. Among the members three are landless, six are women members from SHGs and the rest are landholders from User groups. The Orivyal Watershed Association was registered under Societies act and represents the 740 families in the four hamlets. The association meets once in a month for taking important decisions with respect to watershed development activities. The annual general body meeting is held once in a year to overlook the performance and financial aspects of the association during which all members in the watershed participate. Any change in the executive committee is also made during the AGBM.

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User Groups+Self Help Groups+Panchayat ward member = Village watershed committee

Watershed Development Activities

Through the project many activities viz., creation of farm ponds, field bunding with grass seeding to avoid the erosions, continuous contour trenching, percolation ponds, land development by taking measures on leveling and clearing the juliflora jungles, renovation of drinking water pond, provisions of inlet structures to farm ponds for conservation of soil and water were undertaken. The details of the activities done is furnished in the below table

Table-1: The detail of watershed activities taken during the project period.

Sl.No	Activity	Units
1.	Creation of farm pond	95
2.	Field bunding	19949RM
3.	Grass seeding on the bunding	470
4.	CCT	624
5.	Land clearance	7
6.	Percolation pond	1
7.	Renovation of drinking water pond	1
8.	Retaining wall -CD	1
9.	Farm pond inlets	104
10.	Agro horticulture	6,850
11.	Dryland Horticulture	3,200

Convergence of various programme and interventions in the watershed

With focus on a comprehensive solution for the families living in the four hamlets, effort was taken to combine many schemes from different agencies to create a very good environment that facilitate water harvesting, water saving and meet the drinking water needs of the families apart from focus on agriculture. The following activities were done through this convergence approach

- Renovation of drinking water pond through Philanthropic assistance
- Creation of farm ponds assisted through various partners
- Enhance the agriculture productivity through credit assistance from NABARD-UPNRM
- National Horticulture Mission for Drip irrigation

Renovation of the drinking water pond through Philanthropic support

Villages in drought prone areas of Ramnad district suffer from drinking water deficit and Orivayal watershed area

is no exclusion. The shortage of drinking water, causes innumerable trouble to the people from forcing them to travel long distance to fetch water, causing physical and mental stress to questioning their employability for survival. The drinking water pond in the M.Saveriyar Pattinam village was in very bad shape, the silt deposits has reduced the water holding capacity of the pond. The water in the pond could able to meet only the drinking water needs for six months and the people were either forced to travel long distance to fetch water or purchase water from tanker lorries which sells water for ₹ 3/ pot. People even used to go to Melasirupothu, where a desalination plant (ground water is salty which was rectified through the desalination plant) is installed, stand in queue for hours and return with 2-3 pots of water. They also at times fetch water Nariappauiur desalination plant which purifies sea water.

Some people even went and stood in queue to Melasirupothu, where there is a desalination plant (salty ground water) to fetch 2-3 pots of water. They also received water from Narippaiur, desalination plant (from seawater). This problem persisted for the villagers until 2004 when the water shed program was initiated in the village. The villagers from M.Saveriyar pattinam who came to know of the project sought the support of DHAN for reviving the two drinking water ponds in the village.

This problem was exist till the entry of watershed programme during 2004. By awareness about the watershed programme M.Saveriyar pattinam villagers approached DHAN Foundation to expect the philanthropic support for revival of drinking water source of two ponds. DHAN sourced Rupees three lakhs philanthropic assistance and the user group contributed a amount of Rupees one lakh, which was used to renovate the two ponds, each costing two lakhs.



This incredible work was coordinated by the Village Watershed Committee. The two hundred and seventy plus families living in the village felt extremely glad at the effort that put an end to their long borne drudgery and provided a solution to their drinking water needs.

Creation of farmponds through different projects

Farm ponds play a crucial role to combat the climatic vagaries, which have a drastic effect on the life's and livelihood of farm families, depending solely on rainfed agriculture. Ramnad district traversed with innumerable tanks which are in most dilapidated condition, is severely drought prone and farmers play a gamble with rains by raising rainfed crops expecting good returns, and most of the time end losers. Even if there is no water for providing one or two irrigation,

during critical crop growth phases it will have extreme impact on the productivity and at times utter crop failure landing farmers in debts. Farm ponds can remain as a source of rescue, providing water during critical crop growth phases. Two hundred farm ponds established in the Orivayal watershed area, had a tremendous impact in increasing the cultivable area, productivity and also led to increase in ground water table. Ninety five farm ponds were constructed with the support of NABARD-WDF and hundred and five farm ponds have constructed through European Union and others assistance. The concept of every household having a tree to create a healthy environment is suggested by the government. Likewise, in rainfed farming areas, we should work with the aim that each and every farm families should have farm pond of their own.

Table-2: The details of funding utilized for creation of farm pond.

Sl.No	Source of funding	No.of units	Volume created in cum
1.	European union economic fund	93	146,475.00
2.	NOVIB-Nether land	12	18,000.00
Total		105	164,475.00

Technicality behind farm pond construction

Farm pond and its features

Farm Pond is a small scale water harvesting structure established in a farm land to collect and store water during the monsoon. The runoff water above the surface and below the surface in the catchment area is collected in the farm pond. The water stored in the ponds is used to irrigate crops and survive the crops at the time of water shortage. It is a pro-poor product, suitable for the farming families involved in small scale farming. One notable fact is that about 68% of the area is susceptible to drought in India. Farm ponds are the efficient products to reduce the impact of drought on the poor families. Generally two types of farm ponds are established

Dug out ponds: Generally dug out ponds are rectangular or square shaped and it stores water below ground level

Surface ponds: They are the miniature of irrigation tank, established by building an earthen embankment across small streams flowing in and around the farm lands. Generally the site which has already a depression will be selected for digging a farm pond. It collects the surface run-off from its catchment area.

The agriculture fields are irrigated manually or using traditional devices or through gravity outlet for or by using diesel engine operated pumps.

Purpose of Farm Pond

The farm ponds are established to

- i. Harvest rain water (runoff from the catchment)
- ii. Provide supplemental irrigation to the standing crops at critical growth stages
- iii. Incidental benefit of ground water recharge

- iv. Provide drinking water to cattle
- v. Take up fish rearing activity for generating income
- vi. Promotion of horticulture plantations or tree crops
- vii. Generate wage employment to landless
- viii. Promotion of vegetables to meet the demand of family consumption

Factors influences the effectiveness of the farm pond

1. **Rainfall:** rainfall is the main factor for surface run-off and infiltration of water into soil. Higher the rainfall intensity, greater will be the surface run-off. Shorter spell with long duration leads to higher infiltration of water into soil.
2. **Soil:** The texture and structure of soil decides the storage capacity of the farm ponds. Farm ponds need not be established in sandy or laterite soil areas due to high infiltration. Clay loam or loamy soil is highly suitable for establishing farm pond. The establishment of dug out ponds in this area will help the small and marginal farming community to increase the area under agriculture.
3. **Site of farm pond:** The basic objective of the farm pond is to harvest/conserves water and use it for crop production and other purposes. Therefore, the site of the pond should be decided in such way that major amount of run-off water can be harvested and used easily. Natural depression or low lying area located in the farm land could be ideal area for the establishment of pond.
4. **Percolation and evaporation losses:** percolation or seepage takes place at the bottom as well as sides of the farm pond. Seepage losses are noticed in the first two years; after two years the seepage reduces gradually. To reduce water loss due to percolation clay soil can be deposited in the farm pond bed at 1 foot height and height of the clay packing can be increased based on the soil strata.
5. **Pond size:** The size of the pond varies depending upon the topography and land holding size. In Orivayal watershed farm ponds are established to hold 500 cubic meters to 2000 cubic meter of water. The shape of the farm pond will vary depending upon the field conditions. Normally in square type and rectangular type is practiced
6. **Catchment area:** catchment area decides the number of filling per year; the ponds should have a catchment of at least 3-5 acres.
7. **Cropping pattern:** the sole purpose of farm pond is to harvest rain water to irrigate crops. Here farmers choosing paddy as well as chilli are the major crops benefiting through farm pond structure and it is better to avoid crops that require huge volume of water.
8. **Farmer contribution:** Contribution in any form (Kind / cash / labour) can be mobilized to build the ownership of the stake holder. This ensures regular maintenance and management.

Cost of Establishing a Farm Pond

The cost incurred to dig out one cubic meter of soil is around ₹ 30-45. The establishment works are executed by employing machineries like earth movers (JCB) and tractors. The cost of establishing a farm pond with a water holding capacity of 1000 cubic meters is 40000-45000. The establishment of such farm ponds assures farm productivity and reduces the probability of crop failures.

