



Policy Brief **11**

Water Series

Translating Practices into Policy and Practice Changes

Farm Ponds for Enhancing Food Security



Farm pond constructed by Mr. V. Chandran, Kirungakottai village in Singampunari Block, Sivagangai District



Farm pond of Mr. Sethuraman, Puliangulam Village, Manamadurai Block where inland fishing is introduced

Executive Summary

Climate Change is posing a major challenge for rainfed agriculture. In spite of adequate amount of rainfall, the crops often suffer from moisture stress due to erratic behaviour of the monsoon. To reduce the impact of moisture stress, there is a need to conserve and manage the rain water for efficient use. Farm ponds and small tanks constructed at appropriate locations capture and store surface and sub surface flow of rain water for future use. They also help in preventing over- utilisation of ground water resources. They are able to stabilise rainfed agriculture and facilitate multiple use of the stored water. The Central and State Governments are allocating funds for improving the water resources through development of water harvesting structures such as farm ponds, check dams and percolation tanks. The common

guidelines for watershed development projects provide financial assistance for implementing such works both in common lands and in private lands. (Ref: paragraph 8.2 and 9.6 of Common Guidelines 2008)

Funding through Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) provides for creation of productive assets at village level, beside wage employment to the local people for their livelihood. The works that can be carried out under this Act include improvements to existing water resources such as desilting supply channels and renovation of village tanks, ponds and other water storage structures. According to the Union Rural Development Ministry, the percentage of works done under MGNREGA went up when the Government permitted the execution

of soil and water conservation works in private lands. Under the watershed development approach, the adoption of farm ponds in the private lands has so far been low. This may be due to lack of awareness among the local communities, which calls for dissemination of relevant information and the required technological support to farmers who are ready to take up the work in their own lands. At the state level also, development of farm ponds in private lands has to be included as a component of watershed development and MGNREGA based projects. This work will be an asset for sustainable livelihood of farmers and also become eligible for financial assistance in accordance with the common guidelines. Adoption of farm ponds on scale needs the provision of a package of technologies based on farmers' needs for different rainfall regions, soil types and structures, by the State and Research Institutes. Hence development of technology for farm ponds in different climatic zones and soils is required.

DHAN Foundation, through its Vayalagam Programme, has successfully demonstrated the construction of farm ponds in small and marginal farmers' lands in rainfed areas to ensure in-situ water conservation as a component of overall watershed development. This work was carried out in collaboration with various agencies and programmes such as NWDPPRA, NABARD-WDF, FPARP of MoWR-GOI, DPAP and others such as philanthropy and corporate funding. The impact of the scaled up implementation of the farm ponds construction is highly pronounced in farmers' stabilised crop production and improved pisciculture and livestock.

This brief deals with the need for promotion of farm pond construction on scale, network approach in a watershed, convergence of MGNREGA and watershed development with necessary monitoring, provision of a package of technology for different climatic zones and soil types and incentives and loan support from Government and Banking Institutions.

Summary of suggested changes in policies and practices

Present Status/Existing Policies/Guidelines and Practices	Changes suggested in Policy and Practice
1. Ministry of Agriculture, Government of India	
<p>Adoption of farm pond at the individual farm level had been low. This may be due to lack of awareness and technological and financial constraints on the part of the farmers.</p> <p>There are no specific fund allocations for promotion of farm ponds in the watershed.</p>	<p>Farmers must be made aware of the concept that the farm pond construction is one of the climate change adaptation mechanisms in rainfed areas and they should be encouraged to access technical and financial support available to take up the farm pond construction.</p> <p>Facilitating the farmers by providing technical support and networking with developmental agencies, NGOs and village panchayats, besides state line departments like KVKs is crucial for scaling up the implementation of the farm pond development programme to avoid crop failures.</p> <p>Adequate provision of funds has to be made available to enhance farmers' awareness. For that, specific guidelines and fund allocation have to be made for preparation of Information Education and Communication (IEC) material.</p>

Thrust has to be given for promotion of farm ponds on a scale in the Watershed Development and NWDPA Guidelines. Specific fund allocation of 15-20% has to be made for farm pond construction.

2. Ministry of Water Resources, Government of India

The Government of India in the Common Guidelines (pattern of assistance for Watershed Development Fund (WDF)) provides financial assistance for cost intensive farming system activities in private lands at 80% to farmers of SC & ST general category.

From the field experience it is seen that the farm pond network has emerged as the appropriate technology for watershed development and it acts as a climate change adaptation mechanism in rain fed areas.

For a significant impact on the livelihoods of farmers, construction of a network of farm ponds in the watershed may be considered. Priority should be given for water resource development in different governmental schemes and a specific budget should be earmarked for promotion of farm ponds and similar other rain water harvesting and storage structures.

For rapid expansion of the programme, selective use of machinery may also be allowed for excavation of farm ponds wherever labour is not available or soils are hard and uneconomical to use manual labour. The actual cost of farm pond in hard substrata needs to be realistically worked out to fix realistic schedule of rates. It has to be included in the common guidelines for watershed development.

Promotion of network of farm ponds needs to be specified in the watershed guidelines with specific areas such as Drought Prone Areas.

3. Ministry of Rural Development and Panchayat Raj Department, Government of India

Funding through MGNREGA, Backward Regions Grant Fund (BRGF), Member of Parliament Local Area Development (MPLAD), and Integrated Watershed Management Programme (IWMP) provide ample opportunities for periodic desilting and renovation of village ponds, tanks and other storage structures.

Convergence needs to be extended to all line concerned departments for the effective implementation of water storage structures such as farm ponds to improve the livelihoods of people.

In the Guidelines of revised Macro Management of Agriculture (MMA) in implementation of National Watershed Development Project for Rainfed Areas (NWDPA) during the XI Plan, Ministry of Agriculture, Government of India and Indian Council for Agricultural Research (ICAR) suggest the convergence of MGNREGA with Natural Resource Management (NRM) activities and the expertise of KVKs can be used in conjunction, to make the choice of works under MGNREGA. For example, under Water Conservation, the activities that can be taken are: Embankment type water harvesting, Farm Ponds etc (Source: No.M.13016/1/07-Trg. Vol.II, Ministry of Rural Development, and Government of India).

