May 2012

Development Matters

Monthly Development update from DHAN Collective

Feature

Revalorizing Small Millets:
An action research project

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The action research project 'Revalorising Small Millets in Rainfed Regions of South Asia' aims to increase production and consumption of nutritious small millets and associated pulse and oil seed crops in rainfed regions of India, Nepal and Sri Lanka. This project is supported by Canadian International Food Security Research Fund (CIFSRF) promoted by Canadian International Development Agency (CIDA) and International Development Research Centre (IDRC), Canada.

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From the Editors' Desk

Dear Readers,

Greetings!

Drought is prevalent in many states in India this year, which will have a serious impact on agriculture and our economy. Continuous negligence of our water bodies and exploitation of ground water resources has made water a precious commodity.

This special issue on drought features articles on Mitigating Drought and Floods, Combating Desertification and Conservation of Small Scale Water Bodies (DHANA Project). Role of Small Water Bodies in enhancing the livelihood and eco systems help us to understand the importance of water bodies. RESMISA project on Small Millets also finds a place in this issue. DHAN Participated in India Water Week 2012 event held at New Delhi, a note on which also appears in this issue.

Know your heritage is a new attempt, which will bring to the notice of the readers, the important heritage sites in our country. The readers are requested to send a note on heritage sites they knew so that it will be useful to all.

We expect the continued patronage of the readers and constructive feedbacks to improve the quality of our magazine. Your feedbacks can be sent to dhancdc@dhan.org

Happy reading!

Contents

Mitigating Droughts and Floods - Mutual Risk Reduction

M.Palanisamy*

1.0 Introduction

Disaster is a sudden and unexpected or extraordinary misfortune, causing damage to the community and community infrastructures. The disaster can happen to an Individual, a family, small group, a community or a region, a nation or the entire world.

Disaster is an event concentrated in time and space, in which a society or a community undergoes severe damage and occurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfillment of all or some of the essential factors of the social is prevented.

Drought is one of the natural disasters that occur frequently, in India which leads to crop loss. Sometimes floods also heavily affect the crops and other infrastructure. The frequency of the damages due to drought and flood are increasing year by year. This may be due to the climate change.

In India, 16% and 67 % of the country's total area and 67% of the total crop sown area is drought prone and about 50 million people get affected due drought situation every year

Problems encountered by all living beings including human during the drought are very high. The country's economy is agrarian and hence the livelihoods of people who depend on them are at stake when the drought occurs. The government also makes attempt to mitigate the drought, but the red tapism and bureaucratic delays limit the relief delivery to the affected masses. Therefore, DHAN Foundation decided to take up establishing coping mechanism to mitigate the drought among the community through their own people organisations and panchayats. Various drought mitigation activities such as farm pond construction, irrigation tank renovation including the supply channel desiltation, land leveling and tank silt application to the agricultural fields have been taken up through the community based organizations promoted by DHAN Foundation mainly to save the crop and livestock. Mutual insurances for Crop and Livestock are an innovative idea, promoted and are being implemented in the working areas of DHAN Foundation, India.

2.0 Insurance experiences with DHAN Foundation

DHAN Foundation works in 13 states of India with 10 lakh poor families mostly with marginalized farming families. The farmers are motivated, trained and supported to take up various kinds of site specific activities in their agricultural lands to increase their family income. The broad activities are in the areas of agricultural land development, soil health enhancement, crop production enhancement, livestock development and activities for supplementary income to the farmers etc., Different kinds of risk reduction as *ex ante* measures have been identified in consultation with farming communities and implemented in the field. Life insurance, health insurance, crop insurance and livestock insurance are being taken up for managing farmers' risks.

Life insurance for farmers through group insurance schemes of LIC and other private sector companies Birla Sunlife Insurance Company and SBI-Life etc is facilitated by DHAN. Few of the people federations also have their own mutual life insurance schemes. Health insurance is being run through the government schemes and also mutually. It is to be noted that the people federations promoted by DHAN Foundation runs hospitals and ensure better health services to the member families.

Crop insurance is being done both through insurance companies and through the Farmers' Federations on the principle of mutuality. As far as the livestock insurance is concern, initially it was done through various insurance companies such as Royal Sundaram Alliance and United India Insurance Companies. After facing problems in ensuring the payout to the affected

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farmers, now livestock insurance is done only on mutual basis in the farmers' federations.

Mutual insurance is properly designed and done in the people federations with the facilitation of People Mutuals, a social security initiative of DHAN Foundation. People Mutuals is also a people institution created to facilitate the insurance activities for the poor communities with whom DHAN Foundation works. Customized insurance products are developed in consultation with the communities and implemented with the Mutual Insurance Committee (MIC) of the people federations.

3.0 Deficit Rainfall (DRFI) Insurance

There is a growing attention on weather insurance with a number of experiments being undertaken all over the world. The existing information on such products focus more on the perspectives of the promoters that include national and international development organizations, insurers etc.

DHAN Foundation started piloting index-based weather insurance in the year 2004. It was piloted Deficit Rainfall Insurance, a type of index based weather insurance in two locations namely Nattarampalli in Vellore and Tirumangalam in Madurai districts of Tamil Nadu. In both the locations drought in various degrees is a recurring phenomenon and farmers perceived deficit rainfall as the major weather risk than any other weather phenomena. ICICI Lombard, a commercial insurance company evinced interest and developed a suitable weather insurance product for these rainfed farmers. Two years of piloting Deficit Rainfall Insurance for groundnut, cotton and black gram indicated that there is a limit to which the effectiveness of the product done through insurance company can be improved.

4.0 Process DRFI product development

The rainfed farmers' associations promoted by DHAN Foundation for implementing rainfed farming development activities were very much useful for designing and implementing the weather based insurance. In general, no farmers voluntarily go for insuring their crops. Only when they go for crop loan to the nationalized banks or from the primary agricultural co-operative banks, insurance premium is deducted from the loan amount and paid to the agricultural insurance company. Farmers are not informed about the sum assured and other details such as claim administration and payment details etc.,

However, it was able to educate the farmers on importance of crop insurance in the primary groups called *Uzhavar kuzhus* and farmers' association meetings. When it was talked about the weather insurance farmers were interested to ask several questions to understand it as it was new to them. Farmers' workshops were conducted for the need assessment. It was started to talk on weather parameters such as rainfall, temperature and wind etc., which affects the crop production. As far as the rainfed farming in our context, semi-arid tropics is concerned, rainfall is the single most weather parameter which decides germination, growth and yield of any rainfed crops. Deficit rainfall is more common during the cropping season. Late onset of rainfall, long dry spell during the cropping season and early withdrawal of monsoon are the issues faced by the farmers more frequently. Crop damage due to excess rainfall is also faced by the farmers, in few years. DHAN Foundation works only with small and marginal farmers poor farmers. Farmers' affordability to pay the premium is one of the major factors to design any insurance product. In view of keeping the premium at lower level, it was decided to respond only to the deficit rainfall.

Normal date of sowing, crop duration and water requirement at each stages of the crop was discussed with the farmers in detail. The rainfall requirement at each crop stage was discussed in the local unites and converted into the standard unit of *mm.* Farmers have given the rainfall requirement as per the soil type. In the black cotton soil areas, farmers requested lesser quantity of rainfall compared to the red sandy soil areas.

4.1 Single phase policy to multiple phase policy

Total rainfall requirement of different crops were arrived and based on that single phase insurance products were developed. Premium was collected from the farmers and implemented the deficit rainfall insurance. The sum assured was finalized to meet the cost of cultivation alone to keep the premium at lower level. As the farmers expressed that the premium amount was high to have the gross return as sum assured, the insurance product was finalized to cost of cultivation

alone even less. As far as the rainfed crops are concerned, more than the total quantity of the rainfall, rainfall distribution matters much for the crop growth and development. Hence, as per the needs of the farmers, multiple phase policies were offered. However, both single phase policy and multiple phase policies are available and famers can choose.

4.2 Dynamic startup date

It was observed that the date of sowing the date of seed germination varies in some years. One month difference was reported in between these two dates. Basically this problem was faced by the farmers who have the practice of taking pre monsoon/ dry sowing. Famers wanted to have the insurance products reflecting the ground reality. Meaning is that if there is yield loss, the loss must be reflected in the insurance product and the loss must be compensated to the farmers, as per the policy agreement. Hence we have gone for dynamic startup date.

Here, the probable date of dry sowing is determined. Three to four insurance products are developed at weekly intervals close to the date of sowing. The premium amount varies across the sowing dates. For the maize crop, the premium was worked out as Rs.524, Rs.367 and Rs.210 respectively for the sowing dates of August 23rd, August 30th and September 13th of 2008 for the assured sum of Rs. 2000. Among the five premiums for different dates of sowing, for one closer date, the premium is collected and kept in the insurance account of farmers' federation. Then based on the rainfall received, the germination date is finalized. The premium is then adjusted to the actual date of germination.

4.3 Automated rain gauges at working villages to reduce the basis risk

In response to farmers' feedback, various steps were taken to match the insurance product with the ground reality. The IMD (Indian Meteorological Department) rain gauge's rainfall reading was alone considered by the ICICI Lombard insurance company for working out the payout. For the working villages of Tirumangalam taluk, the IMD station is at the Madurai airport which is situated around 25 – 30 kilometers away. When the payout arriving stage farmers defended

that more quantity of rainfall was recorded in the IMD rain gauges than the rainfall of the insured villages.

Then it was decided to establish automated rain gauges to record the rainfall at village level. But the insurance companies were not able to use the local rain gauge's rainfall for calculating the payout. Hence DHAN Foundation has gone for the mutual deficit rainfall insurance.