NABARD-UPNRM FOR VARIOUS ACTIVITIES

National Bank for Agriculture and Rural Development is implementing Umbrella Programme for Natural Resource Management (UPNRM) as one among the schemes in their development perspective for development of village economy. The project mainly focuses on restoring the natural resource through loan assistance. In Orivayal watershed UGs and SHGs availed loans through the project and got benefited. The activities are taken up through this project is as given in the table.

Table: 3 Loans to members through UPNRM

Sl.No	Loan purpose	Loan amount in Lakhs	Areas benefited in ha	Members benefited
1.	Land development activity by clearing Prosopis juliflora in the farmland	1.20	6	14
2.	To grow pesticide free chilly crop through seed and land development activity	8.00	35	85
Total		9.20	43	99

Impact of UPNRM loan in the watershed

The Chilli producing farmers of User group in Orivayal watershed of Ramanathapuram district took loan to shift from present practice inorganic way of cultivating chillies to produce Pesticide free Chillies. Pesticide free chillies fetch premium price in the market and farmers can earn more income. The loan is used for meeting the seed cost, cost of cultivation, application of organic fungicide, farm yard manure and other organic manures. The orientation by experts to members to produce with organic fungicide and Farm Yard Manure was given which enabled them to produce pesticide free quality chillies which fetches a competitive price in the market. Normally hectic spray of pesticides is done for chillies which are not preferred by the consumers who are health conscious.

National horticulture mission programme for micro irrigation

The watershed development programme enabled the members not only to involve in management of water bodies, but also to conserve water by adapting micro irrigation techniques for Chilli and Cotton. Farmers were facilitated by the program to avail grant from National Horticultural Mission through the Department of Horticulture, to install drip irrigation system in their fields. The total cost for drip irrigation was ₹ 85000/ha, for which a subsidy of ₹ 49000/ha was given and balance was met by the farmers. Chilli and Cotton crops were grown using drip irrigation. The farmers used to follow relay cropping, the cotton seeds will get sown even while the chilli crop is flowering stage, which also helps to use available water effectively. Farmers realized 20 % incremental yield in Chilli and Cotton by resorting to drip irrigation practice.

Out comes and impacts

Crystallizing the different development programme in Orivayal watershed, the following are the major impacts one could infer;

Except for the farmers who constructed farm ponds in the Orivayal water shed, the other farmers in nearby villages faced crop failure due to inadequate rains. However the farmers who constructed farm ponds had a good harvest to a tune of 30 to 35 bags/acre (65 kgs/bag) and 800 to 1000 kgs of Chillies. The farmers got an income of around ₹ 30000/acre, an increase in income by 50 % over the previous year. The experience shows that farm ponds are not a liability but an asset which can insure and ensure the sustainability of livelihoods.

More than 200 farm ponds which can support irrigation to more than 500 hectares were created. This intervention supports the rainfed farmers exclusively thereby stabilizing their farming activity, ensuring food security, improving the productivity and income.

The small and marginal farmers not only gave their portion of land for construction of farm pond but also contributed 50 % of the cost for construction of farm ponds.

The intervention apart from ensuring surface water availability, also improved the quality of ground water by reducing the salinity, thereby making it suitable for irrigation. Farmers now use both surface water and groundwater in a conjunctive way to irrigate their crops

The watershed development activities also enabled to fetch the other government programs such as drip irrigation for the benefit of farmers, which also facilitated effective use of available water.

The activities helped to increase the income of farm families, thereby contributing directly to poverty reduction

Orivayal watershed works is recognized as a good watershed model by NABARD to showcase their watershed implementation program. This model was positioned nationwide to other partners, who came on exposure visits and gained knowledge about the practical benefits of the model.

The farmer of Orivayal watershed also remain as a source of inspiration to other farmers in Ramnad district to take up farm pond construction works, which greatly supports crop cultivation even when there are no adequate rains .

Learning and recommendations

Farmers in Orivayal watershed do not cultivate paddy in the same field every year, but in alternate years owing to salinity of the land. The adoption of field bunding techniques reduced the salinity of the land to greater extent, thereby enabling them to take up paddy cultivation in the same field year after year.

The farmers of Orivayal watershed who earlier practice mono cropping, now resorted to double cropping system of cultivation.

The removal of *Prosopis juliflora* jungle increased the area under cultivation in the project site.

Ground water level in the project site drastically improved and all watershed programs can replicate this model to ensure vibrancy in watershed program.

Adjoining watershed program can be taken at cluster or sub basin level by collaborative approach of panchayat federation, GO and Government.

Though Ramnad Chilli is known for its high pungency and preferred by the consumers, the market price is decided by the middlemen. Facilitating the post harvest techniques like solar drier and cold storage to chilli crops, will greatly support the farmers to dictate price.

Companies with Corporate Social Responsibility (CSR) would come forward to support farmers to adopt advanced irrigation techniques like drip irrigation in larger scale.

Case study

Farm pond source drip irrigation saves the life.....

Alagarsamy is a small farmer, who lives in Maranthai village of Ramanathapuram District in Tamil Nadu. He owns 3.00 acres of rainfed land, which was left barren for two years due to water shortage and increased labour costs. Despite hard work, he was unable to earn income through agriculture. He lost his hopes completely, until a farm pond got established in his field through the EU funded watershed development project implemented by DHAN Foundation. He again started cultivating in his land and also installed drip irrigation system, because of which he was able to earn 1.5 lakhs in a year from his 3 acres of land.

Alagarsamy narrates how farm pond transformed his way of doing agriculture and his life

I am Alagarsamy, living with my wife and two children in Maranthai village of Ramanathapuram district, Tamil Nadu. Agriculture is the primary livelihood of my family which is greatly influenced by rainfall. If the monsoon fails, agriculture also fails, which often led us into the trap of indebtedness. Our area receives scanty rainfall, which offlate has become highly irregular. We also rear milch animal during off season to meet the family expenditure.

Compared to the effort we make, the income from agriculture seemed to me very insignificant owing to water scarcity which had a direct impact on productivity, increased cost of labor and non availability of labor. I left

the land fallow for two years and the milch animal remained as the only source of income to the family. But the income was not sufficient and was much concerned with my way of life. I thought of doing agriculture again, but the thought of crop failure again haunted me. It is then I came to know about the support extended by DHAN Foundation for construction of farm ponds through the European Union funded project. I became the member of tank farmer association and shared by needs in the group and to the field staffs. A request was made for fund support to construct farm pond in my land through a letter, to DHAN Foundation through user group. After field visits and interaction with me my request was considered. Because of this a farm pond with a capacity of 1176 cubic meters was established in July, 2010. I received 50 % fund support through the project and the rest I invested myself. Immediately after farm pond construction, I also opted for installing drip irrigation system in my land, the fund support for which came through National Horticultural Mission and it was facilitated by DHAN

The farm pond constructed got filled with water after the subsequent monsoon. I raised chilly crop in the entire land and harvested 500 kgs/acre and in three acres of land I got a harvest of 1500 kgs. The market rate of chillies was 9,500 per quintal and I earned a gross income of ₹ 1.43 lakhs from Chilli crop alone.

My worries about monsoon failure and lack of water to irrigate during critical stages of crop cultivation vanished after I constructed farm pond in my field and also installed the drip irrigation system. The productivity also got increased by resorting to efficient way of irrigating the crop. After seeing the success, the other farmers nearby also got interested to construct farm pond. If all the farmers in our area, resort to construction of farm pond Ramnad will no more be prone to drought. If all the fallow land comes under cultivation through effective rain water harvesting, the food productivity in the district as well as the state is bound to increase.



An expert team visits drip irrigation with farm pond water source



Field irrigating through drip system

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Small Millets market chain in Tamil Nadu

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Small millets processing is a very complex processes and the travel of small millets from the farm to table is analysed through a market study conducted by Kalanjiam Thozilagam Limited. The study revealed the various actors involved in the chain and processing being done in large scale at Nasik. Intervening in this market chain to reduce the number of market players and producing a low cost technology for polishing small millets at local level can greatly help the farmers and consumers. The detailed report of the study is presented.