In order to facilitate the convergence of MGNREGA with other schemes for water resource development such as tank rehabilitation and farm ponds, detailed guidelines have to be evolved. It will enable the state governments to initiate special programmes on farm ponds/water harvesting structures.

Implementing MGNREGA scheme for construction of farm ponds in small and marginal farmers' (private)

4. Department of Agriculture, Government of Tamil Nadu

To increase the production and productivity of dry land crops the construction of farm ponds have been proposed and are being constructed through various State and Central Watershed Development Schemes under Tamil Nadu Watershed Development Agency (TAWDEVA), State Agriculture Department. The progress of number of farm ponds constructed in the farmers' lands is very less.

However, the adoption of farm pond at the individual farm level had been low. This may be due to lack of awareness and technological and financial constraints on the part of the farmers.

Farmers must be made aware of the concept that the farm pond construction is one of the climate change adaptation mechanisms in rainfed areas and they should be encouraged to access technical and financial support available to take up the farm pond construction.

Facilitating the farmers by providing technical support and networking with developmental agencies, NGOs and village panchayats, besides state line departments like KVKs is crucial for scaling up the implementation of the farm pond development programme to avoid crop failures.

There are no specific fund allocations for promotion of farm ponds in the watershed.

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Adequate provision of funds has to be made available in the watershed development to enhance farmers' awareness. For that, specific guidelines and fund allocation have to be made for preparation of Information Education and Communication (IEC) material.

Thrust has to be given for promotion of farm ponds on a scale in the Watershed Development and NWDPRA Guidelines. Specific fund allocation of 15-20% has to be made for farm pond construction.

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Promotion of network of farm ponds needs to be specified in the watershed guidelines with specific areas such as Drought Prone Areas.

5. Department of Rural Development, Government of Tamil Nadu

The MGNREGS authorises works on agricultural lands of farmers belonging to the scheduled castes and tribes, besides those below poverty line. The Union Ministry of Rural Development in a circular to all State governments has stated that works on provision of irrigation facility and land development could

This is a good suggestion of Rural Development Department of Government of India which needs to be adopted by the State Department of Rural Development, Tamil Nadu.

be taken up on fields belonging to SC, ST categories as well as small and marginal farmers.

In Tamil Nadu Rural Employment Guarantee Scheme, the following amendments are made based on the notification of Government of India, Notification No.11(2)/RDPR/402 (b) 2006 published at pages 1-28, in Part II – Section 2 of the Tamil Nadu Government Gazette, Extraordinary, dated the 2nd August 2006; In the notification, - in clause 1.7, for item (4), the following item is substituted, namely:- “(4) Provision of irrigation facility, horticulture plantation and land development facilities on land owned by households belonging to the Scheduled Castes and the Scheduled Tribes or Below Poverty Line families or to beneficiaries of land reforms or to the beneficiaries under the Indira Awas Yojana of the Government of India”.

The provision does not include to small and marginal farmers as at present.

The amendment may be modified to include small and marginal farmers also to avail the provision of irrigation facilities such as farm ponds under MGNREGA.

6. Department of Fisheries, Government of Tamil Nadu

Fish Farmers Development Agencies (FFDA) and Fisheries Extension and Training Centre of Tamil Nadu Fisheries Department are providing training and exposure visits to progressive farmers for fish rearing techniques. Availability of quality seeds during North East monsoon in stock size is less than the requirement.

To improve the fingerlings production in order to match the demand at field level, especially for inland aquaculture such as in farm ponds the following strategies and technologies are suggested.

1. The present number of fingerling rearing units (29 centres) is not sufficient enough to meet the fingerlings demand at district level. Hence the Tamil Nadu Fisheries Development Corporation Limited (TNFDC) and the Department of Fisheries have to increase the number of fingerling rearing units at district level.
2. Encourage more number of private seed rearing units to meet the demand and quality in promoting inland aquaculture.

7. National Bank for Agriculture and Rural Development (NABARD) and Commercial Banks

Based on a study conducted by NABARD on the financing pattern of farm ponds and from the field experience gained by farmers, a recommendation has been made by NABARD for financing of farm ponds by banks for providing short term loans to farmers who need them.

NABARD and MGNREGA prohibit the use of earth moving machinery in their grant funded projects.

All banks may consider financing this activity subject to the technical feasibility, financial viability and bankability to improve agricultural production under priority sector lending.

Large/medium farmers also need to be encouraged through incentives like differential rate of interest (DRI) rates to construct network of farm ponds in their lands.

Under WDF, selective use of machinery for farm pond construction should be permitted since the availability of labour at the present schedule of rates is becoming impossible where hard soils are encountered. Depth of farm ponds should be at least 2m to reduce evaporation losses. At depths more than 0.50m, the soils are so hard that manual labourers are not able to excavate.

NABARD should consider farm pond construction as an asset creation and not merely as an employment generation programme in the wake of MGNREGA.

8. State Public Works Department/Water Resources Organisation of Tamil Nadu

The present standard schedule of rates for earth work excavation is so low that finding labourers for this work is impossible.

The State Public Works Department should also refix the schedule of rates for earth work excavation in a realistic manner as is allowed by the Central Public Works Department.

Farm Ponds for Enhancing Food Security

I. Introduction

Water is a prime natural resource. The average annual rainfall in India is 1170 mm while that of Tamil Nadu is 912mm. Out of 140.30 million ha net cropped area in India, nearly 83.90 million ha is the net rain-fed area, 56.40 million ha is the irrigated area. Thus rain-fed area accounts for nearly 60% of the cultivated area (Ministry of Agriculture, NWDPR, May 2010). Tamil Nadu occupies 4% of India's geographical area while it has only 3% of the water resources at all India level. (Source: Tamil Nadu Policy Note Demand No.5 Agriculture 2010-2011; www.environment.tn.nic.in; www.tn.gov.in/spc/workshop/WRM_Deenadayalan.ppt). About 40% of the ground water potential and 3% of the surface water potential is utilized for a net irrigated area of around 2.86 million hectares in Tamil Nadu which has a total geographical area of 13 million hectares and a net cultivated area of about 5.1 million hectares. Out of this, 22.37 lakh hectares (44%) is rainfed leaving the net irrigated area of about 2.86 million hectares (56%).