Automated rain gauges are installed in the top of the building of one the group member's house or in the top of the village common buildings such as Panchayath building, the building of the SHGs, bus stop shelter and etc,. Our group leader of the particular village is taking care of the rain gauges. DHAN Foundation has installed around 158 automated rain gauges in the working villages and does the rainfall insurance.

We are thankful for the Agricultural Insurance Company (AIC) for encouraging our models by the way of joint implementation of the rainfall insurance. The insurance products are designed in consultation with the farmers. The Community Based organizations called Farmers Federations collect the premium from the farmers and pay the premium to the AIC. For the villages which received the deficit rainfall than the requirement/ agreement, the payout is being given by the AIC to the farmers through the people federations. The rainfall received in the respective village's automated raingauges is being taken for calculating the payout the respective village farmers.

5.0 Mutual Deficit Rainfall Insurance (MDRI)

Mutual insurance is an insurance mechanism implemented by the farmers themselves through a

Mutual Crop Insurance Committee (MIC) comprised of farmers and federation staff. They decide on the issue to be covered by insurance, design of the product and implementation mechanism, with facilitation from DHAN Foundation. MDRI is an insurance product which uses rainfall data during different stages of the crop period as a proxy for assessing the rainfed crop yield loss.

After gaining experience of mutual deficit rainfall insurance in our rainfed farming federations it was extend to other programmes of DHAN Foundation also. Farmers are happy in using the local rain gauge rainfall data for working out the pay out. Then it was stared to install the automated rain gauges in more number of villages for expanding the DRFI to the farmers. Totally, 158 automated rain gauges were installed in the working villages of DHAN Foundation

As of now different kinds of insurance products such as mutual pest insurance, mutual crop income insurance are available with DHAN Foundation and are implemented through mutual insurance committees of the people institutions.

6.0 Community organization (CO) for Mutual Deficit Rainfall Insurance (MDRI)

Community organization of farmers forms the platform on which mutual deficit rainfall insurance is placed. So well functioning CO of farmers is a prerequisite for taking up MDRI. DHAN Foundation believes that poverty reduction and grassroots democracy go hand in hand and are necessary for sustained development. So it starts with promoting member owned people institutions of farmers. These COs are seen as demand stream for the State. The CO model of rainfed farming development programme is given in the figure 1. Each CO has a general body, executive body and staff(s) and the executive body is rotated every 2-3 years. They have meeting on a regular basis. There is intense face to face interaction between office bearers and staffs with individual members, as part of implementation of farming activities. All COs have a full-fledged accounting system and focus on cost coverage from the beginning. Mutual deficit rainfall insurance is taken up as one of the activities of such promoted farmers' organizations.

A Mutual insurance committee (MIC) is formed at the federation level (Figure 1). The number of members in MIC is around 15 to 30. The *generic roles* of this committee is,

- Policy making related to the insurance product and reviewing the policy at periodical intervals,
- Implementation of the insurance product along with the concerned staff and
- Managing the funds related to insurance.

The *specific roles* will vary depending on the product. The capacity of selected MIC are enhanced by exposing to similar initiatives in other places, training on the basics of mutual insurance and ensuring their intense participation in all the steps starting from design of the product, enrollment of members to claim payment.

Reinsurance: Reinsurance support is essential to make Mutual Deficit Rainfall Insurance (MDRI) effective. Eureko Re, The Netherlands based insurance company came forward to offer reinsurance and technical support to MDRI pilots of DHAN Foundation. The structure of the reinsurance agreement between People Mutuals and Eureko Re is a stop loss contract.

7.0 Advantages of Mutual Deficit Rainfall Insurance over conventional crop insurance

- As the insurance products are evolved in consultation with the farmers, need based products are given to the farmers. Here, the previous years' experiences are taken into consideration and customized insurance products are developed in each year.
- All the farmers are well informed about the insurance product and they very well know about the payout of that particular year.
- Quick settlement of payout to the affected farmers.
- There is no problem of moral hazard. The mutual insurance committee is taking care to ensure proper claim settlement.
- Administrative cost is less.

8.0 Learning

- Mutual deficit rainfall insurance is one of the risk management tools. But, it should not be the only answer to manage risk.
- Farmers need to be trained for taking the coping up mechanism like intercropping / mixed cropping, bund

cropping, crop diversification, crop rotation, selection of right kind of crop varieties, use of quality seeds, ensuring optimum date of sowing, better crop management practices, go for perennial tree crops, soil and moisture conservation practices such as summer ploughing, field bunding and land leveling, farm pond construction for the supplemental irrigation, tank silt application to the agricultural fields etc.,

- Insurance education to the farmers is very much needed. Investment is needed for promoting farmers organization and for training the mutual insurance committee.
- Euroko Re of The Netherlands has instituted the backup guarantee. During the past years experiences, there was a reinsurance claim during 2007-08. However, overall the claim ratio has not exceeded 100% of the premium.
- Taking the mutual deficit rainfall insurance for more areas with increased number of farmers is a challenge. Investment on insurance education is very much needed for taking forward in to a large scale.

9.0 Conditions for the Mutual deficit rainfall Insurance

- Strong people institution structure must be available to develop insurance product and for implementing the Mutual deficit rainfall insurance. For all the organizations who work closely with farming community, it is very much easy to implement the mutual insurance.
- Regular meeting of the mutual insurance committee is very much essential to identify the problems and for addressing the issues.
- External or mainstream funding support is needed in the initial years for the infrastructural developments like automated rain gauge establishment and for the backup guarantee.

10.0 Mutual Livestock Insurance

The People Federations run the Mutual Livestock Insurance with the active support Mutual Livestock Insurance Committee promoted for implementing the same. The premium collected from the livestock farmers is 4%. The Farmers Federation pays 3.5% premium to the People Mutuals, a registered apex level people institution facilitating the insurance activities of DAHAN Foundation, after retaining 0.5% premium to meet out its administrative expenses. The Mutual Insurance Committee takes the responsibilities of ensuring the payout within 10 days to the affected livestock farmer. As the Mutual Insurance committee is taking the responsibility ensuring the genuineness in all the aspects, veterinary doctor is not engaged in this mutual livestock insurance activity.

11.0 Way Forward

In general, the administrative cost for the conventional insurance is high. In India, crop insurance data says that more than four times of premium collected has been given as compensation against the crop loss. At the same time, farmers are not at all happy about the conventional insurance and hence the crop insurance penetration is very poor. Moral hazard is very high in the conventional insurance. To overcome all these issues, mutual deficit rainfall insurance is the way for which the government can support for the people institutions promotion, mutual insurance committee development, insurance education, infrastructure development like automated rain gauge installation and maintenance and for back up guarantee support etc. ■

Development News

Rs 20,000 cr solar energy project for Gujarat

Clinton Foundation, USA, is planning to develop what could be by far the world's largest solar energy project in Gujarat. The project will be an integrated solar city with a capacity of 5 gw—five times the size of the current largest solar project in Mojave Desert, USA, being developed by BrightSource, with an eventual capacity of up to 900 mw. The facility is expected to cost Rs 20,000 crore (about $475 million) and will produce raw materials and manufacture panels on site. This is expected to reduce costs so that the power produced at the site will cost about Rs 4 ($0.10) per (unspecified) unit. It has not been disclosed whether the project would employ solar photovoltaic or solar thermal technology. The project, tagged as one of the largest foreign direct investment in the state, will also be a landmark project as the cost of power generation is likely to be 70 per cent less than the conventional cost of generation,

Combating Desertification by Reviving small water bodies

P.Subburaj*

An overview of Desertification and Climate Change implications:

Desertification is a global environmental problem. To put simply, it is the process that turns fertile land into land that is too dry to support life. Many factors like climate change, depletion of natural resources and other human activities contribute to desertification. Many definitions exists for desertification of which most accepted one is of that the United Nations Convention to Combat Desertification which defines it as "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities. [1] As per the European Commission note on desertification, drought and deforestation are the two major causes of desertification.

In India around 81 Million hectares of land in India is in the process of desertification, as per the 'desertification status map' created by the Indian Space Research Organisation(ISRO). The study which used satellite imagery from an Indian Remote sensing satellite, Resourcesat, also reveals that a third of country's area (around 105 Million hectare) is already degraded. The desertification is happening through various processes. Among them water erosion has the prominent role which affects 10.21 percent of the total geographical area. About 15.8 percent area of country's geographical area is arid, 37.6 percent semi-arid, and 16.5 percent falls in dry sub-humid region. Together, about 69 percent of the country constitutes 'dry land'. The study gives many reasons for land degradation. The important among them are changes in rainfall pattern and over exploitation of natural resources. [2]

In the new millennium, on our Earth planet, humanity needs more water across the globe to produce food to the demands of billions of people. More over better

quality water is required to defuse the health/sanitary bombs created by human negligence and to preserve and upkeep the biodiversity of ecosystems for future systems, fresh water resources across the globe to be protected. [3]

Climate, the average weather experienced over a long period changes with increase in temperature, which in turn alter the wind and rainfall pattern. During twentieth century, the earth temperature rose by 0.74 degree C of which, 0.4 degree C rise occurred between the mid 1970's and new millennium.

Rainfall over land has increased by 5-10 % in the northern hemisphere, in parts of Asia as well as Africa, the frequency and intensity of drought has been on the rise. [4]

Increased trend of very short but intense spells of rainfall is the contribution of climate change in Indian subcontinent. About 14.5% percent increase in the number of incidents of extreme rainfall during every decade in the past 50 years. Droughts and floods could pose serious threat to food security, livelihoods and shelter. [5]

1 en.wikipedia.org/wiki/Desertification
2 www.developmentchannel.org
3 Speech by Mr.Loic Fauch, President, World Water Council in Opening Session on World Water Week, Stockholm, August 17, 2009
4 "Preparedness to Climate Change" – A study by Red Cross Climate centre 2000.
5 A study by M.Rajeevan, Scientist of National Atmospheric Research Laboratory, Tirupathi.