Introduction

Traditionally small millets which occupied a definite space in the daily diet of poor, vanished from their food basket, thanks to green revolution and the public distribution system which intensively promoted carbohydrate rich food rice and wheat. Small millets are highly nutritious as they contain high amounts of proteins, fibre, vitamins like B-complex, vitamins including niacin, thiamine and riboflavin and vitamin E and the essential sulphur-containing amino acid methionine, lecithin. They are rich in minerals like, iron, magnesium, calcium and potassium. The seeds also contain phyto-nutrients, including phytic acid, which is believed to lower cholesterol and phytate which is associated with reducing risk of cancer. Most of the minor millets have more of fibre with less glycemic index. It helps to effectively manage life style diseases like obesity, diabetes, hypertension, stroke, anaemia and some kinds of cancer

Under the climate and resource stress condition, the solution to the future food and nutritional security perhaps lies in nutritionally superior small millets, owing to their ability to grow using limited resources even in extreme stress conditions. The cultivation and consumption of small millet's staged a backfoot after green revolution, despite the above advantages. Coupled with this is the complex marketing chain and the heavy price spread, which has made small millets costlier than rice and wheat and out of reach of poor. Addressing these issues is crucial to make small millets affordable

to all. The market chain study of small millets conducted in Tamil Nadu throw lights on the issues in small millet marketing, which escalate their market price

Market chain study on small millets

To understand the market chain of small millets and possible areas of intervention to reduce the consumer price of the processed small millet produce an "Investigative study on the market chain of Small millets" in Tamilnadu was taken up by Kalanjiam Thozilagam Limited. The study focused on tracing the market chain, problems of the producers, chain actors involved, price spread and areas of intervention needed to increase the on farm price realization by the farmers.

Objective of the study

- To Identify key actors and their relationships in the chain
- To Identify the enterprises that contribute to production services and required institutional support
- To analyze the bottlenecks in the value chain that prevent progress
- To Provide a frame work for sector –specific action
- To Identify strategies to help local enterprises to compete and to improve earning opportunities
- To Identify relevant stakeholders for programme planning (also in distant markets)

The study was conducted starting from major small millet growing areas in Tamil Nadu from where the products were procured, the actors involved in the procurement and processing and finally how they reach the consumers. The small millet pockets and processing units covered under this study were Peraiyur and Sengapadai (Madurai district), Jawadhu hills (Thiruvannamalai district), Ariyalur (Ariyalur district), Harur and Pennagram (Dharmapuri district), Alangayam and Tirupatthur (Vellore district), Processing units Theni and Paramakudi in TamilNadu and Nashik in Maharashtra.

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OBJECTIVE I: IDENTIFICATION OF THE ACTORS OF THE MARKET CHAIN

The study revealed the presence of ten major actors in the market chain. All the eleven actors were present in the market chain with respect to barnyard millet, in the case of Kodo millet big traders are absent and in little millet there were only seven actors. The different actors identified in the chain were discussed in detail

1. **Farmers:** Normally farmers sell the harvested produce to the local traders in the village, at the current market price immediately after harvest even without drying. They retain only a small quantity for seed purpose and consumption. The reasons for the immediate sales of barnyard millet & kodo millet are 1. Lack of drying and storage facilities 2. Labour shortage 3. To Pay off debts borrowed for cultivation and 4. Risk of weight loss after drying. In case of little millet farmers have the practice of storing the harvested grains in their home and sell whenever they need money or when the price is favorable in Jawadhu hills.
2. **A Small processors at village:** Processing of small millets is cumbersome. Dehusking of small millets is taken up by small processing units in some villages, the processing charge being ₹ .5/kg to ₹ .6/kg. In some places instead of cash, bran of small millet is bartered. These small processing units however fast disappeared at many places owing to free distribution of rice through Public Distribution System, which decreased the need for processing small millets for consumption.
3. **Small local traders in village level:** This second chain actor deal with small quantity of viz 15-20 quintal per day. Once transportable quantity is pooled, they market to the next level chain actor mostly on the same day. These chain actors procure 2 kgs in excess to adjust the weight of gunny bags.
4. **Big Traders:** Big Traders operate in the close proximity on the villages as third chain actor, in particular for barnyard millet. They receive stock from more than one point, normally deal with multiple product bases. Handling capacity varies from 5-10 tons per day and charge commission of 3% from the small traders. This actor is absent in kodo millet and little millet.
5. **Wholesalers:** Operates from nearby place linking to other chain actors. They have their own shops or mandies where they store the produce, transport and other infrastructure facilities. Some time they also buy the produce directly from the farmers. The volume of sales would be around 10 to 25 tons per day. During season they operate for 20-30 days. Total expenses for the procurement of one bag (100 kgs) is ₹ 125 for barnyard millet, ₹ 94 for kodo millet and ₹ 315 for Samai.
6. **Processors at Theni & Paramakudi:** Semi processing units of kodo and barnyard millets (30% processing) taken up by eight millers, available at Theni & Paramakudi, Semi polished grains further sent to Nashik for further processing. Recently after 2012 two units at Tamil Nadu have developed infrastructure like Nashik and fully process and supply.
7. **Brokers at Bangalore:** Links the processors at Theni, whole sale traders in other places of Tamil Nadu to the processors at Nashik on 5 % of commission basis.
8. **Processors at Nashik:** Mills at Nashik are usually called as Bhagar mills. There are Bhagar mills in North at Nashik (37), Thane (2) and Kolhapur (1) in Maharashtra and in Anand in Gujarat (10). They receive little millet as raw grains for full processing.
9. **Wholesalers for processed grains in Nashik & Madurai:** Bhagar mills at Nashik sell the product at their own brand in ½ kg packing to the wholesalers and retailers. Sometimes whole salers purchase the rice from mills in bulk and further packing is being done in their brand in small packing and sells to retailers and to the consumers directly.
10. **Retailers:** Retailers directly sell the rice to the consumers in northern states as ‘SamaBhagar’. They do not differentiate barnyard and little millet. Retailers in Tamilnadu get their stock from Theni, Paramakudi and a small portion from Nashik and sell to the consumers in their brand name.
11. **Consumers:** Due to change in consumption pattern with freely available wheat and paddy rice through PDS, consumption of small millets rice has declined. The poor man’s food once has become a food of rich men, owing to the growing health consciousness among upper class. The small millet consumption currently show a increasing trend, however they are not easily accessible to all consumers, because of the price factor .

OBJECTIVE II: TO IDENTIFY THE POST HARVEST PROCESSING AND VALUE ADDITION UNDERTAKEN IN SMALL MILLETS

- a. **Post harvesting in the village:** No post harvest practise like drying and cleaning is followed by farmers, since they sell them immediately after harvest. The non availability of drying and storage facility is also a reason for the same.
- b. **Processors at Theni:** The miller at Theni undertakes drying, Dehusking and polishing of small millet. They grains are sun dried to reduce moisture and stored. The grains are later dehusked and polished within three months after harvesting. Drying is done once again before dehusking
- c. **Semi polishing of Small millet:** In the first stage, using destoner machine, small stones and sand are removed. The cleaned millets are passed into the first polisher where 15% dehusking and 10% polishing is done. After removal of husk in the blower, partially dehusked grains are passed into the second polisher where 20% dehusking and 20% polishing are completed. Again the husks are blown off and the remaining grains are passed on to the next polisher for further process. Altogether, 7 such polishers interconnected with elevators are used for semi polishing. The grain recovery would be 65 -70 % in semi polishing. This semi polished product is sent to Bhagar Millers in Nashik, where they undertake further polishing of grains, color sort and pack small millet in 500 gram packets or 30 kgs and 50 kgs packing in their own brand name.
- d. **Processing in Bhagar Mills at Nashik**

Processing Techniques

The activities involved in the Processing of small millets are narrated below.

Stage I – Grading the raw grains before processing

The raw grains received at the mills are being segregated into 3 grades by a simple procedure, rubbing the raw grains by hand with Ivory paper, No. 50, which removes the husks from grain. The grading is given based on the colour and output percentage of food grains (White colour).

I Grade - > 75-80% pure white coloured grains

II Grade - in between (>50% <75%) - partial mixture of reddish and white colour

III Grade - <50% - more reddish and less white colour (Named as damaged grains).

When the harvest is done during rainy days, the quality of raw grains is affected resulting in decolorization and damage of grains. For the damaged millets only 50% cost of the agreed purchase value by the Bhagar mill owner is made to wholesalers.

Stage II - Cleaning the Raw Materials

This involves three activities viz. 1) De stoning 2) Removal of foreign materials like, sand, mud and other admixtures of other crops and materials and 3) Removal of damaged, partial matured raw grains using different types of meshes.

Stage III - Cleaning and polishing

This activity is done by passing the cleaned grains through 3 to 4 silicon carbide coated inverted cone shape energised machines. In this stage, the raw grains are dehusked and the husk is removed through blowers and collected separately. The processed raw grains are again sampled into 3 forms: viz.

I Grade: 100% White grains

II Grade: White grains 50% and Red grains 50%

III Grade: White grains 25% and Red grains 75%

The III grade sample will not be used for reprocessing and is considered equal to bran.

The other two, Grade I and II samples are further polished by the polisher and finally passed through the colour sorter, to get the finished product. The partially cleaned grains are stocked separately in heap. Wherever there is a purchase order, the stock is reprocessed further passing through polishers.