In spite of adequate amount of total annual rainfall, the crops suffer from moisture stress due to erratic behaviour of the monsoon. Heavy rainfall followed by prolonged dry spell affect the crop yield. Hence there is a need to conserve and manage the rain water mainly to reduce the impact of moisture stress and bring about sustainability in agricultural production. Rainwater management is the most critical component of rainfed farming. In earlier days rainwater harvesting was done through

construction of tanks, ponds, khadins etc. by the community and managed by the community, (Village level Institutions). After independence, with the availability of electricity and pumping technology, private investment on dug wells and tube wells had increased manifold and the tank systems are being gradually ignored. The emphasis has shifted from community based structures which use surface water to individual investments which exploit ground water.

Considering the need to prevent over exploitation of ground water resource and highlight the importance of rainwater harvesting structures, the Centre and the States have recently taken

Farm Ponds

Farm ponds are small water bodies formed either by the construction of a small embankment across a field waterway or by excavating a dug out. Rain water is usually harvested from small catchment areas and then used for irrigation when the crops need wetting. Since a farm pond is formed in the low-lying area in an agricultural farm it will act as a run off collection water body. Farm ponds are traditionally in use in coastal agriculture in some parts of Tamil Nadu like Nagapattinam district.

Advantages of farm pond

- It provides water to raise crop nursery well in advance.
- Protects the crop during dry spell between two rainfalls during the crop season and thereby stabilises the yield.
- Supplies water for domestic purposes and livestock.
- Facilitates crop diversification and promotes dry land horticulture.
- Promotes fish rearing.
- Farm pond bund provides space to raise vegetables and fruit trees. Thereby the farm household gets additional income and also nutritional food.
- Gives confidence to the farmer; thereby the farmer is able to apply adequate farm inputs and perform farming operations on time.
- 'Catch water where it falls' is possible with farm pond.
- Increases cropping intensity.
- Recharges the ground water.
- Improves drainage.
- Excavated earth has a high value and can be used as nutrient and soil amendment, and also for land leveling and construction of farm roads.

steps for improving the water resources through formation of farm ponds and percolation tanks and de-silting of tanks and village ponds. The success of rainfed crop production depends on how efficiently soil moisture is conserved in situ or the surplus runoff is harvested, stored and recycled for supplemental irrigation. About 90% of farmers in Tamil Nadu are small and marginal farmers. Access to irrigation infrastructure /services for the small and marginal farmers to enhance their production and income is limited. Also there is low awareness among farmers to utilise the opportunities such as in-situ moisture conservation and excavation of farm ponds to store rain water for cultivation.

The adoption of farm ponds at the individual farm level has so far been very limited, particularly for drought proofing through life saving irrigation of kharif crops. It may be due to technological, socio-economic and financial constraints. Harvesting of rain water through farm ponds and tanks holds an important place and it requires significant improvements in the existing services to promote them on a large scale among farmers, through favourable policy and practice interventions. Hence the need for this policy brief on farm ponds for sustainable agriculture production.

II. Experiences from the Field

2.1 DHAN Foundation

DHAN'S approach and experience in Farm Ponds: DHAN Vayalagam (Tank) Foundation (DVTF) has been working in the theme of water, in the areas of tank renovation and watershed and farm pond development for improving rainfed agriculture and for providing access to safe drinking water, which mostly benefit the rural communities. The area dependent on rainfed agriculture has been on the increase due to deteriorating tank systems and declining ground water availability. Sustaining rainfed agriculture and improving the livelihoods of dry land farmers' have become an urgent need. DVTF has been making continued efforts to bring about an appropriate solution for dry land

farmers. After a successful attempt in tank rehabilitation, the learnings have triggered the need for initiating in-situ water harvesting structures in individual farm holdings. Farm ponds, the localized small scale farm based water bodies are found to be a low cost, easy to adopt rain water harvesting structures to provide supplemental water source to the dryland farmers.

So far the programme has taken up development of farm ponds in various parts of Tamil Nadu, Karnataka and Andhra Pradesh. In the highly drought prone districts like Ramnad in Tamil Nadu and Chittoor in Andhra Pradesh, the farm ponds brought significant changes in the cropping pattern and increased income of the farming families. DHAN Foundation, a pioneer in promotion of people institutions for sustainable livelihood is organising the communities and forming village level people institutions to take up this activity. DHAN facilitates mobilisation of resources for the community to renovate the common water resources such as tanks for varied purposes and construct farm ponds to benefit their individual farms.

DHAN has supported 444 farmers to construct the 516 farm ponds in two types of soil viz., Sandy soil and Clay soil in the coastal areas of Tamil Nadu during the year 2010-11. DHAN has also constructed an additional 972 farm ponds in Tankfed areas and around 100 farm ponds in Rainfed Areas of Tamil Nadu benefiting 1840 acres (748 ha) of cultivated land with supplemental irrigation.

Under the Drought Relief Fund from NOVIB, the Netherlands and UPNRM around 100 farm ponds were supported by providing interest free loans to farmers. The loan is returned back to the respective people organisation by the benefiting farmers during the following normal rainfall year. The summer rain was effectively harvested in the farm ponds and many ponds supported irrigation to two crops namely rice and chillies. It is recommended that construction of farm ponds is a bankable activity and it needs to be promoted on a large scale.

Salient Impacts through Farm Pond

Case study-1: Farm Pond– Paraman an enterprising farmer in Sengapadai Village, Tirumangalam, Madurai district

Paraman is a shepherd-farmer belonging to Sengapadai village of Tirumangalam block, Madurai district, Tamil Nadu. He owns six acres of dry land which he bought 15 years ago. He cultivated pulses and millets under rainfed condition. Usually once in four years, when the rainfall was good, he could harvest two or three bags of the grains. He kept it for his own family use. He used to rear sheep for the other families in the village using the traditional method of 'varam'. In this method the rearer and the owner would share the profit at the end of the year.



DHAN Foundation team promoted a Farmers' Group in this village in 2004 as part of its intervention in rainfed farming. The members of DHAN team encouraged the farmers to construct farm ponds and take up various land development activities through interest free loans. The loans were given from the Drought Relief Fund created with the support of NOVIB, a funding organisation from The Netherlands. In the year 2006, Paraman received Rs.17,000/- as interest free loan through his group and excavated a farm pond. Soon after the rains, the farm pond got filled. He cultivated paddy on a part of his land (0.60 acre) and used the farm pond water to irrigate the crop. As a result, he got a yield of 14 bags (72 kg/bag) of paddy. Due to the early withdrawal of the monsoon, he was not successful in his attempt to rear fish. But he got enough fish to meet his family needs.