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Desertification in the context of southern coastal Districts of Tamilnadu

The southern coastal districts of Tamilnadu viz. Pudhukottai, Ramanathapuram and Tuticorin are drought prone and agriculture there is highly dependent on rainfall. These districts are characterized by thin film of fresh subsurface water due its close proximity to sea. The factors that are responsible for the desertification in these districts are discussed below.

1. **Drought:** Many times the disaster which brings loss the human life are getting attention of the media, general public and the government. But slow onset disasters like drought which brings huge damage to the economy of the nation as well as to the livelihoods of the individual farmers are not getting due attention. The southern coastal districts, which falls into the second category do not have any perennial water source for agriculture. Hence the agriculture depends only on rainfall. As the rainfall become highly erratic due to changing climatic conditions, harvesting a successful crops becomes herculean task for the farmers in these area. As the water is the lifeline for agriculture, drought becomes one of the major contributor for desertification in this semi-arid region.
2. **Poor Maintenance of Kanmois(Irrigation tanks):** Irrigation tanks are small earthen bunded reservoir which are constructed across slope to capture the run off water from rainfall and distributes water during the rest of the crop season. These districts are served by more than 1000 such water bodies. These structures has embankment for storing water, sluice for regulating water for agriculture and weir safe disposal of excess water during heavy rainfall. These tanks some time will be fed by the feeder canal from rainfed river or irrigation tanks situated in the upstream. Improper maintenance of these structure leads to reduced effectiveness. For example, weak embankments allows people to store less water than its original capacity, silting up of tank bed leads to reduction in storage of water which in turn leads to reduced command area and leave the land as fallow. In the same way, the entire command area becomes fallow and infested with full of Prosopis Julifera (A thorny shrub which is a symbol of desertification in these districts) when the complete tank becomes dysfunctional.
3. **Poor maintenance of Ooranies (Village Ponds):** These districts have an exclusive structure called Ooranies for the domestic purposes such as drinking, bathing and other household activities and for livestock. These are dugout area having water holding capacity of 2000 cubic meter to 15000 cubic meter which holds water during rainfall and people use the water stored in these village ponds till next monsoon. As these Ooranies are not desilted every year, the water holding capacity is reduced. Some times the Ooranies are not getting filled due to dysfunction of feeder canal and mixing of sewage water in the catchment area of these structures. This makes the people to migrate as the people do not have one of the life supporting resource i.e. water in their village.
4. **Erosion of top soil :** Top soil which is rich in nutrients are getting eroded and are getting collected in the tank during high rainfall. Earlier, there is a mechanism called 'Kudimaramathu' which means the removal of silts deposited in the tank bed and applying to the field by contributing free labour. Now this practice is extinct as the farmers are separated from maintaining the common property due to centralized maintenance. The loss of nutrients were managed by applying silt. Due to absence of this practice, the lands are getting degraded, which leads to reduction in the yield or high cost in applying organic manure to maintain the soil nutrients.
5. **Absence of creation of new water harvesting structures:** The "water commons" that is present now are created centuries back and are designed based on the needs of population at that point of time. Due to increased population, new water harvesting structures are not created. This again leads to migration to places where there is water and abandoning of agriculture from the place where people are migrating.
6. **Gender insensitiveness:** Even if new water structures are created, it is not created in a place which can be easily accessed by women. Hence water structures created are not being used and does not arrest migration.
7. **Local needs are unheard:** Just by creating a small infrastructure worth of a lakh rupees, livelihood of more than 250 families can be saved. Since the people who are deciding the fund flow are not resident/do not have any stake in it, it is not becoming the priority. For example, a backwater extends between Vedharanyam and Nagapattinam. During high tides, the water from these canals enters into

the fresh water canal and makes the canal base saline. When the fresh water comes, the water becomes salty due to salt deposits and crop growth is getting affected as the crop is irrigated with saline water during tender age. This leads to reduction in the yield and their voices are not heard. Continuous avoidance will lead the farmers in the area to abandon agriculture

8. **Local wisdoms are unheard:** Many times the local community knows what they need and how to do it effectively. When local community are involved/ provided a space in designing and execution, they give better long lasting solution for the existing problem. The work out put also will be more than 100% as the works are felt needs of the community.
9. **Mismatch in availability of funds:** As the fund flow into the village is based on departments fund availability, sometimes money will be spent on relaying roads which is not lifeline resource when compared renovation of water bodies.
10. **Vulnerability of poor:** The predominant section of people who are doing agriculture is very poor who do not have any assured income. Due to erratic rainfall, poor are now hesitating to go for agriculture and left the land as fallow. These uncultivated lands now infested with prosopis julifera. The lands which are infested with Prosopis Julifera is a sign of desertification. The infestation of this thorny bush make the land also less fertile.
11. **Agriculture is becoming unsustainable livelihood:** As the income from the agriculture is dwindled due to many reasons such as increased input cost, high labor cost, people are abandoning agriculture. In many villages elders are only practicing agriculture and young one are migrating to near by town/cities/abroad in search of livelihood. In such condition, if rainfall fails, then it the situation becomes still worse.
12. **Conversion of Agricultural land for other activities**: The agricultural land in coastal districts are converted into salt pans and shrimp farms. The salt pan in addition to affecting the area where it is located, also affects the land in the proximity due to seepage. The problems become severe when the run off from this enter another tank and affects the area commanded by that tank. The shrimp farms that created in one of the block viz. Thirupullani in Ramanathapuram district are abandoned more than 5 years back. But the ill effect of are not even subsided now. The Ooranies which are located downstream of it can not be used even now. This makes the people to abandon their village and shift to near by town.
13. **When the tank fails:** The irrigation tanks act like flood moderator and drought mitigator. When even these structures fails, farmers do not have/aware of alternatives to have successful crop or mechanism to mitigate the risk.
14. **Availability of Financial Resources:** The irrigations which are more than 100 command area are under the control of Public work department and are getting renovated. But the tanks which are having less than 100 acre command area are coming under panchayat which does not have any funds for renovation.
15. Many times the centralized water supply schemes fail, as entire districts to be supported by bringing water from another basin. People are not able to get water even once in two days. This brings uncertainty over the much needed resource for the day to day activity and force the people to migrate and there by abandoning the agriculture.

Combating desertification - DHAN's Experience: DHAN Foundation in partnership with European Union implemented a project in the Costal districts of Tamilnadu. Through this project nearly 85 irrigation tanks and 40 Village ponds have been renovated and 1080 farm ponds have been newly created to address the issues of Desertification.

- Through this project water storage capacity of 1.2 billion liters (1.2 Million Cubic Meter) of water has been created to store rain fall run off. Through this project, the embankments of all the 85 tanks has been strengthened which leads to the storage of water to its full capacity and farmers were able to take successful crop due to renovation. In few of the tanks, farmers were able to go for second crop due to surplus water available.
- Many farmers have reclaimed their land by taking silt from the tank and depositing in their field. The soil below one foot is used for strengthening embankments.
- Community ownership has been created by creating the space for the community to design and execute the works. This leads to the good quality work and effectiveness of tanks improved. This leads to decreased desertification.

- New village ponds have been established in addition to renovation of existing ponds. These village ponds are serving even the villages which are nearer to the renovated ponds. Otherwise these people have to go to other villages even for bathing. This ensures water for their domestic purpose and prevents the migration. The water availability in these ponds has been extended by more than 4 to six months by the increased storage of water.
- Local needs are heard: For example, In Mathalapuram village in Tuticorin district, the need reconstruction of wall in one side of the well has been requested. The project can meet out only 40% of the cost. But the community mobilized remaining 60% of the cost and ensured quality construction. Once space is created for the poor, they perform.
- Local wisdom are heard: For example, In Pudhur block of Tuticorin district, while renovating the village pond, the people used the dugout soil to create an embankment in such a way that the run of water is getting stored in the embankment in addition to the dugout area. Once the water in the dugout area recedes, the water collected in the embankment fills the ponds continuously. This water will be enough for them till next season.
- The tanks act as flood moderator and drought mitigator. Sometime even the tanks were unable to support to have successful crop when the rainfall is scanty. In such situation the farm ponds created have come to the rescue of farmers to irrigate the crop during critical stage and to have successful crop. During last north east monsoon, the rain fall is low in Saveria pattinam village. They did not get rainfall after December 10, 2011. But they were able to harvest good crop with the support of Farm ponds. Nearly 200 farmers in the Mudhukulathur block of Ramanathapuram got benefited due to this. Now the farm pond gives the confidence for the farmers to go for agriculture even under rainfed condition. They have seen that they can harvest good crop even the rainfall fails during critical stage with the support of farm ponds and it acts as good tool combat desertification.
- With the limited resource, the works were done to the highest quality without wasting a single rupee due to the involvement of the farmers in execution. Many times they have ploughed back the income which they have got through this execution and exceed the required quantity of the work to be done. Community ownership created through this project will have positive impact in maintaining the tank for the future as they have got the confidence of carrying out such a big work on their own.
- Weather based insurance programme has been introduced in three blocks of Ramanathapuram to mitigate the risk faced by farmers in the event of failure of rainfall. This is part of ongoing programmes of DHAN in the development of small and marginal farmers.