Stage IV - Colour sorting

The processed grains are passed through colour sorting equipment (specifically devised machine named as “Vital Hi-tech machine” manufactured in Coimbatore which is automated and controlled by computer system). One or Two numbers of sorters are kept to get 100% white grains. Here also, once again, half filled and immature grains are separated and only pure white grains (100% level) is sorted out and collected separately. Thus in this final stage of processing where 100% white small millet grains are collected.

Stage V - Packing

Initially, the packing size was 50 kgs, 30kgs in jute /poly oven bags. As the demand rose among the consumers, ½ kg packing was taken up to satisfy them. Air tight packing is made so that the keeping quality of finished product (i.e., Samai grain) lasts for more than 2 years. From our observation, ½ kg package made in 2011 in the mill at Nashik is still afresh without any damage or pest attack confirming the above statement.

Output

Finished product - An output of 45-50% (100 % white grains)
(obtained 70% from 65% semi processed grains got from Primary Processing)

Bran - 7%
Husk - 35%
Foreign material - 2.5%

Utility

Finished product - Consumed for making recipes like Samai rice, Porridge, Samai kitchedi, snacks and other items
Bran - Powdered and mixed with other food grains utilized for consumption
Husk - Contains 14 to 16% oil and used for oil extraction for soap manufacturing and Cattle feed.

OBJECTIVE III: PRICE SPREAD OF BARNYARD MILLET FOR EACH MARKET CHAIN ACTORS**Price spread of Barnyard Millet**

S. No.	Price paid to actors	Cost Price (₹/Qtl)	Selling Price (₹/Qtl)	Expenses*	Value addition charges**	Net price realized	Nature of grains	Net Price spread ₹ /Qtl	Profit % on SP
1	Farmers	Nil---	1,900	-----	-----***	1,900	Raw	--Nil---	
2	Village level small traders	1,900	2,000	60	-----***	1,940	Raw	40	2
3	Big traders	2,000	2,150	65	-----***	2,085	Raw	85	4
4	Whole sale traders	2,150	2,350	125	-----***	2,225	Raw	75	3
5	Processors at Theni	2,350	3,100	55	595	2,450	Semi-processed	100	3
6	Processor at Nashik	3,100	4,500	345	645	3,510	Fully processed	410	9
7	Retailers at Madurai and other places	4,500	5,000	200	-----***	4,800	Fully	300	6
Total Price Spread		1,900	5,000	850	1,240			1,010	

Expense details relate to one quintal of produce.

**Expenses incurred by the processor at Theni include weight shortage on drying (7 kgs), dust, bran, broken grains, polishing loss, and labour charges for drying and dehusking and packing for barnyard millet*

***Expenses incurred by the processor at Nashik include weight shortage on polishing (5-7% grain weight), transport from Theni to Nashik, commission to the broker at Bangalore (3%) and handling charges for loading, unloading and 500 grams sachet packing.*

****The farmers, village level small traders, big traders, the wholesalers and the retailers do not incur Value addition charges as they do not undertake any of them.*

The following inferences are drawn by analyzing the above table.

1. The Processing millers at Nashik are getting the highest share of Price, i.e., ₹ 410 per bag of barnyard millet. The spread is more because they have to invest a huge capital for infrastructure and procurement but the returns would be time consuming. Further, they have to absorb the risk of price variation, delayed receipt of payments from the retailers and losses due to such other factors.
2. Expenses incurred on transport, handling and commission increases the price up to ₹ 250 per quintal of the raw barnyard millet when it reaches the processor at Theni before any value addition is taken up. This works out a price spread of 19 % (₹ 450) on the purchase price of ₹ 2350/qrtl incurred by the processor.
3. The cost spent on value addition is ₹ 595/ for semi polishing by processors at Theni
4. The distance factor from Theni to Nashik attracts a major share of ₹ 345 (₹ 250 on transport and ₹ 95 on commission) which is 11% on the purchase price of the miller cum processor at Nashik.
5. Final polishing is taken up at Nashik by the millers for which an amount of ₹ 645 is spent.
6. A total price spread of ₹ 710/qrtl increased as a mere share of different actors in the small millet market chain before any value addition is taken up of Theni & Nashik.

7. The seventh actor, the retailer before the real consumer, incurs a price spread of ₹ 300/qrtl.

Inference on the market chain of small millet chain for Barnyard millet

The poor rain fed farmers get ₹ 1900/qrtl as farm price for Barnyard millet losing a price of ₹ 650 being the cost spread of different actors just because the grains are being taken away for value addition to a very far off place. If suitable machinery for value addition is available in Tamilnadu as in Nashik, the farmers can realize a better price. The cost of transportation on onward to Nashik for fine polishing and return to Tamilnadu for marketing may be saved to the tune of ₹ 450 per quintal.

B. The price spread of Kodo millet (The price spread of Kodo millet was analyzed and presented below)

**Expenses incurred by the processor at Theni includes: Weight shortage on drying (7 kgs), dust, bran, broken grains, polishing loss, and labour charges for drying and dehusking and packing for kodo millets.*

***Expenses incurred by the processor at Nashik include: Weight shortage on polishing (5-7% grain weight), transport from Theni to Nashik, commission to the broker at Bangalore (₹ 5/bag of 100kg) and handling charges for loading, unloading and sachet packing.*

S. No.	Price paid to actors	Cost Price (₹/Qtl)	Selling Price (₹/Qtl)	Expenses*	Value addition charges**	Net price Realization	Nature of grains	Price spread ₹ /Qtl	Profit %
1	Farmers	Nil---	1,200	-----	-----***	1,200	Raw	--Nil--	
2	Village level small traders	1,900	2,000	60	-----***	1,940	Raw	40	2
3	Whole sale traders	2,150	2,350	125	-----***	2,225	Raw	75	3
4	Processors at Theni (Semi processed)	2,350	3,100	55	595	2,450	Semi-processed	100	3
5	Processor at Nashik (Full Processed)	3,100	4,500	345	645	3,510	Fully processed	410	9
6	Retailers at Madurai and other places	4,500	5,000	200	-----***	4,800	Fully	300	6
Total Price Spread				890	1,345			1,535	

***The farmers, village level small traders, big traders, the wholesalers and the retailers do not incur Value addition charges as they do not undertake any of them.

The following inferences could be drawn by analyzing the above price spread in the above table

1. The Processing millers at Theni are getting the highest share of Price, i.e., ₹ 565 per bag of kodo millet.

They have to absorb the risks of weight loss on drying, cleaning and polishing. They have to incur the difference in price variation, transportation charges and storage charges as the crop is season bound. Delayed receipts of payments from the retailers and losses due to such other factors have to be accommodated in the price spread.

To analyze the price spread realized in Little Millet

Price spread

Raw grains before 10 years	-	whole sale purchase price – ₹ 700-1500/Qtl
Present trend	-	whole sale purchase price – ₹ 2,000-2500/Qtl
Finished grains	-	whole sale selling price: ₹ 5,000-5,500/Qtl
Whole sale selling price	-	₹ 50-55/kg
Retail price selling cost	-	₹ 100-110 /Kg

(Actual selling cost of ½ kg finished grain is ₹ 40-45 with a profit of ₹ 17.50 to ₹ 20 per ½ kg packed Samai grains)

Samai bran	-	₹ 10/kg
Samai husk	-	₹ 5/kg

The discount on payment to the whole salers is being negotiable in between the mill owner, to whole sale suppliers of raw grains / through the brokers, depending upon the payment in a week time or 15 days in either way. The discount of 2% is given by the mill owners as immediate payment and the price negotiation is held for the damaged raw grains received, as understood from the Bhagar mill owner.

S. No.	Price paid to actors	Cost Price (₹/Qtl)	Selling Price (₹/Qtl)	Expenses*	Value addition charges**	Net price Realization	Nature of grains	Price spread ₹/Qtl	Profit %
1	Farmers	Nil---	2,300	-----	-----***	2,300	Raw	--Nil---	
2	Village level small traders	2,300	2,400	50	-----***	2,350	Raw	50	2
3	Whole sale traders	2,400	2,850	315	***	2,535	Raw	135	5
4	Processor at Nashik	2,850	4,500	345	645	3,510	Fully processed	660	14.6
5	Whole sale sellers								
6	Retailers sellers	4,500	5,000	200	-----***	4,800	Fully	300	6
Total Price Spread								1,145	

2. Expenses incurred on transport, handling and commission increases the price up to ₹ 345 per quintal of the raw millet when it reaches the processor at Theni before any value addition is taken up. This works out a price spread of 21.56% on the purchase price of ₹ 1600/qtl. incurred by the processor.