The farm pond received a lot of water in the subsequent season. He decided to further deepen the pond. The cost was met partly by him and the remaining from the watershed development programme of the Government.

He could grow more area under paddy in the second year. He got 53 bags of paddy from 2 acres of land in 2007. He sold 25 bags in the market and the balance, he used for his family consumption. In the year 2008, he got 45 bags of paddy from 2 acres of land. 2009 was drought year; he lost Rs.12,000 by the way of cultivating paddy in 1.5 acres. However, it was compensated in the year 2010; he got bumper yield; 24 bags of paddy that he got from just half acre of land. Very good rainfall in the north east monsoon filled the farm pond three times and the farm pond water was effectively used for irrigating his paddy.

He bought a diesel pump to irrigate from the pond and got a loan for farm expenses from his group. He raised vegetables on the pond bunds for as long as there was water in the pond. He took another loan from the group and bought a cow. From this, he earned Rs.1500-2000 per month. He also planted 60 amla and 60 tamarind saplings on his land which is next to the paddy field.

Source: Mr. M.Palanisamy, Programme Leader, Rainfed Farming Development Programme, DHAN Foundation, Madurai

Case study-2: Farm Pond– Manickam, E. Velayuthapuram Village

Mr. Manickam is an old man living in E. Velayuthapuram village of Vaippar watershed in Tuticorin district. He is a hard working marginal farmer. He has one acre of land which is surrounded by prosopis jungle.

He is a forerunner in realizing the benefits of the Farm pond in this locality. He himself excavated a small Farm pond just before the Kalanjiam Community Banking Programme (KCBP) works started. During the intervention he readily accepted to excavate another farm pond in one of his fields with a storage capacity of 600,000 liters of water. He could give two life saving irrigations to his chilly and



coriander crops, which he raised in his one acre land, while the nearby farmers were encountering loss because of drought. He raised chilly as an inter crop with coriander. From the mixed cropping he got a reasonable income from his land. During the previous year he had cultivated only chilly. Due to the failure of last rain needed to sustain the crop he lost the economic yield from the crop. This made him to think that providing additional one irrigation will be sufficient to harvest the crop successfully. This message was transmitted to the neighbouring farmers. Now many farmers come forward to construct farm ponds even with 50% contribution. The benefits he realized through the farm pond are as follows:

- Production and Productivity have increased
- Field was levelled, using part of the excavated earth.
- Part of his land left fallow over the last three years was brought back to cultivation.
- It also supported his and other neighbour's cattle with fodder and drinking water during scarcity.
- Land value has increased.

Source: Mr. A.Suresh, Team Leader, DHAN Vayalagam (Tank) Foundation, Tuticoin District

Case study -3: Farm Pond - Naluvadapathy Village, Nagapattinam district

Naluvadapathy is a coastal agrarian village located in Thalainayiru block of Nagapattinam district, Tamil Nadu. About 90% of the farmers living in this village are involved in small and marginal farming and all these families fall under low income group. The village communities are highly exposed to various risks like drought, and cyclone, as it is located adjacent to the Bay of Bengal Coast. The correlation between poverty and vulnerability is explicit and the low income group in this village is frequently prone nature's fury. The tsunami disaster in the year 2004, wiped out the crops cultivated and damaged the households. The inundated sea water submerged the crops and filled the farm lands with wreckages.



As part of livelihood restoration, DHAN Foundation organized the victims of tsunami into Self Help Groups. Mr. S. Dhanabalan, a marginal farmer having around 1.5 acres of land and affected by tsunami, became a member of Mahatma Gandhi Vayalagam – an SHG. He received support to remove sea debris and promote horticulture crop, which also serves as barrier to natural hazards. But the nature never remained calm. The cyclone in the year 2005 damaged the horticulture crop. The SHG provided a helping hand in the form of credit, to restart the livelihood activity from the scratch. He cultivated groundnut, cashew and coconut in one acre of land and the remaining 0.5 acres of land was left fallow due to shortage of water for irrigation. The income generated out of agriculture from one acre of land and wage income through labour works were the resources to feed the family members and educate the children.

In the year 2009, Mr. Dhanabalan received orientation on micro water bodies – farm ponds. Based on the orientation he made a request to Vayalagam federation and DHAN Foundation to establish a farm pond in the fallow land to harvest, store and utilize the rain water for irrigation. He was supported to establish a farm pond with a water holding capacity of 432 cubic meters under the project supported by European Union and Oxfam Novib. After the establishment of the farm pond, Mr. Dhanabalan cultivated groundnut in half acre of land. The water stored in the farm pond was sufficient to irrigate and sustain the crop and he was able to harvest 14 bags of ground nut worth of Rs. 15400 (Rs. 1100 per bag). The net income after deducting all the input and cultivation expenses was Rs. 9400. Through establishment of the farm pond an opportunity was created to generate additional income. With the availability of water for irrigation Mr. Dhanabalan is secured with income and food.

Source: Mr. R. Villayutham, Project Executive, Coastal Conservation and Livelihood Programme, DHAN Foundation, Nagapattinam District

DHAN Foundation's learnings from farm ponds formed in Orivayal Watershed - Ramanathapuram district: In the Orivayal watershed 98 farm ponds were constructed in farmers' fields with the grant support of Rs 12,800/farm pond of 800 cu.m storage capacity and the rest 50% of the cost as contribution from the participant farmers during the period 2005-2010. The learnings are;

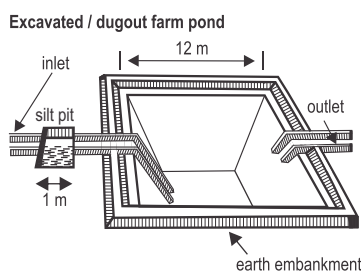
Farm ponds of varying sizes (10 m x 10 m x 2 m to 40 m x 30 m x 3 m) for different purposes can be constructed. (e.g.) for nursery, for livestock, for crop cultivation and inland fish culture. Larger sizes with shallow depth increase evaporation losses and wastage of land surface. Greater depth does not increase evaporation losses but it increases the seepage losses due to increased hydrostatic pressure which is however beneficial for ground water recharge.