Recommendations:

Tanks are Life lines of underprivileged poor and rural community

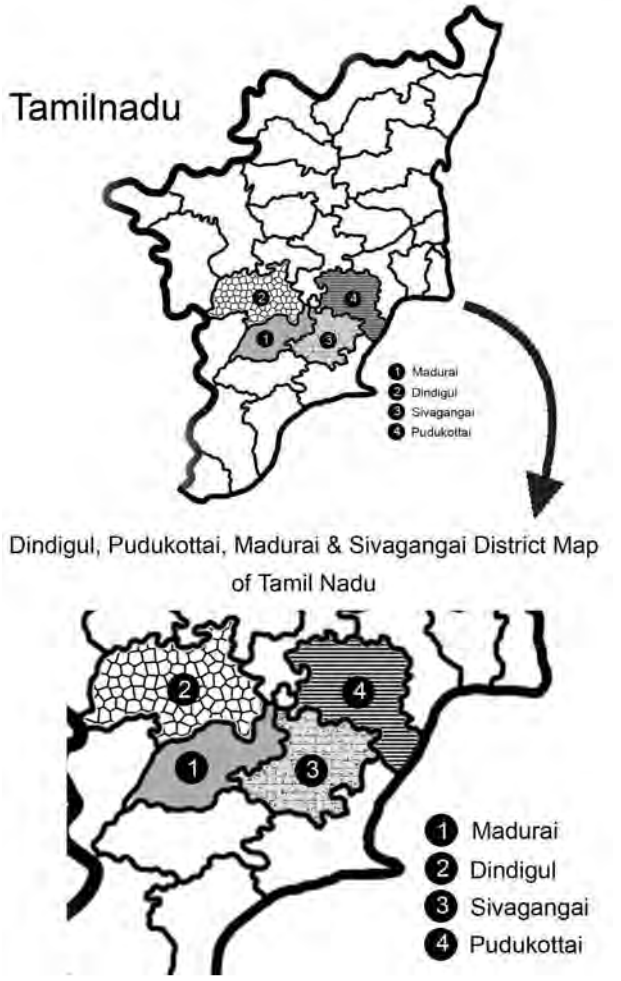
- Capital Investment in Tank Infrastructure development by the Government with Bilateral assistance of World Bank/ADB credit should focus Community driven, tank cascade development at sub basin level. In addition the centrally sponsored programme Repair, Renovate and Rehabilitation (RRR) of water bodies by the Ministry of Water Resources must give priority to chain of non-system rainfed tanks which are highly susceptible to breaches induced by climate change implications.
- The Ministry of Rural Development should complement rural drinking water supply programmes by allocating adequate resources to scientifically develop surface water based drinking water ponds in alluvial coastal plains and/or in water scarce, ground water exploited regions of the country.
- Roles for CBOs, NGOs and Government should be well defined with partnership principle
- Convergence of schemes - Single Window Approach should be given priority
- Adequate Resource Allocation for carrying out Action Research on Tank Irrigation Systems by professionally qualified research institutions, grassroots agencies should be given importance
- Small scale irrigation sources based agriculture will require increased support and an approach to farming built on indigenous and native crop species to boost biodiversity is essential. Marginal and small tank farmers require adequate schematic support from government through policy changes and research that addresses their problem of livelihoods.
- New Product development comprehensively to tackle risks through Mutual Insurance should be complemented. ■

DHAN - Axis Bank Foundation project for Conservation of Small Scale Irrigation Tanks

N. Venkatesan*

About the project

A pilot project for conserving small scale irrigation tanks for livelihood protection of farm families relying on agriculture and allied activities using tanks water as the source is under progress in Pambar-Kottakariyar river basin in South India. This model project is the collaborative effort of Axis Bank Foundation and DVTF to revive the tank cascades for poverty reduction and sustainable agriculture. The total cost of the Project is Rs.1648.76 lakhs of which, Axis Bank Foundation shares Rs.1336.32 lakhs and Community contributes Rs.312.44 lakhs. The total project period is for 5 years from the year 2011



Dindigul, Pudukottai, Madurai & Sivagangai District Map of Tamil Nadu

Project Area

The project area is at the junction of four districts namely Madurai, Dindigul, Sivaganga and Pudukottai where the four blocks are situated on contiguous basis namely Natham in Dindigul, Kottampatti in Madurai, S.Pudur in Sivaganga and Ponnamaravathy in Pudukottai districts. This entire belt is known for intensive tankfed agriculture and most of the families residing here are small and marginal farmers and they mainly depending on agriculture for their livelihood.

The project area is part of the Pambar- Kottakaraiar river basin on hydrological basis for drainage of rain water during the monsoon. The area falls under Thirumanimuthar sub basin with three ephemeral streams namely Thirumanimuthar, Virusuliar and Manimuthar and finally joins together at a point and then drains to Pambar Kottakaraiar basin. This region has hundreds of small scale water bodies viz. irrigation tanks and village ponds which caters the irrigation, livelihood and drinking water needs of the people.

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Objectives of the project

Overall Objective

"Ensuring the improved agricultural and allied livelihoods to the underprivileged poor farming and landless community living in disasters (flood induced/ drought hit) ephemeral Pambar-Kottakariyar river basin in South India"

Specific Objectives

The following are the specific objectives of the project

1. To organize the unorganized people in project villages into formal associations viz. Vayalagams, Cascade and federations in phased manner and empower their capacity through need based skill and leadership development programmes..
2. To enhance the bio diversity and Micro Environment in the Project Villages with appropriate actions to overcome from Degradation and constant disaster occurrences.
3. To create access to improved Drinking Water Surface Water resources
4. To Financially include the Excluded by Promoting micro finance activities
5. To empower the women folks by integrating their needs for occupational development and basic needs in the project area.
6. To create a mass awareness of the Climate Change Implications in Madurai City through Marathon Event.

Programme Components

To ensure the above development interventions the following programme components will be

a) Creating nested people institutions for the 750 water bodies proposed

To achieve first objective of the project, one professional and one community accountant will be placed in each block. Primary people institutions will be promoted at village level covering 156 tanks under each block with 15 to 20 cascade of tanks and 31 village ponds per block. A nested people institution that covers 750 water bodies and 75tank cascades will be created

b) Conservation and development of water bodies

To achieve the second objectives of the project, our local team would ensure the rehabilitation of 156 tanks and 31 village ponds in each block. Each tank would be focused for rehabilitation of its supply channel, deepening tank bed, repairs of sluices and surplus weirs and provision of shutters to sluices. The priority will be given for the most affected and needy poor farming community under each tank and ponds. Focus will be on increasing agricultural productivity and livelihood enhancement through this developmental works.

c) Creating an endowment for 625 tank institutions promoted

The endowment will be created for each water body proposed for rehabilitation and through this endowment created the interest earned would be available for the annual regular maintenance of the tanks and ponds. This activity would ensure the future sustainability of the promoted institutions.

d) Creating demonstrations on sustainable agriculture interventions for productivity enhancement

The farmers field school for selected crops, SRI System Rice Intensification and plant clinics at cascade level etc. will be established in 80 cascades for demonstration purpose. Crop Cultivation Competitions is also planned at each block level.

e) Demonstrations on Livestock development for enhanced productivity

It was observed that farm families in the project area own livestocks for generating additional income. Animal health camps are hence planned in the project area at cascade level at the rate of one camp per cascade. Based on the needs the packages of intervention will be evolved and integrated. The MFGs to be promoted would take care of the credit needs for animal rearing and related activities.

f) Arresting the siltation of the tanks and channels in the project area

It was observed that the project area and the Thirumanimuthar sub basin is at the head reaches of the pambar and Kootakaraiar basin and is situated very close to hillocks with higher percentage of slope. This would enhance the soil erosion and siltation of the link

channels and tanks in the lower reaches. It was observed that 25 to 40 percentages of the cultivable lands along the channels and drainage lines in the sub basin is affected by this issue of siltation. In addition, this siltation also reduces the storage capacities of the tanks and ponds. Soil and water conservation measures such as loose rock check dams across the drainage lines, field bunding in the private lands, tree plantations in the lands of catchment's and in foreshore of the tanks and others as suited in the particular tank catchment's in consultation with the community is planned in the project area to arrest siltation in 60 cascades.

g) Fisheries development for ensuring the food security and enhanced revenue

Fingerlings will be provided for developing inland fisheries in 300 tanks and water bodies and demonstrations of the activity will be done. The additional revenue generated through fish rearing would be used for sustainability of the people institutions around the water bodies for regular maintenance and management of the tanks and water bodies.

h) Creating dead storage exclusively for the fish rearing

Out of 625 tanks, at 100 tanks exclusive focus would be given to create dead storage which would be below the sill level and is available only for fish rearing and animal drinking. This would be the unique product for demonstration of fish rearing and replicated for the rest in future.

Anticipated benefit from the proposed project

- 750 tank based people institutions and 80 tank cascades will be promoted and in place for taking care of the local management of these water bodies for generations.
- 10100 hectares of tank command area will get stabilized for their tank fed agriculture and assured production by rehabilitating the 625 tanks.
- 4750 more ground water wells are getting recharged because of the storage created additionally through the tank rehabilitation under this project.
- The 30000 and more farming families will get an additional income by stabilized agriculture and allied activities through this project. Indirectly another 30000 and more landless would get benefit through this project for their agriculture wage labour through the stabilized agriculture
- The 30000 and more livestock population in the project area would get benefit through the ensured dead storage in the 750 water bodies in the project area. In addition livestock productivity will be increased by conducting periodical veterinary development activities and introducing improved breeds.
- The dead storage will be created in 100 water bodies as an exclusive basis for aquaculture development and ensuring the nutrition security for the landless and marginal farming communities.
- Through the agriculture interventions, the productivity at each farming household level would be increased by 5 to 10 bags per season through the integrated interventions.
- The endowment created at 625 tanks would ensure the annual regular maintenance of the tanks for ensuring the future sustainability.
- The small and marginal farmers will be mobilized as micro finance groups among the tank farmers and they will do savings, credit and insurance and get the access to banks and KDFS for their credit needs for economical and financial sustainability. 750 more Micro finance Groups will be promoted and linked with the banks and KDFS for their credit needs on phased manner.
- With the support of Axis bank, mass awareness on climate change adaptation through Madurai marathon will be created by involving the community and other stake holders.
- The impact and success stories of the project will be documented as film, publications and it is made available for replication of similar approaches to else where in the country. The learning's will be disseminated through organizing the seminars on various themes of the proposed project.
- Through the village drinking water pond development, hardship faced by the women will be addressed at 125 villages in the project area. In addition the women will be integrated in decision making forums like executive and management committees of the people institutions.
- They also will be part of the 750 MFGs for their livelihood and agriculture development for addressing their poverty situations.