3. The real cost spent on value addition is ₹ 1375 by both the processors at Theni and Nashik.

4. The distance factor from Theni to Nashik attracts a major share of ₹ 345 (₹ 250 on transport and ₹ 95 on commission) which is 11% on the purchase price of the miller cum processor at Nashik

5. Final polishing is taken up at Nashik by the millers for which an amount of ₹ 655 is spent.

**Expenses include cost of gunnies, Transport and commission.*

***Value addition charges include Weight shortage on polishing, transport to retailers, brokerage, handling charges for loading and unloading and sachet packing.*

**** Value addition is not taken up by farmers and village level small traders before marketing.*

The following inferences could be drawn by analyzing the above price spread in the above table

1. The Processing millers at Nashik are getting the highest of price spread, i.e., ₹ 660 per bag of Little millet. The spread is more because they invest a huge capital for infrastructure and processing. Further, they have to absorb the risks on stones, other foreign materials, weight loss on drying and polishing. They have to incur the difference in price variation, transportation charges and storage charges as the crop is season bound. Delayed receipts of payments from the retailers and losses due to such other factors have to be accommodated in the price spread.
2. Expenses incurred on transport, handling and commission increases the price up to ₹ 345 per quintal of the raw millet when it reaches the processor at Nashik before any value addition is taken up. This works out a price spread of 23.16% on the purchase price of ₹ 2850/qtl. Incurred by the processor.
3. The real cost spent on value addition is ₹ 1355 by both the traders and processors at Nashik.
4. The distance factor from the Tamil Nadu to Nashik attracts a major share of ₹ 345 (₹ 250 on transport and ₹ 95 on commission) which is 12% on the purchase price of the miller cum processor at Nashik
5. Final polishing is taken up at Nashik by the millers for which an amount of ₹ 645 is spent.
6. The seventh actor, the retailer, before the real consumer makes a price spread of ₹ 300/qtl.

Inference on the market chain of little millet

The poor rain fed farmers in Tamilnadu realize only ₹ 2,300 per quintal losing a price of ₹ 2,200 just because the grains are being taken away for value addition in a very far off place. If suitable machinery for value addition is available in Tamilnadu as in Nashik,

the farmers can realize a better price. The cost of transportation and onwards to Nashik for fine polishing and return to Tamilnadu for marketing may be saved to the tune of ₹ 710 per quintal.

Recent trends in the small millet Processing at Theni and the consequent Price spread:

The investigative study has thrown light on the new development taken place in the market chain of small millets, after the promotion of small millets by the Government of Tamilnadu and DHAN Foundation. There is an increasing awareness to consume recipes made out of small millets in Tamilnadu and thereby a new market demand is shooting up in recent times. As a result, the processed grains of small millets are sent to the retail market in Tamilnadu itself.

The processed grains are used to prepare traditional recipes which were in use earlier. The new recipes developed and popularized by Food Processing Research Institutes are also gaining momentum. Three such entrepreneurs have come out with Cookies made out of Small millets in Tamil nadu. Hence, the demand has increased in the retail outlets.

Consequent to these factors, and in addition, high risk of ensuring quality and delayed payment from the processors in Nashik, two units are operating in Theni for the past 30 years have developed infrastructure as in Nashik to produce the same quality of polished grains. The stocks are sold in Tamil nadu itself.

OBJECTIVE IV: POSSIBILITIES OF IMPROVING THE ON FARM PRICE REALIZED FOR MILLET GROWING FARMERS

Suggestions were sought from all the 20 respondents selected for investigation. The following were some of the suggestions made by them.

1. Introducing farm mechanization in small farm level to reduce the cost of harvesting and threshing
2. Establishing infrastructure facilities for drying and storage
3. Providing credit facilities both on kind such as seed and cash for cultivation. Forward linkage facilities available to the farmers both in kind and cash for cultivation.

4. Enhancing the productivity. Capacity building on Good Agricultural Practices through training and demonstrations.
5. Linking the farmers with processing millers at Theni & Nashik to increase the price realization. Sustainable market network with backward linkages among producer and processing mills.
6. Promoting Producers Company for small millets through Small Farmers Agri Business Consortium.

Other Findings from the Study:

1. Area of cultivation under small millets has come down from 53 lakhs hectare to one lakh hectare and the production has come down from 22 lakhs tons to 5 lakhs tonnes.
2. Small millets gets sold immediately at farm gate, due to lack of storage space in home and to meet immediate monetary needs.
3. More number of actors involved in the chain, huge transport cost due to long distance, high investment for procuring, storage and processing tremendously increase the price of the produce.
4. The production of small millets is high in southern states whereas their consumption is less compared to northern states

Intervention suggested benefiting both the producers and consumers

1. Mechanization in cultivation, introducing improved varieties with high productivity
2. Reducing transportation cost by taking primary processing in the production area itself
3. Awareness promotion/campaign about the nutritive value of small millets, developing new recipes and other millet based food products, more retail outlets in production area to increase local consumption
4. Price stabilization by shortening the chain actors both for Producer and Consumers
5. Vacuum packing/ Nitrogen infused packing to improve the shelf life
6. Facilitating policy change for Minimum Support Price to small millets and to include in Public Distribution System.

Event Update

Plastic awareness campaign



The folk lore unit of Center for Development Communication, DHAN Foundation along with Department of Environment, Tamilnadu organized an awareness campaign on ill effects of plastic from 15.02.2014 to 24.02.2014 in Madurai and Ramnad Districts. The inaugural event of the same was organized at Viraganur Panchayat office, Madurai District, in which Ms. Vijayalakshmi, Engineer, PWD gave a special lecture. The headmaster of Govt. Higher secondary School, Viraganur, teachers, students, members of kalanjiam self help groups and others participated in the inaugural event. Mr.Palpandi, Folklore Team Coordinator, CDC, organized this event.

Street plays, folk lore dances, distribution of leaflets and stenciling in walls were done as a part of the campaign which covered forty-one villages in sixteen blocks in Madurai and Ramnad district. The village head ward councilors and members and large number of people including women and children witnessed the campaign and got benefited. The purpose of the campaign was to create awareness to the people on ill effects of plastic, making them to maintain their living environment clean and devoid of plastics, protecting the local natural resources from pollution. The people were advised to reduce usage of plastics and instead use environmental friendly locally available alternatives. The campaign was successful in reaching more than 11000 people who watched the event.

Icon of Puliyankudi

Gomathinayagam is a progressive farmer, who does not restrict his learning's and knowledge in sustainable organic farming methods only to himself, but took efforts to spread them to many farmers through the 'Vivasaya Seva Sangam'. He was the first to install the biogas plant in the state, introduce organic farming in sugarcane and new varieties of lime in the village. His outstanding works is recognized by many organizations. During the Foundation day celebrations on 2nd Oct, 2013, DHAN also honored him with a felicitation and award. The contribution of Gomathinayagam to the farming society is presented here.

The Icon of Puliyankudi

Puliyankudi, in Thirunelveli District, Tamil Nadu renowned for lime fruits is the biggest supplier of lime fruits in the state. The village bestowed with fertile red soil and loamy soil is slowly turning toward organic agriculture, thanks to the efforts of Mr. Gomathinayagam, the catalyst behind this transformation. Running past eighty years, Mr. Gomathinayagam still strives hard to promote sustainable farming methods, not only in his village, but also in other villages in the state.

Born to Mr. Pichandi chettiyar and Ms. Gomathiammal on 11th July, 1934, he has two younger brothers Mr. Arunachalam and Mr. Nallathamabi. Owing to drought and water scarcity, Gomathinayagam's father Mr. Pichandi leased his land to other farmers and started a printing press 'Murugan Printing Press', which was the first printing press in the village. Though the printing press gave a reasonable income, Pichandi passed away due to kidney ailment when Gomathinayagam was just six years old. Gomathinayagam was hence raised by his grandparents.



Gomathinayagam got educated till 8th Standard at Roman Catholic Church and later at government high school, Puliyankudi till 10th Standard. He also underwent a basic course in teacher training, based on Gandhian principles and started his career as a teacher in Ramalingam Middle school, in 1957. He got married to Ms. Velammal, from a farming family on 4th Dec, 1960 who gave birth to one three children, one daughter and two sons.

Reading brought the change

Being a voracious reader, he got inspired doing something for the betterment of the society. He was moved by the book 'The world I saw' by Mr. G.T. Nayudu a renowned scientist of Tamil Nadu. Inspired by the book, he wrote a letter to G.T. Nayudu, who called him for a meeting. Gomathinayagam who got astonished and delighted, accepted the invite and went to Coimbatore. G.T. Nayudu took him to his research farm at Gopal Pak, in Avinasi road and explained him about the various researches done by him in agriculture and explained him about natural farming. Gomathinayagam remained there as a guest for three days and on his return was carrying a bag full of books donated by him. Nayudu also advised him to do his own agricultural research in his field, which he took very seriously and formed a foundation for all his innovative works in agriculture.