Water from farm pond is used either by manually lifting it or by pumping or by both.

The following aspects decide the size and depth of the farm pond.

- Land area available for farm pond construction.
- Nature of soil profile – soil type, soil depth.
- Water requirement of the farm
- Rainfall and Runoff yield.
- Cost of excavation.
- Alternate uses of excavated earth.

Cost of a farm pond varies from Rs.8000 to Rs. 144,000/- according to its size. The design of inlet and outlet should be site specific and should have mechanism to regulate/conduct the water flow to the pond, without causing scour at the



Dimensions	
Bottom width :	6mx6m
Top width :	12mx12m
Depth :	3m
Side Slope :	1:1
Silt pit depth :	0.5 m
Inlet width :	2 m
Capacity :	252 m ³
Catchment :	1 ha (approx)

inlet portion. Outlets are provided to dispose the excess water safely. The ponds are provided with a small bund all around with excavated earth with adequate gaps on the upstream side where from the runoff gets into the pond.

The dimensions of the farm ponds are designed based on the area projected for the cultivation

Example

Total catchment (land holding) area	=	5.0 acres or 2.0 hectares
Effective rainfall received	=	400 mm (0.4m)
Total volume of rainfall received from 2 hectares	=	2x10000x 0.4 = 8000 cu.m
Expected run off into farm pond	=	40% of effective rainfall or 8000 x 40/100 =3200cu.m
No. of expected fillings	=	2
Storage volume required in farm pond	=	3200/2 = 1600cu.m
Depth of farm pond proposed	=	2.5 m
Mean area of farm pond will be	=	1600/2.5 = 640 sq.m
Mean length	=	32 m
Mean breadth	=	20 m
Side slope of the farm pond	=	1:1
Top length of farm pond	=	32+2.5 = 34.5
Top breadth of farm pond	=	20+2.5 = 22.5
Bottom length of farm pond	=	32-2.5 = 29.5
Bottom breadth of farm pond	=	20-2.5 = 17.5
Land area that will be lost for cultivation	=	34.5 x 22.5 = 776.25 sq.m or 3.88% of land holding
Net cultivable area	=	(2x10000)–776.25 = 19223.75 sq.m
Requirement of water per irrigation for paddy crop	=	50mm depth or (0.05 m)
Volume of water required per wetting for net cultivable land	=	19223.75 sq.m of = 19223.75 x 0.05 = 961.2 cu.m

Net storage available in farm pond after allowing for evaporation and percolation losses at 25% of storage

$$= 1600 \times 75 / 100$$

$$= 1200 \text{ cu.m per filling.}$$

Net storage available in farm pond after allowing for evaporation and percolation losses at 25% of storage

$$= 1600 \times 75 / 100$$

available for 2 fillings

$$= 1200 \times 2 = 2400 \text{ cu.m.}$$

Therefore the available water in farm pond will be sufficient to provide life irrigation of 2 to 3 times for a total area of 2 hectares, when the standing paddy crop faces moisture stress. Where other crops such as Groundnut, Cotton and Chillies are raised, this quantity of available storage will supply water for 4 to 5 wettings.

Other considerations to be borne in mind

Test pits should be dug before finalizing the location of farm pond and depth of excavation. Regular upkeep and maintenance of farm pond is very much important. Effect of catchment's characteristics on rainfall-run-off and sedimentation needs to be assessed. Effect on water flow to lower down water harvesting structures is also to be considered. Farm ponds in a watershed should be linked/connected wherever feasible for better impact.

Small and marginal farmers can have farm ponds individually or a group of them can have a common farm pond. Construction of farm pond is a bankable activity and it should be promoted. Farmers' Self Help Groups in watershed area can give loan to individual members for farm pond construction. In Orivayal watershed, well owning farmers are used as saline ground water for irrigating the crops by mixing it with the farm pond water without much adverse effects on their lands.

Farmers should be given awareness about the multiple uses of farm pond and each farmer has to be involved in various activities like planning, construction, utilisation and maintenance. While constructing farm pond, concurrence of adjoining land holder should be obtained.

2.2 Central Research for Dryland Agriculture (CRIDA) experience

A case of successful rainwater harvesting and reuse is facilitated under the ongoing (2007-2012) National Agricultural Innovation Project (NAIP) being led by CRIDA in Andhra Pradesh. The farm pond technology was taken to a farmer's field (Mr. Namdev) by CRIDA team in Sithagonthi village of Adilabad district in Andhra Pradesh under NAIP project on Sustainable Rural Livelihoods Security in the year 2008. The average annual rainfall in the area is 1050 mm. After seeing Mr. Namdev's successful case, many tribal farmers have come forward to get farm ponds dug on their lands in convergence with the ongoing MGNREGS. Overwhelmed by this response, the NAIP project has facilitated inclusion of farm pond excavation work in the MGNREGS shelf of works. Consequently the district authorities of Adilabad district visited this successful farm module and allocated an amount of Rs.20.00 lakhs for upscaling this intervention in other areas. This successful case has demonstrated the value and usefulness of Farm Pond technology for sustainability of rainfed farming systems and importance of convergence of MGNREGS and R & D institutions. (Source: Farm Ponds Help Cope with Droughts September 1, 2009 by Sreenath Dixit)

DHAN's experience in promotion of farm ponds among farmers in different climatic zones has provided leads for policy recommendations. They are;

1. Farm-Pond Based Watershed Development needs to be promoted.
 - **Nested farm ponds in a watershed:** At least fifty farm ponds in a 500 ha watershed would provide a significant impact.
2. Large scale private investment for agricultural development is needed.
 - Beyond Common Properties like Tanks and Village Ponds, farm ponds need to be promoted in private lands. There is a great scope for multiplying water harvesting structures with Farm Ownership. At least 5 to 10% of land has to be allocated for capturing rain water in small scale water bodies

3. Promotion of farm ponds on a watershed basis is an appropriate Climate Change adaptation method/ tool for
 - Drought mitigation
 - Flood regulation
4. Farm Pond is used as a multi-purpose 'Livelihood' source for small and marginal farmers
 - Stabilises and increases farm productivity
 - Promotes horticultural plantations
 - Provides additional income from fisheries
 - Provides incidental benefit of ground water recharge
 - Supports livestock for drinking water
5. Farm ponds are credit driven 'green' technology with renewable surface water based development intervention.