- As a whole, the project will ensure efficient system of local management and sustainable development in 750 water bodies in the Thirumanimuthar sub basin.
- Because of the reviving the missing links and enhanced storage, the frequent flood damages will be reduced and community will take care through early warning system.
- This project will be the demonstration model in the sub basin to address the tank management issues with holistic approaches and it will influence the mainstream policies to effectively implement the small scale water bodies' development through community participation in a holistic way.

Electricity Saving Tips

Light bulbs

The compact fluorescent lights (CFL) though might be costlier than normal incandescent bulbs, they save much energy. Go for branded CFL bulbs with necessary watts as an alternative for normal bulbs and tube lights both at office and work place. Compared to the investment you make you can save more power and they will prove economical in long run, more than compensating the cost you incurred on them

Sharing

Know Your Heritage

Madurai- Athens of the South

Of all the ancient cities of India, Madurai has a unique place with its literary efflorescence, puranic glories and continuous long history. Madurai has trade contacts with the cities situated on the banks of river Ganges and as well as the Greeks and Romans. Even today, Madurai keeps its glorious past, traditional temple festivals and political importance intact.

Thirumalai Nayak Palace : It is believed that the celebrated Nayak King Thirumalai Nayak (A.D.1120-1659) erected this palace around A.D.1636. There were two main portions ie. Swargavilas and Rangavilas, enclosed by a high wall called Parimathil. Most of the structures of the Palace have been destroyed and only one fourth of the palace exists today. The elephant staple, horse court, vasanthavavi, garden, officers residences, playground, the temple of the Goddess Rajarajeswari and other parts of the original palace were destroyed due to obvious reasons. The northern part of the Palace, seems to have existed by the side of the Naubat-Khana street. The king Thirumalai Nayak believed to have resided in the celestial pavilion called Swargavilas, which still exists. The remaining existing parts of the Palare are a large courtyard, darbhar hall, pooja room, natakasala and bed chamber.

The upper portion of the Palace is decorated with a number of beautiful domes supported by wonderful short but heavy columns. Attractive arches, stucco figures and stucco works are some of the artistic splendours of this Palace. This is an ancient South Indian Palace constructed by lime, bricks, wood, and stone, showing curious workmanship and great beauty. The Palace is the best example of Indo-Sarasanic architecture, ie. an admixture of traditional Hindu and Muslim architecture.

Enhancing livelihoods and ecosystems - role of small water bodies in India

N.Rajasekaran *

1.0. Introduction

In rural India, tanks/ponds have been playing very vital role in socio, cultural, economic and environment development. Tanks & Ponds are the common property of Indian villages and support the livelihoods of the marginalized community in rural, urban, coastal and tribal areas of India. These small scale water bodies generate substantial income to village common fund through usufructs (fishery, trees etc.), which in turn is used for village development work. Tanks are sources of fuel wood, timber and fodder to livestock of marginalized people. During summer season, landless people use tank bed for cucumber and vegetable cultivation to earn additional income. Several lakhs of farming families are dependent on tank system in South India. There are about 5,00,000 tanks in India and these tanks are intensely situated in semi arid parts of Peninsular India. These tanks capture the runoff water of the monsoon rainfall occurring in a short span of time and providing water for irrigation & other multiple uses for the community who depend on this. These tanks were created by our forefathers and managed by the local communities over several centuries. These tanks and ponds are highly adoptive to the implications of the climate change. This paper discussed about the role of these small scale water bodies in enhancing the livelihoods of the local community in rural, urban, coastal and tribal community.

2.0. Present Status and livelihood option

2.1. Rural context

The people living below the poverty line in rural India are not getting adequate water and in a affordable manner. The tanks and ponds are highly used for agricultural and other village uses in semi arid regions of South India; However the degeneration of the these water bodies is happened due to sedimentation, encroachments, damaged water regulating structures, weak bunds, disappearance traditional community

governance, over extraction of ground water and changes in the land use of their catchment areas. Their performance efficiency also has been deteriorating due to inadequate maintenance and neglect. Many efforts are being made to enhance water storage by such activities as water conservation and rehabilitation of tank irrigation systems with community participation and management in a most cost effective manner. These tanks are mostly spread over rural and drought prone areas and the users are predominantly small and marginal farmers having land holdings less than 1 hectare each. Their livelihood depends on such small water bodies. They are vulnerable sections of the farming community, primarily depending upon the capricious monsoons. They do not have access to large scale canal irrigation systems or to independent groundwater sources like wells. The only way to improve their crop production from tank fed farming is to provide them access to such supplemental water resources like conservation of small water bodies like tanks and ponds through participatory process and enable them to manage the water distribution and thus become self reliant.

2.2. Urban context

Water demand is increased in urban area because of faster urbanization; the water need could not be fulfilled by the existing combined drinking water projects from the rivers. Because of the dense population ground water

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extraction is too high in urban area. However the tanks/ ponds in the urban area have the high potential to bridge the gap in the existing water demand of the urban population. But the urban water bodies are forced to the environmental problems because of the dumping of the garbage in water bodies, draining sewage water in to the tanks, construction of the government buildings & other infrastructures in the water spread area and encroachment of the water ways. This leads to the extinction of the water bodies, contamination of the water bodies, spreading of the water borne diseases and other environmental problems. Encroachment of the water ways resulted in heavy flood during the monsoon time. These water bodies have high potential of ground water recharge and other water supply. So the way to supplement the existing water resources to meet out the increasing water need, prevention of extinction of water bodies, waste water recycling and other rainwater harvesting techniques.

2.3. Coastal context

In coastal areas, drinking water ponds still continue to be the primary source of drinking water and domestic water use, where the ground water is saline and these areas have no rivers to supply drinking water. In some of the coastal areas there is less intensity of the traditional water resources and other water diversion structures. Creating the new water bodies like common ponds, farm ponds, restoring existing water bodies and other water harvesting structures will help to cope up with the saline ground water problem and enhance the livelihoods of the poor people.

2.4. Tribal context

In tribal context, tank based watershed development resulted in the renovation of the ponds, tanks, creating new water harvesting structures, orchard development and wage employment for the poor families. In tribal areas the ground water resources are less utilized. Use of surface water supplemented with ground water will help for the poor families of tribal area. These water conservation activities enhance the livelihood activities of the tribal poor.

3.0. Tanks and their Roles in Ecosystem Conservation

Tanks have been playing very vital role in conserving the village ecosystem and environment development. The eco system perspective of tanks given under:

3.1. Wetland Ecosystem

Tanks/ponds are one of the wetland eco-systems with many trees flora and fauna in their foreshore, water spread area, channel area and bunds in addition to agro-climatic zone specific cropping pattern in command area of the tanks. It is act as the place for the bio diversity conservation of the local species of the village. They generate greater revenue for the people who directly dependent on them. The local species of the village are conserved traditionally as sacred grooves in some of the village tank complex.

3.2. Ground Water Recharge Basins

Tanks are predominantly situated in hard rock area and most of them varying from shallow 1m depth up to 6 metres depth. They store monsoon run-off for more than 4 to 6 months. They facilitate ground water recharge in their zone of influence and facilitate the ground water level increase in many places. The aquifers in the wells in the vicinity within the radius of one kilometre of the water bodies were revived and have again come into life through ground water recharge after the tank development works, since the pores closed due to siltation opened up after rehabilitation of tank systems.

3.3. Tank cascades/tank based watershed development

Tanks in the Southern India are situated in Deccan Plateau in cascades. The monsoons received in the catchments are equitably distributed among the tanks in cascade based on their capacity and hydrological linkage. There is least amount of conveyance, seepage losses in tank cascade systems as against the canal

irrigation systems. These tank cascades are acts as a flood moderator at the time of monsoon season. The equitable distribution of water and smaller land holding in command area of each tanks facilitate higher productivity if the tank cascade systems perform to their optimum efficiency. In tribal area tank based watershed development includes the renovation of the existing water bodies and catchment area treatment for the effective storage of the rainwater.

3.4. Tanks and Inland Fisheries

As the tanks hold water for 4 to 6 months period, the village community take up pisciculture activities as the freshwater ecosystem nurture the growth of fishes and gives good income to the community. In some villages fish rearing activities help to ensure the nutritional security of the poor people of villages their own household consumption.

3.5. Tanks and Afforestation

In the context of South India, especially in Tamil Nadu, the Forest Department is allowed to raise social forestry (acacia plantations) in the tank bed; in a period of 5 to 6 years, they mature to a sizable bio-mass which are cut and sold for fuel and timber. Also, a sizeable amount of resource mobilized from selling woods is likely to be shared by the local institution for managing and maintaining the tanks. In addition to this the trees planted in the rear of the bund and foreshore by the tank farmers associations and local panchayat and it gives good income to the village. It is used as a fodder and fire wood by the local people. Orchards developed in the tank catchment area of tanks reduce the erosion and it ensures the livelihood security of the tribal families.