Gomathinayagam started doing agriculture in his farm land putting his heart and soul. He constructed a well in his rainfed land by obtaining a subsidy of ₹ 4,000 from the government and installed a motorized pump to irrigate the crops. Crops like paddy, chillies, cotton, groundnut, ragi and vegetables were grown in his field. Besides this he planted 380 coconut trees in another four acres. He spent his time in agricultural fields early in the morning before going to school and later in the evening. He sowed seed of crops like sun hemp, horse gram, gingelly, castor, cowpea, field beans and other crops and ploughed them in situ before they started flowering as manure to the field. He stopped applying inorganic fertilizers completely to his crops. Even in the times when the inorganic fertilizers are ruling, he resorted to organic agriculture.

Sustainable Natural farming

Gomathinayagam avoided usage of inorganic fertilizers and also pesticides in his farm lands. He owned twelve cows, which provided sufficient manure for his fields. You can get 100 kg of cowdung from a single cow in ten days. He constructed a composting pit of size 12 x 5 x 3 feet in which along with cow dung, 1500 kg of agricultural waste, 1800 kg of sand and 1500 litres of water. In a period of three months he was able to get 3000 kgs of good quality compost. Not only he protected his soil wealth but also was able to reduce his cultivation expenses to great extent. He also sold 50 to 60 litres of milk every day, which gave him good returns. He also grew fodder for the cattle in his field. Thus a natural cycle was maintained in his field.

Biogas plant

While the government itself was struggling to promote the concept biogas plants, Gomathinayagam installed two bio gas units in his cattle farm, with the support of Vivekanandha Kendra, Kanyakumari. The methane produced through the unit was carried through pipes to the gas stove in his house, located 250 feet away. The first ever biogas plant installed in India also gave a liquid manure of 700 litres which was used for composting. He also motivated others in the village to adopt the practice, effort of which was appreciated by the then District collector who paid a visit to the village. But due to continuous drought, water scarcity and reduction in fodder crop production etc., forced the units to get shutdown last year. 'How can a farmer get enough cow dung if he was not able to feed his cattle due to water scarcity that prevented growing fodder crops?' is the question he asks.

Vivasaya Seva Sangam (Agricultural Seva Sangam)

Gomathinayagam being a Gandhian, did not want to restrict the benefits only with him but wish to extend what he learned in organic agriculture to other farmers in his village and neighboring villages. He spoke with all the farmers in the village and tried to organize them. With the support of Mr.A.P.C.Veerabagu of the Sarvodaya sangh, he formed the Vivasaya Seva Sangam on 12th July, 1975. Mr. Sankarapandi Pillai, Ex- MP, from the place was appointed as its President

and Mr.Isakimuthu functioned as its treasurer. Gomathinayagam became the secretary of the Sangh. This Sangam initiated with 50 farmer members, started functioning without any government support or aid and presently it is functioning as a self reliant organization. It functions with the following objective

- Evoking interest in agriculture among youth and making them involve in agriculture
- Networking the agricultural experts across the country with the member farmers of the sangh
- Providing agricultural consultancy services and technical guidelines for the needy
- Promoting organic agriculture by way of experience sharing by member farmers
- Supporting the member even in matters related to their family and personal issues
- Repair and maintenance of agricultural implements and oil engines of the members by the sangh itself

He also introduced the concept of Chit fund in the Sangh, to enable farmers to meet the emergency expenses, by providing a loan of ₹ 30,000, the practice however was given up later.

Revolution in crop production

Even in most fertile soils, the sugarcane stubbles left after harvest will sprout again and give returns only for a maximum span of three years. The inorganic way of cultivating sugarcane spoils the soil health, reduces the microbial load and fertility of the soil. But Gomathinayagam was able to cultivate sugarcane, for twenty one years in succession, through which he also got a good yield of 60 to 70 tonnes/acre. This was possible because of organic way of cultivation of sugarcane. Many other farmers in the village who were inspired by these also started cultivating sugarcane organically. There are more than 400 sugar mills in the country and nowhere sugarcane is cultivated organically like done in Puliyanakudi. The sugar mills give good price to our crop, since they yield high quality sugar. Not only that, they make sugar locally in a organic way (brown sugar) and sell it at premium price which fetches them good income.

The lime trees in Gomathinayagam's farm got damaged and uprooted due to cyclones in 1991 and 1996. But he

again planted lime trees in part of the land and getting good yield. Here too he resorted to sustainable farming methods using organic inputs. He also established a coconut grove with the guidance of G.T.Naidu. Besides this he got the technical support and guidance for organic farming from Mr. Nammaazvar, an expert who is involved in promotion of organic farming, Mr. Krishnasami gounder, 'Eer Uzavan' Editor of the magazine on agriculture and Mr. P.S. Mani, a renowned organic farmer.

He also was the first to adapt drip irrigation system for lime cultivation in Puliyangudi, and remained an inspiration for others to follow the same. He even got an income of ₹ 1500/day during peak seasons. This method helped them to save water considerably and cope up with water scarcity during summer. His sons were also supporting him in agriculture and supporting him for value adding the agricultural produce from his farms. His son Jeeva, is making traditional food products and another son Nallathambi is running an organic store in Tirunelveli.

Activities done by the Vivasaya Seva Sangam

- The members of the Vivasaya Seva Sangam had the opportunity to visit many organic farms across the country, by way of exposure visits arranged since 1980. The visit to 'Karpaga Viruksha' organic farm in Maharashtra, 'Naturopathy hospital' in Coimbatore, 'Modern goat farming' in Thirumangalam, Madurai, organic farm of Mr. Muthukumar and Mr. Sethuraman, Kallikudi, Coimbatore and Organic farm of Mr. Sunderraman, Sathiyamangalam. The exposure visits which are continued till date enabled them to adopt organic farming techniques in their own farms in a more effective way.
- Leaflets were produced by the sangh for promotion of organic farming in different crops
- Gomathinayagam also introduced improved variety of Ber tree in Puliyangudi through the Sangam, fetched from Haryana, which many farmers are cultivating even now.
- Medical camps were held by the sangam with the support of Rotary club for creating awareness on sanitation and hygiene and also to prevent dengue.
- The sangam provided training on organic cultivation of vegetables to inmates of Palayamkottai prison every fortnight, due to which vegetables were grown in prison campus and used in their foods. The prisoners, majority of who were farmers carried this knowledge and applied in their farm fields.
- Gomathinayagam also distributes 5000 tree saplings every year through the sangh to school students and encourage them to plant them in their home or school premises. The sangam also advises on proper maintenance of those trees and does follow up to ensure that the trees are properly maintained. Apart from this he also distributes placards with environment friendly slogans to school students
- The task of laying roads from Puliyangudi to farm fields near foot hills of Western Ghats was entrusted to Vivasaya seva sangam by the Tirunelveli District administration through which seven roads were laid for which an expense of ₹ 84 lakhs was incurred.
- The seva sangam also trains farmers to produce value added products from agricultural crops they raise and also supports direct marketing of them to consumers, thereby enhancing their income greatly.
- Gomathinayagam used to participate in the farmer's grievance meeting organized by the district administration and represent the issues of farmers to the government. Also he provides guidance to the administration based on his experience which was well received. For e.g., he convinced the administration to extend subsidy of 75 % to all farmers for adopting drip irrigation system, irrespective of whether they are small or marginal farmers which was accepted and implemented by the government
- For ensuring water harvesting practices he obtained a fund support of ₹ 14 lakhs from Department of Agriculture Tamilnadu and ensured construction of many farm ponds in the village. He also convinced the farmers to allocate a portion of their land for construction of farm ponds. Because of these efforts the ground water table in the area improved considerably
- To improve consumption of healthy foods by children and others he resorted to producing

traditional healthy snacks and foods out of small millets viz., finger millet, proso millet, barn yard millet and little millet. He also produces various health mixes through the sangh and selling them to the public. He also encourages others to resort to production of healthy and hygienic foods

- The Vivasaya Seva Sangam also has held many farmers conferences and to enrich their knowledge in farming and marketing of farm produce. The conference on cultivating fruit tree crops organized with the support of Horticultural department in 2010 benefited more than 700 farmers. Along with World Medical Council, he organized training on 'Preparing Home based medicines' in Pabanasam, in which fifty women participated. Training and demonstration on small millet recipe preparation was given to in 2011 to many women in Puliyangudi. A seminar on 'Changing food habits and culture and its impact on younger generation' was given to Pushpalatha Matriculation Higher secondary school students on behalf of the sangam.
- Gomathinayagam also participated in many radio programs to spread the concept of organic agriculture and has written articles in leading regional newspapers on the same. His interviews on organic farming also got telecasted in Pothigai channel and other private channels
- National award for enhancing the productivity of lime through organic way of cultivation and through drip irrigation was won by a farmer Mr. Anthonisami of Puliyangudi, for which the guidance and support of Gomathinayagam played a major role.
- He also developed a new variety of lime by crossing a local variety and an improved variety which yields even 8000 fruits/tree/season and now widely cultivated by many farmers in Puliyangudi and surrounding villages.