III. Sectoral Review Analysis

Farm Ponds for climate change adaptation: Climate change is posing a major challenge for rainfed agriculture and the prevailing constraints in further expansion of irrigated area. **Rainwater harvesting and efficient water use are inevitable requirements to sustain rainfed agriculture in future.** Farm Ponds and open wells provide an opportunity to capture and store surface and sub surface flow of the land without exploiting the ground water resource. The scope and impact of farm ponds on enhancing food production vary across the region and context, due to the uncertainty on availability of surface water for harvesting, which is dependent upon the amount of rainfall, land slopes, soil types and the capital cost. The economic returns also depend on the reliability of water availability and its end use.

Technology of Farm pond: In order to make the farm pond adoption viable for small and marginal farmers, the technology needs to be developed as a package with proper support and incentives. Research by ICAR and State Agricultural Universities has resulted in designing efficient water harvesting structures for different rainfall regions and soil types, effective storage of harvested water and methods

of its efficient use. Different state governments such as Maharashtra, Madhya Pradesh, Gujarat and Orissa have initiated special programmes on farm ponds/small storage structures in order to ensure the sustainability and to improve the livelihoods of people.

Review of State Agriculture Policy 2008, Agriculture Department, Government of Orissa: In order to achieve better co-ordination in planning, implementation and supervision in watershed programme, Government of Orissa has set up a separate mission named Orissa Watershed Development Mission. Under the DFID – assisted Western Orissa Rural Livelihood Project (WORLP), “Watershed-plus” approach has been successfully adopted, wherein, in addition to area development, livelihood component has also been included. Farm ponds will be dug in the farms of individual farmers through the Watershed Associations. The small and marginal farmers will avail the facility free of cost while the other farmers will have to contribute 50% of the cost of such ponds to the Watershed Association. The Government of India has in the common guidelines (pattern of assistance for Watershed Development Fund (WDF)) prescribed 40% as the contribution of farmers of general category and 20% for SC & ST for cost intensive farming system activities, the remaining cost being borne by the WDF.

After a study conducted by NABARD on the financing pattern of Farm Pond Projects in Rainfed Area of Orissa, it has made a recommendation that the financing of farm pond would be considered for refinance support by NABARD. Therefore, all participating banks may consider financing this activity subject to their technical feasibility, financial viability and bankability to improve the agriculture in rainfed areas.

Review of Drought Management Strategies, National Rainfed Area Authority, Ministry of Agriculture, Government of India, New Delhi (Vide Draft Report 2009 in para 13.2 Use of poor quality water is that Short Term Strategy of Contingency Planning): Some specific strategies for efficient use of poor quality water are that there should be a national level programme for digging farm ponds to capture and

store good quality rain water. Such farm ponds should be sealed using plastic linings or other effective methods to reduce seepage losses and conserve water and should be taken up at state level. This good quality water can be used conjunctively with poor quality groundwater. The same draft report states that about 11 to 37% run-off water is generated by the monsoon rains. It should be stored in the farm ponds or tanks which will recharge ground water during normal or excessive rainfall years, in areas where excessive extraction of ground water is practiced, tanks, percolation and farm ponds. Funding through National Rural Employment Guarantee Act (MGNREGA), Backward Regions Grant Fund (BRGF), Member of Parliament Local Area Development Fund (MPLADF) and Integrated Waste Management Plan (IWMP), provide ample opportunities for periodic desilting and renovation of village ponds, tanks and other storage structures.

For convergence of MGNREGA with ICAR (MoA), the strategy suggests that Natural Resource Management (NRM) activities and the expertise of KVKs can be used in conjunction, to make the choice of works under MGNREGA. For example, under Water Conservation, the activities that can be taken are; Embankment type water harvesting, Farm Ponds etc. (Source: No.M.13016/1/07-Trg. Vol.II, Ministry of Rural Development, and Government of India).

The MGNREGA authorises works on agricultural lands of farmers belonging to the scheduled castes and tribes besides those below poverty line. The Union Ministry of Rural Development, in a circular to all State governments has stated that works on provision of irrigation facility and land development could be taken up on fields belonging to SC, ST categories as well as small and marginal farmers. The Union Ministry had also given its approval for taking up similar works on farm lands owned by beneficiaries of land reforms or the Indira Awas Yojana, small and marginal farmers. The Union Ministry has laid down a few guidelines for the works on water conservation and water harvesting such as construction of dug wells and farm ponds and recharge structures on existing wells could be taken up.

The works done during the period from 2006-2009 under MGNREGA for water conservation and water harvesting is worth of Rs 14,000 crores and the works done on Provision of Irrigation facility on private lands is worth of Rs 3000 crores. The percentage of works done on private lands has gone up from 10.68% in 2006-07 to 12.24% in 2007-08. It is also noted that the demand on soil and water conservation works on private lands has gone up. (Source: Ministry of Rural Development, Government of India, ORF Seminar series Vol-1 Issue No.4 January 2010, MGNREGA for Water Management Symposium Proceedings)

In Tamil Nadu Rural Employment Guarantee Scheme, the following amendments are made based on the notification of Government of India, Notification No.11(2)/RDPR/402 (b) 2006 published at pages 1-28, in Part II – Section 2 of the Tamil Nadu Government Gazette, Extraordinary, dated the 2nd August 2006; In the notification, - in clause 1.7, for item (4), the following items are substituted, namely:- “(4) Provision of irrigation facility, horticulture plantation and land development facilities on land owned by households belonging to the Scheduled Castes and the Scheduled Tribes or Below Poverty Line families or to the beneficiaries of land reforms or to the beneficiaries under the Indira Awas Yojana of the Government of India”. **The provision does not include to small and marginal farmers at present. It is necessary that this provision should be extended to them also.**

Need for up-scaling: The experience of farm pond based watershed development approach reveals that adoption of farm pond at the individual farm level had been low. This may be due to lack of awareness and technological and financial constraints on the part of the farmers and the policy of some State Government Agencies which is yet to consider the farm pond in private land as an in-situ water conservation measure and an integral part of overall watershed programme requiring financial support.