3.6. Tanks and Grazing

After rehabilitation of tanks, if foreshore plantation is carried out and grasses are grown under the trees and bunds, then the grasses are used to the livestock as grazing land. As such in Tamil Nadu State, there is no category under Land Use pattern for grazing lands, only the tanks provide source for grazing immediately after monsoon season.

3.7. Tanks and Bird Sanctuary

The trees for shelter and availability of sufficient feed in the water make the tanks as a better place for residing of birds. In many South Indian tanks, the birds' sanctuaries are situated. To quote few, Vedanthangal in Kancheepuram District, Vettakudi in Sivagangai district, and Chitrakudi tank in Ramanathapuram District serve as bird sanctuaries. The community even now preserve the sanctuaries by deputing their own watch and ward and impose social norms such as no fire crackers use, banning hunting practices and the like.

4.0. DHAN Foundation's approach in Enhancing livelihoods and ecosystems

Since 1992, DHAN Foundation a professional development organization based at Madurai has been implementing tank conservation and watershed development projects including rejuvenation of drinking water ponds in south India. DHAN Foundation's ap-proach is mainly reviving the community management in small scale water bodies which are already locally managed in terms of water distribution and utilization. Our efforts over the past two decades in drought prone areas of Tamil Nadu, Andhra Pradesh, Pudhucherry , Odhisa and Karnataka in south India for making the tanks more useful to the rural communities. The program named Vayalagam tank fed agricultural development is being implemented for livelihoods development of poor marginalised farming community. The programme is working with 212879 farming families who are depending on the small scale water bodies. 75% of the members reach is from rural context, 2% of the member from urban context, 15% of the member from coastal context and 8% of the member reach from the tribal context. The programme has the following major components.

4.1 Community mobilisation: Promotion of the people institution for the small water bodies is of core of the programme wherein the communities are mobilized to conserve their water resources in a sustainable way.

4.2 Integrated tank development and tank based watershed development: Component ensures the conservation works like tank renovation, pond renovation, clearing the link channel, catchment area treatment works are done in a tank cascade/ watershed basis ensuring highest possible returns to the farming families.

4.3 Tank fed agriculture development: Tank fed agriculture development provides appropriate methods and techniques in using the water and land

efficiently for improving the productivity of the tank command area and catchment areas.

4.4 Tank endowments: A corpus fund is generated to village tank institutions on a matching basis to sustain their conserved tanks.

4.5 Micro finance activities: Micro finance groups are formed within the tank farmers associations and timely credit need is availed through the bank linkage for livelihood activities of the farmers and it help the tank farmers to meet at regular intervals.

Water bodies	Ecosystem/context			
	Rural	Urban	Coastal	Tribal
Irrigation tanks	High to moderate for agricultural use	Low to negligible due to pollution and encroachment. There is good scope for groundwater recharge	Moderate useComplementing the drinking water	High to moderate for agricultural and other domestic use
Village ponds and drinking water ponds	High to moderate	Negligible due to pollution and encroachment	Moderate use and complementing the drinking water	High to moderate use for domestic and livestock purpose
Focus	Conservation and development	Prevention from extinction	Conservation and development, disaster prepared ness and risk reduction Creation of new water bodies	Creation of new water bodies
Approach	Community mobilization and conservation works with community investment	Demonstrating the waste water recycling and dissemination of the knowledge to the various stakeholders & general public, ensuring the safe drinking water to urban households	Community mobilization and conservation works with community investment	Community mobilization, ensuring the employment, integrated development
Programme reach of 2 Lakh + families	75%	2%	15%	8%

5.0. DHAN's works for Enhancing livelihoods and ecosystems

- Since from the inception of the programme, community is organized into 2673 tank associations, 168 tank cascade associations/watershed development associations and 31 block tank farmers federation in different contexts.
- The programme
  - State government of Tamilnadu, Andhra Pradesh, Karnataka, & Orissa,
  - NABARD, Local banks
  - Funding agencies Ford foundation, European union, UNDP, FAO
  - Corporates like HUL, Axis bank, ITC Rural development trust, Bharath Petroleum corporation and others
- The community investment for all the conservation works ranging from 10-25% either by cash or kind for common resources and 25-50% for individually owned water resources such as farm ponds.

- The tank rehabilitation and other tank development works were completed for 1338 tanks, 882 ponds and 61 watersheds have benefited over 1,50,840 hectares of land owned by small and marginal farmers.
- Microfinance groups promoted among the tank farmers including both men and women were able to mobilize the Rs296.42 million worth loans from the local commercial banks for the livelihood development activities.
- Social security programmes like life insurance and crop insurance is facilitated to the farmers to cope up with risk and vulnerabilities.
- By the promotion of the inland fishery, additional income along with the enhanced nutritional security in the poor families is ensured. In the year 2010-11 fish rearing activities were taken up in 367 water bodies.
- In urban context, renovation of urban water bodies including the temple tanks, improved access to safe drinking water through bio sand filters, demonstration and dissemination of the decentralized waste water treatment is being done by the Centre for Urban Water Resources(CURE) promoted by DHAN Foundation.

6.0. Way forward

- Thrust needs to be given to people's involvement and to build their stake in implementing
- Each and every phase of tank development and watershed development programmes of Government.
- Tank development and watershed development activities have to be converged together to ensure the better impact. The treatment of catchment area in the watershed has decreased the silt deposition in the tanks. So Inclusion and rehabilitation of tanks as a part of watershed treatment or vice versa could be done for better impacts.
- Context specific or ecological based planning and implementation of the watershed development and tank development works.
- There are variations across the regions, local environments, practices and tank user regimes, and so the conservation and development approaches will be varying from place to place.
- Government must be careful in constructing new percolation tanks in red soil area where most of the tanks are situated and construction of percolation ponds would diminish the runoff to the existing tanks.
- Another issue in tank conservation is silt removal. The Government can consider investing it funds in desiltation / give ownership of the silt to landless people to encourage equity in irrigation development.
- Public-Private participation in developing and implementing conservation and sustainable use policies and programs should be provided for and encouraged in the country.
- Projects like TN-IAMWARM, JSYS, and APCTMP can be implemented by joining hands with the existing Tank association/water user associations (Vayalagam) in community management of water bodies in real time.
- Urban water resources should be protected from encroachment and extinction by suitable protection act by the State government.
- Poverty reduction needs to be approached in longer perspective for the under developed tribal area.

Development News

Mission Milk

The ambitious Rs 2,242-crore National Dairy Plan phase-one (NDP-I) also called as Mission Milk was launched on 19th April, 2012 by Union agriculture minister Sharad Pawar at National Dairy Development Board (NDDB), Anand. NDP-1 Is a multi-state initiative aimed at increasing the productivity of milch animals and enable Indias 70 million rural milk producers a greater access to organized milk processing sector. NDP-1 will focus on 14 major milk producing states namely Andrapradesh, Bihar, Gujarat, Hariyana, Karnataka, Kerala, Madhyapradesh, Maharashtra, Odisha, Punjab, Rajasthan, TamilNadu, Uttarpradesh and West Bengal which accounts for country's 90 % of milk production. The Mission Milk will be implemented by NDDB through identified End implementing agencies like State cooperative dairy federations, District Cooperative milk Producers unions, registered societies/trusts, Section 25 companies and other related institutions.

Revalorizing Small Millets: An action research project

M.Palanisamy and M.Karthikeyan*

About the Project

The action research project 'Revalorising Small Millets in Rainfed Regions of South Asia' aims to increase production and consumption of nutritious small millets and associated pulse and oil seed crops in rainfed regions of India, Nepal and Sri Lanka. It focuses on overcoming existing constraints related to production, distribution and consumption of small millets and associated crops It pursues a multi-pronged research strategy related to conservation, productivity enhancement, value addition, post-harvest processing, promotion and policy action to raise the profile of small millets. The project has selected six research sites in the backward and tribal dominated pockets of Tamil Nadu, Andhra Pradesh, Odisha and Jharkhand states of India and one site each in Sri Lanka and Nepal. . This project is supported by Canadian International Food Security Research Fund (CIFSRF) promoted by Canadian International Development Agency (CIDA) and International Development Research Centre (IDRC), Canada. This three and half-year project is anchored by DHAN Foundation in association with Canadian Mennonite University. In India the project is implemented through DHAN Foundation,Tamil Nadu Agriculture University, All India Coordinated Small Millets Improvement Program, Indian Council of Agriculture Research and Watershed Support Services and Activities Network (WASSAN)

Objectives

The major objective of the action research is to increase production and daily consumption of nutritious small millets, pulses and oil seeds in rainfed regions of India, Nepal and Sri Lanka by using gender sensitive participatory approaches to address constraints related to the production, distribution, and consumption of underutilized species. This project has the following specific objectives.

- To promote sustainable use and on farm conservation of agro biodiversity of small millets that are important for minimizing climate change related risks in agriculture and improving human and animal health in rainfed ecosystems.
- To develop sustainable agriculture kits, through gender sensitive farming system based participatory research, for minimizing agronomic and production related constraints experienced by small millets based cropping systems in rainfed regions.
- To develop and adapt appropriate post-harvest technologies and add value for increasing consumption of small millets, especially among rural women and children, and to create sustained demands in local markets.
- To revitalize indigenous knowledge and sociocultural practices that augment cultivation, processing, storage, and utilization of small millets.

***Mr. M.Palanisamy,** Programme Leader and **Mr. M.Karthikeyan,** Programme Leader, DHAN Foundation

- To enhance the consumption and social status of small millets as a wholesome foods in rural and urban settings.
- To undertake policy analysis and advocate for a policy environment that counterbalances incentives for green revolution crops and provides a level playing field for production and consumption of small millets.