The Awards and Honors

The selfless service of Gomathinayagam has won him several awards and recognitions from the government and other institutions

- He was appointed as a member of Tamilnadu agricultural research and development council

during 1981-1984, during which he had the opportunity of spreading the concept of sustainable organic agriculture to other farmers

- The Grassroots innovator's society, Hyderabad honored him with 'Shristi Sanman' award in the year 2003 for helping farmers through Vivasaya Seva Sangam which is operation for more than twenty five years
- He got a appreciation certificate from the District collector of Tirunelveli in the year 1999 for its outstanding contribution to promote organic agriculture
- World medical council honored him with a certificate for writing a book on nutritive value of cereals and small millets.

Gomathinayagam is 80 years old now and remain hale and healthy, thanks to his healthy food habits and the habit of walking at least ten kilometers daily. Gomathinayagam says with pride 'Running an organization to promote agriculture without political and government support, with internal funds generated from members is not an easy task. I feel delighted by the fact that Vivasaya Seva sangh is still rendering its services to farmers for nearly four decades'. Sustainable agriculture is not only organic farming but integrated farming approach which makes best use of the resources says Gomathinayagam. He shares that he still have some dreams about the future like

- Making educated youth to involve in agriculture
- Ensuring pesticide free organically grown food to all households, at least in Puliyangudi and other villages nearby in coming days
- Inculcating healthy traditional food habits back into the society
- Enroll all farmers into the practice of organic farming to ensure healthy food to the future generation.

Gomathinayagam is really an Icon not only for Puliankudi, but for other organic farmers in the state of Tamilnadu. The nation and the world need many such persons to do away with the greedy high inorganic input agriculture that spoils the health of the soil and the people.

Developmental issues in Jawadhu Hills

Ramesh. S*

Jawadhu hills, the tribal block in Thiruvannamalai district though very backward in respect to education, livelihoods and health, recently face the effect of modernization, but in a negative way. While the basic amenities have to be improved to larger extent, more problems are being created because of wrong guidance of the youth and lack of proper livelihood opportunities at locally. The issues like alcoholism, lack of proper education, unutilized potential in agriculture and tourism are presented here



The people

It was my first visit to Jawadhu hills. Jawadhu is a block situated in Kalasapakkam taluk of Thiruvannamalai district. Jamunamarathur, which comes under Kovilur panchayat, is the center point and an important market town in the hill. I was on an official visit to do a field survey and study on 'Social seed network' as a part of a revalorizing small millets project implemented in the hill station. Apart from the study I came across many developmental issues in Jawadhu hills which need to be addressed for the well-being of the natives especially the youth and women. Many of the issues are related to lack of proper education, guidance, culture and less importance given to agriculture in the area both by the people and the government.

The hill

Jamunamarathur is 24 km uphill from Alangaayam, which is again an hour travel from Vaniyambadi. One can reach Alangaayam from Tirupattur also. The beauty of the hill and the pleasant climate will enthrall all the nature lovers. When you travel still interior, there are many villages even without proper approach roads, the landscape of which are a treat to your eyes. And during my visit in last week of June, 2013 the travel was made more cherishing by the swarm of butterflies. Butterflies of different colours—blue, black and yellow were flying everywhere. Some dashed against the two-wheeler we were travelling, some against my face and body and it seemed that I got in a wind swirl of butterflies. The place is yet to become a tourist spot. There is a waterfall called Bheeman falls near Jamunamarathur. Unfortunately there was no water in the falls during the visit.

The people living there are mostly 'Malayali Tribes', very hospitable and innocent by nature. While their earlier generation was deprived of formal education, the generation today is blessed with enough schools both Government and private. Despite this the school dropout rate is higher. Most of the people are poor living in houses with mud walls and thatched roofs. However one could observe that their houses were maintained very neat and clean. Agriculture is their main livelihood occupation and predominantly rainfed. Crops like little millet (Samai), finger millet (ragi), Horse gram (kollu), Niger, maize, cholam and cumbu are grown in rainfed conditions while paddy is grown in irrigated lands. It seems that they do not put much effort towards agriculture, satisfied with what they grow and what they have. Though the red loamy soil there is very fertile and suitable for sowing a variety of commercial crops, the people are satisfied with what they grow. Usually they retain the seeds and sow it for the next season or borrow from neighbors and relatives, in case of need.

A curious thing about the houses is that most of the houses are surrounded by a fence, many a times without a proper gate, constructed so to protect themselves from wild and grazing animals. One can enter their premises only by jumping or trespassing the fence (the fence usually is made of bamboo/ bamboo + Lantana (lantana is a weed crop which is available in abundance

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in the hills. However the height of the fence is lesser at a particular place so that one can jump around it easily).

The food

Rice which is available through ration shop free of cost occupies majority of their diet. Earlier little millet (Samai) used to occupy a definite place in their diet and presently its consumption is limited. However people continue to cultivate Samai, as the rainfed conditions and soil favors the crop apart from the market. Ragi and maize are grown by the people purely for consumption purpose, but only in very limited area. When you walk around a village you can see most of the people rearing pigs at least one or two, which forms a important place in their diets especially during family functions and festivals. Vegetables are grown rarely and hence they have to source it from outside. Unlike in plains their rice meals go just with sambar and with no accompanying vegetable side dish. In sambar however they use minimum quality of vegetables. Apart from these there are some naturally growing plants which are consumed as greens by the local. Being uncultivated and growing in millet fields, barren lands, around houses, near fences and forest lands these greens serves as a source of food and nutrient during the rainy season from July to December every year.

Pudhu Vazhuvu Project in Jawadhu Hills

DHAN Foundation was the implementing agency of Work Bank funded Pudhu Vazhuvu project of Tamilnadu Government since 2011. Under this project 436 new women SHGS and 62 differentially abled SHGs were formed. Apart from this 227 existing SHGs in the project area were affiliated. All these 725 SHGs were organized under fifty four Village Poverty reduction committees and supported with subsidized loan. Through the project 822 differentially abled persons were identified in the block of which 702 persons with more than 40 % disability were supported to avail the National ID card for the disabled. Need based medical camps (Eye camps and OAP camps) were organized through the project through which 3200 people got benefited. The project also facilitated the submission of 4020 applications for availing community certificate and 1820 certificates got issued. To support the youth with better employment opportunity, different skill building trainings like four wheeler driving, masonry work, tailoring were given to 188 persons through the project . Apart from financial assistance to SHGs special attention was given to differentially abled and the vulnerable due to which 675 differentially abled out 822 and 2587 Vulnerable out of 3027 received financial support from VPRCs. To undertake different livelihood activities like honey bee keeping, goat rearing, Dairying, Small millet cultivation and other activities Seventy five CLGs (Common Livelihoods Groups) were formed of which forty two groups were given with the grant support of one lakh rupees each. As an additional effort 134 differentially abled persons in the block were assisted with necessary aids and appliances which cost around ₹ 6.0 lakhs, the fund support for the same being provided by Adhinath Jain Trust, based at Chennai.

The youth

The youth in the hills are a cause of concern, since they seem to be carried away by the negative influence of modernity. Though situated remote, Youth in Jawadhu hills were fond of all modern amenities mobile phones and motor cycles. This is evident from existence of two-wheelers all, brand new and some even without proper number plates in the hill, despite the fact that many still live in huts. There is a two-wheeler showroom Jamunamarathur, to capitalize the existing market. Most of them ride their bikes in the hilly terrain at rash speed. The death of youth due to accident is very common, which even occurred on my second day of visit. And there are at least five mobile shops in Jamunamarathur which sells mobile phones. It is a small town and existence of five mobile shops shows how mobile phones have occupied the life of invariably everyone.

Smoking and drinking is very common among youth. Even kids at the age of six starts smoking and they start consuming alcohol at twelve or fifteen years. This is of very serious concern. There are many widows in the villages, which can be seen as a result of these habits. A study has to be undertaken to know the health and social issues caused by smoking, drinking and dietary habits in their villages

Agriculture is not so prosperous, people are not eating proper diet and don't live in proper houses. Yet many youths have a bike and a mobile phone, the symbol of status. Where does the money comes from? The answer to the question came as a shock- "Smuggling of Red sandal wood". The youth here who were born and brought up in the hilly terrain covered with forests have the strength and knowledge to cut trees. This is misused by some greedy people, who lure the youth promising high wages for cutting red sandal tress in the forest areas of Thirupathi (₹200/ as labour cost for cutting a kg of red sandal wood) . A trip to Thirupathi forest for a month or more will fetch a person more than ₹ 50000/-. And when they are caught they will pay a fine of ₹ 15000/- , goes through some legal procedures and let free. However there is a risk of death if being shot by the Andhra forest department personal.