A review paper of Department for International Development (DFID) on Farm Pond Technology

shows, that the benefits gained by farmers through the project has paved the way for change in their mind set for better utilization of the most important natural resource viz., rain water. DHAN's impact study of farm ponds also reinforces these observations and that farmers must be made aware of the technical and financial support available and encouraged to take up the farm ponds to stabilise and improve agricultural production in their land holdings. Facilitating the communities by providing technical support and networking with developmental agencies, NGOs, village panchayats, besides state line departments like Agricultural Engineering, Water Resources Organisation and KVKs is crucial for scaling up the implementation of the farm pond development programme to avoid crop failures. (Ref: Supplementary irrigation from Farm Pond, Groundnut crop after supplementary irrigation, DFID-NRSP R8192, Improved NRM for Better Livelihoods, Rainwater Management for Drought Proofing, Farm Pond Technology for Sustaining Groundnut Production in Anantapur).

Centre for Science and Environment (CSE), after studying the progress and impact of MGNREGA programme comments "CSE's analysis of the programme in nine states attributes the low demand for jobs under MGNREGA to the Government's inability to articulate it as more of a development programme rather than just a wage employment one".

The proceedings of the National Workshop cum Brain Storming on Rainwater harvesting and reuse through farm ponds: Experiences, issues and strategies held at Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad brought out the following areas for the policy changes

1. **Design aspects of farm pond, lining materials, storage of harvestable runoff should be given due attention for different agro climatic zones.**
2. **Research:** Adaptive research through field trials for various lining materials including locally available ones and possible recommendations across agro ecological

zones. Standardization of inlet and outlet for different sizes of farm ponds, lifting, conveyance, efficient use, water productivity and choice of crops.

3. **Policy, institutional and support systems for upscaling:** Priority should be given for water resource development in different governmental schemes and a specific budget should be earmarked for promotion of farm ponds. For rapid expansion of the programme, machines may also be allowed for digging of ponds wherever labour is not available or soils are hard and uneconomical to use manual labour. Large/medium farmers should also be encouraged through incentives like differential interest rates to construct farm ponds in their land as being done in case of roof top water harvesting for big buildings.

Farm Pond Network: The farm pond network has emerged as the appropriate technology for watershed development in rainfed areas. The innovative model in the watershed development of Adihhals – Mylanhalli village area of Hassan district of Karnataka by BAIF, offers a viable option to replicate in arid regions and semi arid regions of India. In the design, the dimensions of pond vary from 20' x 20' x 10' to 30' x 30' x 10'. Each pond has an inlet chamber to trap the silt and an outlet for allowing excess water to flow out, which then joins the next pond in the chain. Stone pitching is provided at inlet and outlet channels to protect them from scouring. The excess water from the first pond goes to the second and from the second to the subsequent one in the chain. In this manner, the entire runoff water is harvested in the area itself through the web of ponds. About 350 ponds have been constructed on a treatable area of 700 ha in a 1004 ha watershed. (Source: Watershed Development, Farm Pond Network, Surface and Sub-surface Flow Dynamics, Ecosystem and Socio-economic Status). This model offers better option for watershed development based on the surface and subsurface characteristics, suitability can be assessed at micro watershed level. Potential negative impacts such as land slides and water logging should be considered while assessing the technical feasibility.

IV. The Seminar

A Seminar on the theme “**Farm Ponds for Enhancing Food Security**” was organised by DHAN Foundation on 17th November 2009 at Centre for Water Resources (CWR), Anna University, Chennai. The farmers, representatives from government agencies, scientists from organisations like central research institutes, agricultural and engineering universities and research institutions and State Planning Commission shared their experiences. The deliberations mainly focused on cost effectiveness of farm ponds to stabilise crop production and provide the farmers subsidiary income for livelihood promotion. Recommendations were made to propose the promotion of farm ponds to the government through policy advocacy, to facilitate large scale adoption by the farming community and to formulate a policy based on farmers' practices and experience for the government's consideration and approval. The recommendations are included in this policy brief.

V. Recommendations

Farm ponds – Technical Design Perspectives

1. The design for storage of Farm ponds must be made after calculating crop water requirements and extent of land holding, taking into account the type of soil, amount & intensity of rainfall, number of rainy days and watershed characteristics.
2. If the topography is suitable, the location of the farm pond should be at a higher elevation as this would eliminate energy requirements for irrigation.
3. Depending upon the configuration of the land, the shape of the pond may be a square or a rectangle and the depth of the pond should be based on the volume of water requirement and soil characteristics.
4. Depending on the type of soil, side slopes should be designed when excavation is made for the farm ponds with a minimum of 1:1 slope to prevent caving in of the soil.
5. The excavated soil from the farm pond should be deposited to form a bund on three sides outside the pond with a minimum of 1 meter berm width, leaving the top edge of the pond free to capture the runoff. The top and side slopes of the bunds may be used to cultivate vegetables or creepers or other vegetation that will bind the soil and prevent the erosion of the newly formed bund.
If the depth of the pond is more than 2 metres, it should be designed as two stepped ponds one inside the other with suitable side slopes.
6. Provision of inlet and outlet channels is a must for the farm ponds. If the topography is suitable, both the inlet and outlet can be integrated suitably as a single channel.
7. There should be a silt chamber in the inlet channel to capture and trap the silt before the rain water gets into the farm pond.
8. When excavating the farm pond, the top 20 cm depth of the soil may be used for enriching the land around the pond. If the type of excavated soil is not suitable for enrichment, it may be deposited for forming the bunds. The cost of forming the bunds also should be taken into account while sanctioning funds for the excavation of farm ponds, as they need to be shaped to proper side slopes and uniform height.
9. To prevent the erosion of the bunds around the farm ponds, suitable vegetative cover should be raised such as 'grass', 'Vetiver' and other species which would provide enough roots to bind the soil.
10. Farm ponds can be formed in coastal belt with clay packing, to minimise/prevent excessive seepage losses.
11. Selective use of earth moving machinery is needed for farm pond excavation where the subsoil strata is hard and uneconomical to excavate manually. Further, the use of machinery becomes inevitable wherever the excavated earth requires to be transported to distant places through tractor- trailers.
12. Farm ponds in tail reach of an irrigation command area help land drainage besides providing space for inland fisheries.
13. Fishery can be integrated with cropping through farm ponds in wet lands.