Outputs

The expected major outputs of the project are as follows:

- Significant improvement in food availability and nutrition levels of women and children.
- Increase in production of minor millets and pulses by 20 to 25 per cent.
- Increase in spatial distribution and richness of genetic diversity of minor millets on farmers' fields.
- Site specific sustainable agriculture kits for cultivation of underutilized species.
- Development of at least three low cost technologies for processing and value addition of target species.
- Scaling up of at least two value added products from minor millets either by local entrepreneurs or public institutions.
- Practice manual or recipe book on the cultural and nutritional significance of minor millets and other underutilized species.
- A policy brief for supporting consumption and production of millets and supporting sustainable agriculture.
- Academic and non-academic publications including a book documenting indigenous technologies and practices. The project will organize two workshops and a national policy meeting to disseminate findings.

Project Themes

Theme 1: On-farm conservation of crop varietal diversity and improvement of crop varieties

There is a growing realization that crop varietal diversity, cultivated by small and marginal farmers in the global South, has enormous public value for ensuring global food security, poverty alleviation, and environmental sustainability. The research project examines the current state of crop varietal diversity of small millets in India, Nepal and Sri Lanka to understand the constraints and opportunities in promoting on farm conservation of crop varietal diversity. This project strives to strengthen farmers' efforts to improve, use and conserve crop varietal diversity of small millets. This will be achieved through the following research activities in the project sites.

1.1 Documentation and characterization of agro-biodiversity of small millets : A systematic survey of existing varietal diversity of different small millets will be conducted in each project site using participatory tools such as Diversity Fairs (locating diversity) and Community Biodiversity Registers for documenting associated traditional knowledge. The study will focus on inter crop and intra crop varietal diversity in small millets based cropping system. The farmers' taxonomy or folk classification will be used for identification and classification of crop genetic diversity. The data collected on crop genetic diversity will be analyzed for classifying varieties on the basis of their pedigree (farmers' varieties from within and outside the region, modern varieties, and creolized varieties) and spatial distribution indicating richness and evenness. The scientific measures do offer precise information on classification but are extremely costly and labour intensive. This project will employ molecular or DNA level analysis at the University of Guelph Centre for Biodiversity Genomics only when genetic diversity is not manifested in distinctive morphology attributes.

1.2 Participatory varietal trials and evaluation: Promising genetic materials collected from documentation of agro-biodiversity and materials from gene banks will be selected on the basis of farmers' yields, consumption, and local market preferences. Selected material will be used in participatory varietal trials, employing Mother and Baby trials. The mother trial will be established in farmers' fields using Randomized Complete Block Design (RCBD) with one replicate allocated per farmer. These experiments will be researcher designed but farmer-managed with farmers' normal level of input use. Data management will be done by researchers with major yield attributing parameters relevant for on-farm evaluation. Local male and female farmers and researchers will jointly visit the trial plots at the time of maturity of the

crop to evaluate the performance of the varieties. After the visit to the trial plots, focus group discussions with women and men will be organized to rank the tested varieties.

Existing self-help groups (SHGs) and farmers' groups (FGs) will be involved in seed multiplication of tested varieties in micro-plots to assure the project of enough seeds of preferred varieties for distribution to farmers under baby trials in subsequent years. For baby trials, one or two cultivars from the mother trial per farmer will be distributed to a large number of farmers through kits for testing in their plots. Unlike the mother trial, baby trials will be completely farmer managed with farmer inputs and supervision. The evaluation will be on the basis of farmers' perceptions collected at the household level through a simple questionnaire.

1.3 Mapping of seed channels and improving farmers' access to varietal diversity: Farmers' networks play a significant role in flows of information and genetic materials. A network analysis approach thus will be used to explore and map seed flow channels and the processes involved in maintenance of crop diversity on-farm. A socio-metric survey will be used to obtain relational/linking data among individuals and institutions. Snowball sampling will identify the initial sample of respondents as 'starters' who will provide data on their socio-metric links. The socio-metrically indicated individuals then become second stage respondents, and they in turn lead to third stage respondents. The process ultimately will identify a network of individuals and institutions (seed sellers) linked through seed and information flows. The nodal persons identified in the network will be used by SHGs/FGs in provision of project identified varieties and information to enhance farmer's access to diversity. The project will improve the farmers' access to different seed sources (community, public, private), and support farmers' visits across project sites for exchange of knowledge and practices as well as genetic materials. Seeds of lost varieties would be revived through mobilization of SHGs/FGs in local communities.

Theme 2: Crop Production Enhancement

According to a recent report of the All India Coordinated Research Project (AICRP) on small millets, there is a wide gap in productivity between small millets on research stations and on farmers' fields. This indicates that either currently available technologies are inappropriate for farmers' fields or they are not disseminated through site specific action research. This project seeks to revive the culture of farmers' experimentation by engaging them in diverse research activities to adapt and improve available scientific technologies.

2.1 Preparing sustainable agriculture kits: A systematic survey will be carried out on soil fertility, crop nutritional deficiency symptoms, farmers' cultivation practices, water management, disease and pest issues, abiotic stresses, post-harvest storage and other constraints. Based on the study outcome, an inventory of best scientific practices and available technologies to match these challenges will be compiled from national, regional, and international research centers (e.g. ICRISAT) as well as from indigenous knowledge systems (elsewhere in India and Africa). A number of low-cost approaches already exist to address the problems of soil fertility, water management, and plant protection in a sustainable manner but have yet to be exploited for conditions experienced by small farmers.

One of the most promising of these innovations is the idea of low-cost agricultural kits. A team of innovative farmers, scientists, and village level development workers will adapt these locally through inclusion of seeds (improved millet seeds, improved seeds that can be intercropped with millets to promote nitrogen fixation, phosphate solubilization, and "push-pull"-type organic pest management), low cost technologies (to help farmers with on-farm diagnostics of soil nutrition; low cost grain storage bags; microbial bio-fertilizers, etc.) and a picture book of best practices for illiterate women farmers (e.g. how to make own quality seeds; cleaning seed of fungal pathogens; water harvesting).

The goal is to rapidly disseminate global knowledge and already-available low cost technologies to local women farmers based on local needs. The kits will be distributed first to the most innovative farmers who have the highest probability of using the seeds, technologies and information to start local grassroots agri-businesses.

2.2 On farm research on agronomic practices: Site specific on farm research trials will be conducted on farming and cropping systems. The on-farm experiments in this project will be conducted on fields of small and resource poor farmers. The project will also ensure participation of women managed farms resulting from male outmigration.

2.3 Promoting soil and water conservation: The project will explore opportunities to promote long term soil and water conservation measures at individual farm and collective levels as they complement the project's focus on small millet production. Based on DHAN's experience, the project will develop a location specific package of livelihood focused natural resource management measures on a pilot scale.

Theme 3: Post-harvest processing and Value Addition

3.1 Evaluation of nutritional content and other attributes: A comparative biochemical analysis of nutrient content will be carried out for important varieties identified by farmers and rural consumers. The laboratory research will include proximate analyses (moisture, protein, lipids, carbohydrate and ash), and mineral composition (calcium and iron) as well as their bio-availability in products. Further, some recent studies have validated farmers' knowledge about use of small millets for people with diabetes. Research will focus on characterizing different attributes of starches extracted from small millets. Nutritionally promising varieties will be assessed for their potential in developing value added products to address nutritional insecurity and the growing rural and urban epidemic of diabetes. Selected varieties will be recommended for the participatory breeding program to improve their productivity.

3.2 Development of millets based food products for rural and urban consumers: Millet based products are typically consumed immediately after preparation and have a very short shelf life. There are very few millet based products on the market; a common exception is a dried enriched malted powder that is used as a breakfast drink. Given the healthful attributes of millets compared to other grains, however, there is ample opportunity to develop retail products as well as improving the shelf life of products for rural household consumption. This project will draw on women's knowledge of traditional foods to develop improved cooking processes and enhance the nutrient values and shelf-life of home cooked food products. This project will focus on alleviating health issues in the region including anemia, malnutrition and diabetes. Products will be evaluated for quality, shelf life and nutritional attributes. Consumer sensory evaluation will also be part of the product development process. Attention will be paid to the processes (unit operations) required to make products locally given their potential to generate income and employment in rural areas as well as to enhance rural consumption of these beneficial products.

3.3 Technology for de-hulling and milling of small millets: The post-harvest technology currently used by farmers for de-hulling is primarily designed for large sized grains. It yields a product that is inferior in terms of storage, taste and nutrient content. This project will develop a low cost, easy to use, efficient, and high capacity alternative appropriate technology. The project will assess available technology, if any, and make a plan for its adaptation to small millets. Students of local engineering colleges and local innovators would be engaged to brainstorm ideas for developing this technology. Prototypes will be constructed and tested at Tamil Nadu Agricultural University with part of the design and experimental work executed at McGill University, Canada. Once an appropriate technology is developed, it will be tested for quality of final output (cleaned grains and flour). These analyses will measure compositional, thermal and physical-chemical properties of the flours and compare them to traditional hand-pounded flours. A panel will be constituted and trained to evaluate sensory attributes of the flour slurry developed from the control flour.