The cutural issue among youth has to be addressed through proper education and guidance.

Agriculture

Little millet (Samai) is the predominant crop grown in rainfed condition. The varieties grown are Chittan Samai, Karunsamai, Kolluthunan Samai of which Chittan Samai is grown widely. The farmers do not pay much importance to the quality of seeds and after harvest they follow the same processing steps for grains for consumption and for seeds. Though they grow local land races, admixtures of these seeds cannot be ruled out because of improper handling of seeds. Application of fertilizers and pesticides is very minimal, but the application of inorganic fertilizers is slowly catching up due to non-availability of organic manure. The farmers used to grow Panivaragu (Proso millet) and Thinai (Fox tail millet) too, earlier the practice of which is now extinct. Ragi and maize are also grown under rainfed condition purely for consumption purpose; Horse gram is grown after the harvest of little millet. Paddy is grown by few farmers who have irrigation facility. Farmers usually retain the seeds for next sowing and they purchase rarely from outside. Small millets especially little millet is procured by traders in Jamunamarathur, from which it was sent to wholesalers at Bangalore and from there to Nasik for processing.

The natives of the hill though not satisfied with the low yield obtained from the crops they grow, doesn't have any urge to improve agriculture. The lack of access to knowledge of new seeds, cultivation practices and other technologies in agriculture can be attributed as a reason. However when they are provided with the opportunity of growing new varieties, they never hesitate to try, which can be known from the positive support they are giving for the participatory varietal selection trials through our



RESMISA project. Introduction of improved varieties in little millet and finger millet and reintroduction of Proso millet and foxtail millet is very well received. New farm implements ranging from iron plough, sieves for little millet sorting and harvester and binder machine is done through the project with the support of the people.

The impact of red sandal smuggling on agriculture can be seen in few villages. Especially in the village Kuttakarai, many have given up farming and they did not cultivate any crop last year, which partly affected our trials in the village. This year also there is no sign of farming operation in many of the lands. Migration for labour also happens to coffee and tea estates in Kerala and Karnataka.

Revalorizing Small Millets in South Asia project

Jawadhu hills is one among the sites selected by rainfed agricultural development programme of DHAN Foundation for implementing the action research project 'The Revalorizing small millets in SouthAsia' supported by IDRC and CIDA '. The project basically aims to promote cultivation and consumption of small millets through on farm conservation of small millets, introducing new sustainable agricultural kit, support for post harvest processing, documenting indigenous knowledge and promotion of small millets. Extensive participatory research trials done in Jawadhu led to identification and introduction of high yielding Samai Varieties like CO 4, Koluthana and Perungolai Samai. To reduce the drudgery two ploughs "Tirupatthur Plough" and 'Otthangarai plough' were introduced instead of conventional wooden plough which were well received by farmers. Apart from this Foxtail millet and Panivaragu were reintroduced in the hills, which again performed well. The people in Jawadhu hill were educated on nutritive value of small millets and trained on making different recipes on small millets. Low cost machinery for processing small millets was also introduced in the site. The project has enabled the farmers to increase cultivation of small millets and in the next phase of the project more focus on promoting consumption of small millets is planned.

Health

Since Jawadhu hills have its remote nature and lack of infrastructure facilities such roads, communication etc, and the access to medical services is one of the major problems. Tribal community knowledge towards health care practices and personal hygienic is alarming in Jawadhu and girls used to get marriage in the age between 14- 16, it leads various health related issues. The health indicators such Institutional delivery, early registration, Immunization is ensued by push rather than pull efforts.

In general distance between habitations and villages are very high in this hill. Around 50 percent habitations are not reachable through transport facilities; it is possible only through walk/ two-wheeler. Even though there are two Primary Health Centers and 13 Health Sub Centers, the service is not penetrated to all habitations due to poor transportation, non-availability of enough staff and poor infrastructure facilities.

The existence of quacks (unqualified/untrained in handling medicines) is becoming severe problem in this area. It leads to health complications (sometimes death) which create unnecessary expenditure to them. It is found that there is existence of home deliveries handled by 'untrained Thais' which may leads to Maternal Mortality and Infant Mortality. As per the report of Reproductive Child Health, District Level Household Survey, 2002-04, Tamil Nadu, IIPS, MOHFW, GOI, PRC Gandhi gram, the maternal and child health indicators were critical in Thiruvannamalai district especially hill areas like Jawadhu.

It was noticed that the prevalence of anemia among adolescent girls was 95.5 percent and 45.4 percent of children under three are malnourished. The exclusive breast feeding recorded only at 16.0 per cent, Institutional delivery was recorded at 63.7 per cent and the percentage of Full Ante Natal Check-up recorded at 25.8. As per the National Family Health Survey (NFHS 3) for 2005-06 in Tamil Nadu, around 53 per cent of the ever married women and pregnant women and 73 per cent of the children below the age of three years have been affected by the anemia disorder.

Without awareness of health issues, most tribal populations tend to fall ill more frequently and wait too long before seeking medical help, or are referred too late by untrained village practitioners. The health care expenses per household also increased over a period of time.

Ecotourism

The site offers much scope for ecotourism opportunity, due to the presence of Bheeman falls, just three kilometers from Jamunamarathur, the pleasant climate and natural scenic beauty of the villages. Bheeman falls however, currently have some safety issues. Right below the falls is a steep valley and at times of heavy waterfalls, there is high probability of people being swept away with no safety barricades in place. Also there are no good hotels or staying places in the hill.



Possible areas for Developmental intervention

- There is more scope for developing rainfed agriculture in the area. Though DHAN is implementing RESMISA project for development of millets in the area, the project can be extended to provide concrete solution to the problem. A continued effort is needed to change the mindset of people towards agriculture and educate them to adopt smart farming techniques to reap results.
- The issue of alcoholism is the worst in the hills. Illegal brewing alcohol can also be observed in some villages. Even the children at the age of 10-12 get into the habit of drinking and smoking
- Despite the presence of schools in the hills, the school dropout rate is very high. Even though the parents are interested to educate at least their male

child, the early marriage and the attitude of the youth to earn at younger age remain as a barrier. Proper counseling for education and opening up remedial education centers will be helpful. Apart from this life skill training can be given to the youth.

- Child marriage is another big issue, which has to be addressed properly taking into account their customs and tradition
- There is more scope for health intervention in Jawadhu hills, since the traditional custom of early marriage is still followed. People consume less nutritious foods and hence a baseline survey can be carried out to know the health seeking behavior of the people.
- The cultural changes seem to have a negative influence over the youth, visible from the moral degradation like high alcohol consumption and smoking rates, youth engaging them in red sandal wood smuggling lured by the money it offers etc. The skill building initiatives taken through the Pudhu Vazhuvu project and revival of small millet cultivation through RESMISA project though address the livelihoods issues, a comprehensive approach is needed to guide the youth in proper direction.
- Ecotourism can be promoted with the support of the government and the local people, which apart from attracting tourists can generate additional income to the local people.
- Improved access to health services, health education and behavioral change communication to address alcoholism, anaemia, reproductive and child health care and addressing the problem of quacks requires immediate attention for increasing the health standard of the people in Jawadhu hills.

The nature has bestowed us with plenty of wealth. Putting them to right use can transform the lives of the poor. The soil and climatic condition are well suited for growing for a wide range of small millets and other rainfed crops. Enabling the people to do agriculture and allied activities with a business sense, taking care that the natural wealth is retained can transform the lives of the thousands of poor living in Jawadhu Hills.

Agricultural Biodiversity and Food Security



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Drawing competition entry - Walkathon 2014*



Meenakshipuram Village Tank

Dead storage is the storage level in tank, which cannot be used for irrigation purposes, but can be used to meet the other demands of villagers like drinking water for cattle, bathing and washing purposes. Dead storage pits are sometimes artificially created to enable water availability in the pits even if the entire tank dries. The photo is of one such dead storage pit artificially constructed in Meenakshipuram village tank, Reddiarpatti block Virudhunagar District as a part of tank renovation work under HUL project. The tank renovation work led to cleaning of three inflow channels, which resulted in filling up of the tank after fifteen long years. Result the farmers are able to cultivate paddy in the village after fifteen years. The picture is taken after the crop season in Jan, 2014 where the water remains in the dead storage pit, which is used effectively by the villagers. Additionally, the drinking water well in the tank which used to be salty, now became much suited for drinking.



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