14. Capacity building for implementation through hands - on experience must be a prerequisite to farmers and other interested stakeholders.
15. Construction of ponds in village commons/government porombokes may be facilitated under NREGP to the extent possible.

Financial Resources for the Construction and Maintenance of Farm ponds

1. The estimate for the pond should be prepared after discussion with local farmers (stakeholders) taking into account the local condition and the structural design of the pond.
2. Financial resource required for the construction of the farm ponds should be raised by approaching Government for grant, banks for loan and the concerned land owners for their contribution.
3. There should be a policy for providing loan to farmers by nationalised banks for the construction of farm ponds in those places which are not covered by Government schemes such as Watershed Development Projects, along with some subsidy.
4. The loans sanctioned for the farm ponds should be short term loans with three to four years for repayment.
5. While sanctioning loans to construct farm ponds, the investment required towards maintenance, fish rearing and purchase of agricultural implements should also be taken into account.
6. There should be a policy for disbursement of loans for the construction of ponds under various schemes of the government through banks to marginal and small farmers as interest free loans. Also provision should be made for sanctioning loans with minimum interest for the others.
7. Farm pond construction needs much greater impetus and larger budget provision, considering its cost effectiveness and ability to save a crop from total failure for want of a life saving wetting.

Convergence of Farm pond Construction and Government Schemes

A number of organisations in Tamil Nadu are involved in Farm Pond construction with different schemes under implementation such as:

- a) IAMWARM Project - Water Resources Organisation
- b) Minor Irrigation Schemes, Command Area Development Projects - Water Resources Organisation and Agricultural Engineering Department
- c) Tamil Nadu Watershed Development Agency implemented Project
- d) National Agriculture Development Scheme
- e) NABARD – RIDF
- f) 12th Finance Commission - Coastal Area Development Scheme
- g) Micro Irrigation Management Scheme
- h) National Horticultural Scheme
- i) Artificial Recharge Scheme
- j) JNNURM
- k) Western Ghat Development Project
- l) Eastern Ghat Development Project
- m) Hill Area Development Project
- n) Tribal Area Development Project
- o) ATMA System

It is suggested that the implementation of Farm Ponds may be entrusted to voluntary organisations also such as Vayalagam/or any stakeholders' organisations existing in the district/state.

Way Forward

DHAN Foundation will take this policy brief into consideration for advocating the required changes in Policies and Practices to the authorities concerned for the benefit of the people who are dependent on surface water in rainfed areas, with the following departments:

- Central and State Water Resource Departments
- Central and State Agriculture Departments
- Central and State Rural Development and Panchayati Raj Departments
- Department of Fisheries of Tamil Nadu Government
- Research Institutes involved in Water Resources development
- NABARD and Commercial Banks

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Abbreviations

BCM	-	Billion Cubic Meters
BRGF	-	Backward Regions Grant Fund
CRIDA	-	Central Research Institute for Dryland Agriculture
CSE	-	Centre for Science and Environment
DFID	-	Department For International Development
DRI	-	Differential Rate of Interest
DVTF	-	DHAN Vayalagam (Tank) Foundation
FFDA	-	Fish Farmers Development Agencies
ICAR	-	Indian Council of Agricultural Research
IEC	-	Information Education and Communication
IWMP	-	Integrated Watershed Management Programme
KVKs	-	Krishi Vigyan Kendras
MFGs	-	Micro Finance Groups
MMA	-	Macro Management of Agriculture
MGNREGA	-	Mahatma Gandhi National Rural Employment Guarantee Act
MoA	-	Memorandum of Agreement
MPLAD	-	Member of Parliament Local Area Development
NABARD	-	National Bank for Agriculture and Rural Development
NAIP	-	National Agricultural Innovation Project
NGOs	-	Non Governmental Organisations
NRM	-	Natural Resource Management
NWDPRRA	-	National Watershed Development Project for Rainfed Areas
R & D	-	Research and Development
TNFDC	-	Tamil Nadu Fisheries Development Corporation Limited
TAWDEVA	-	Tamil Nadu Watershed Development Agency
WORLP	-	Western Orissa Rural Livelihood Project

Why this policy brief?

DHAN Foundation is involved in Natural Resources Management focusing mainly on Community based Development and Management of Water Resources in South India. The initiatives taken so far have reached several villages through rejuvenating water bodies benefiting thousands of families. By working closely with the community, DHAN Foundation has gained valuable experience over the past two decades. DHAN believes that for better management of water resources, certain changes in the present policies and practices are needed. Hence, it has been decided to come out with Policy Briefs to disseminate the changes needed in specific sectoral issues. This will facilitate Administrators and Field level Organisations in their attempts of better management of scarce water resources.

Policy Brief 11 focuses on the usefulness of farm ponds in stabilising rainfed crop production and for providing subsidiary income to the farmers. The brief is brought out for focusing the attention of Central and State Government departments of Agriculture, Water Resources, Fisheries and Rural Development. This brief deals with the promotion of farm pond on scale, network approach in a watershed converging of NREGA and watershed development, provision of package of technology for different climatic zones.

About DHAN Foundation

DHAN Foundation is a grassroots development organisation and was initiated with the objective of bringing highly motivated and qualified young professionals to the development sector for new innovations in development programmes and for upscaling development interventions to eradicate poverty. The Foundation works towards bringing significant changes in the livelihood of the poor through innovation in themes and institutions.

The approach of the Foundation is to promote people's organisation and their networks aiming at improving the livelihoods of poor communities by organising development works around themes. These people's organisations would sustain themselves and excel in long run. Presently DHAN Foundation is working on the themes namely Community Banking, Conservation of Tanks, Information and Communication Technology for Poor, Rainfed Farming and Panchayats..

About the Centre for Policy and Planning

The Centre for Policy and Planning of DHAN Foundation provides support to the programmes and institutions of the DHAN Collective so that they evolve, develop and modify their policies and fulfil their aims. It shapes the sectoral policies to practice at the grassroots. DHAN Foundation as a member of many policy-making bodies on Micro Finance and Water Conservation strongly advocates pro-poor policies. The Centre takes up policy study and initiating research on Micro Finance, Water Conservation, Rainfed Farming, Panchayat Raj Institutions and Disaster Mitigation. As a resource centre, it organises many capacity building events and training programmes for Bankers, Government Officials and Representatives of NGOs within and outside the country.



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