Theme 4: Revitalize indigenous knowledge and socio-cultural practices

The project will approach indigenous knowledge systems as: (a) the 'practice of ecology' and (b) the 'ecology of practice'. Research on these two ways of understanding indigenous knowledge systems by adopting gender sensitive methods and empowering women as women play crucial roles in many agricultural operations and conducting competitions on this theme in schools and colleges will be done to revitalize the indigenous practice.

a) Practice of ecology

This perspective emphasizes research on farmers' practices, knowledge and skills related to farming; their natural resource management; and their food and livelihood options. The project will focus on agronomic practices, soil and water conservation, plant protection, characterization of crop varieties, conservation and improvement of crop varietal diversity, harvesting and processing of crop produce, grains storage and quality, coping mechanisms for environmental risks, nutritional qualities, and cooking and consumption of small millets. This area of knowledge systems can be codified, explained, validated, and augmented through the application of formal sciences. Some innovative agricultural practices developed by farmers will be incorporated into project participatory varietal selection trials, on-farm experimentation, and value addition research. These activities will help bridge between formal scientific and informal indigenous knowledge systems while acknowledging the role and significance of socioeconomic and cultural factors. The outcome of documentation of indigenous practices and subsequent validation and value addition will be disseminated to farmers within and across project sites.

b) The ecology of practice

This dimension of the research focuses on forces shaping or driving change such as ethnicity, gender, economic conditions and livelihood options, sociocultural institutions, and politics. The project will collect data on socioeconomic variables at individual, household, and community levels. A particular focus will be to understand how the power dynamics of resource allocation, reinforced through sociocultural institutions and the state, affect the poor, women, and marginalized social groups. Quantitative socioeconomic data will be gathered to analyze trends related to topics including resource use, access to land, and the nutritional balance of food consumption, food habits and daily energy use. Understanding the sociocultural context in which knowledge is produced and reproduced will help to identify structural limitations on disseminating any changes introduced by the project. Awareness of these limitations will increase the likelihood that interventions will reach marginalized groups, especially underprivileged women. Decoding the ecology of practice requires long term research and reflection, combining insights from both external viewpoints and local positions.

Theme 5: Promoting Consumption

In contemporary globalized agriculture, farm producers are not necessarily consumers of their own products and linking local production and consumption of small millets is complicated. Challenges arise from the inferior social status of small millets, their increasing demand in urban niche markets, and the labour intensive methods of preparing traditional foods. In order to ensure that increased cultivation area and productivity of small millets translate into a matching increase in consumption at the household level, the project will examine various means to:

- enhance the social profile of small millets based diet in rural communities
- increase access to small millets based products in local as well as distant markets; and
- improve the distribution of small millets based healthy foods or nutraceuticals across gender and class lines locally.

The project will pursue the following activities for promoting a brand called Mighty Small Millets. Consumer Survey, Promoting small millets through local entrepreneurs, Public and community based channels, Public outreach events like recipe contest and exhibition and educational campaigns will be done to promote consumption of small millets

Theme 6: Public policy analysis and change aimed at conducive policy environment for small millets

The project will analyze existing policy documents as well as the process of policy formulation, implementation, and enforcement. DHAN's experience with policy change suggests that policy makers are positive about taking action on policy recommendations when the latter are based on empirical evidence drawn from various sociocultural and political environments. In keeping with this point, the project offers an appropriate diversity of policy contexts and instruments as the selected research sites fall in six different geopolitical jurisdictions in South Asia. Policy analysis, opportunities in existing policies, reallocating direct subsidies provided to beneficiaries of PDS, networking with policy makers and like-minded NGOs and creating awareness in scientific institutions will be carried out to effect policy change during and after wrap-up of the project.

India Water Week

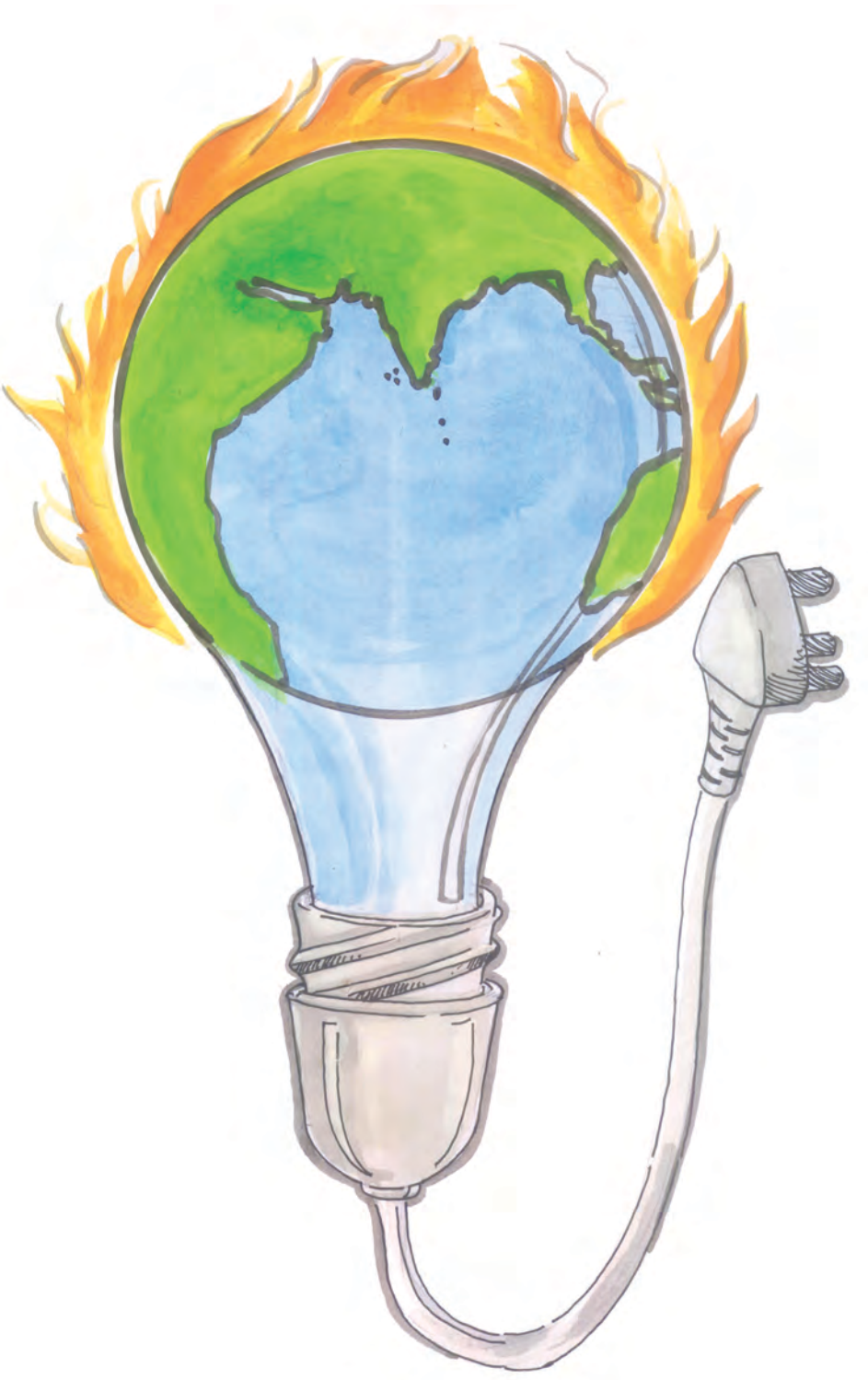
A. Gurunathan*

DHAN Foundation, Madurai took part in a week long "India Water Week" convened by Minsitry of Water Resources, Government of India, New Delhi. The event got organized at Vigyan Bhavan, India Habitat Center and Central Board of Irrigation and Power(CBIP)between 10th April 2012 to 14th April,2012. The inauguration was done by Shri.Manmohan Singh, Honorable Prime Minister of India in the presence of Mr.Pawan Kumar Bansal, and Honorable Minister for Water Resources and Mr.Sharad Pawar, Honorable Minister for agriculture.

As a part of this grand event, DHAN Vayalagam Foundation conducted an exhibition at Pragathi Maidan, New Delhi (Hall No : 9, Stall 11), highlighting the grassroots water resources development intervention by DHAN Foundation between 10th April,2012 and 12th April,2012. Many delegates and general public visited the exhibition. On 13th April 2012, DHAN Vayalagam Foundation conducted a National Seminar on 'Water bodies(irrigation tanks) sustaining food security' at Central Board of irrigation and Power" Chanakia Puri, New Delhi. Shri Jayaram Ramesh Honorable Minister for Rural Development. Government of India inaugurated the seminar and released a Manual on" Ahur-Payne rehabilitation in South Bihar". In his inaugural speech, he highlighted the contribution of MGNREGs in creating water assets in rural India and said that the Ministry is in the path of constantly improving the effectiveness of the MGNREGs. He appreciated the contributions of DHAN for improving the status of water bodies to benefit poor farmers in small scale water sectors. Mr.M.P.Vasimalai, Executive Director in his Key note address reiterated the necessity of stringent conservation laws and rolling out of massive tankfed agricultural mission. Earlier Mr. A.Gurnanathan, CEO, DHAN Vayalagam (Tank) Foundation welcomed the participants. Many other experts and DHAN's professionals presented technical papers on the subject Mr.N.Venketesan, COO delivered the vote of thanks.

***Mr.A.Gurunathan,** Programme Leader, DHAN Foundation

Avoid Incandescent Bulb



Art by:
Mr.Sundarajan, *CDC, DHAN Foundation*

Greening through farm orchards

Alleviating the "Greenhouse Effect", trees act as "Carbon Sinks". One acre of tree plantation will sequester about 2.5 tons of carbon annually. For every ton of new wood that grows, about 1.5 tons of Carbon dioxide is removed from the air and 1.07 tons of life-giving oxygen is produced. Trees planted in between or interspersed with crops can enhance soil fertility, increase soil moisture and reduce erosion. Trees act as windbreaks, attract bees and other insects that pollinate crops, and they can supply food for livestock. Horticulture trees provide commercial products like fruits, fodder and fiber, bringing assured additional income to farmers. Trees stabilise the soil and in arid areas they can prevent erosion of soil and its nutrients, thereby preventing the lands from desertification.

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