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RESEARCH ARTICLE

FARM POND: NEED OF THE HOUR FOR SUSTAINABLE AGRICULTURE

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ABSTRACT

The agricultural sector employs nearly half of the workforce in India. However, its contribution to the GDP has been declining steadily in recent years from 18.2 percent in 2014-15 to 16.5 percent in 2019-20 according to the Economic Survey 2019-20. As high as 61 percent of the farmers practice rainfed farming with 55 percent of the crop area in India being rain dependent, while the rest is irrigated using tubewells, canals, wells, tanks, and other sources. Fifty percent of agriculture depends on groundwater in India with 39 million hectares of land irrigated by groundwater, 22 million by canals with about 100 million hectares being rainfed. Agriculture consumes around 80 percent of India's available water and 90 percent of the total production includes water-guzzling varieties like sugarcane, wheat, and rice. This inefficient use of water has led to a dip in India's per capita water availability from 4000 m³ in 1947 to 1545 m³ in 2015 making India a water stressed country. Farm Pond is one such program initiated. The Farm Pond program has triggered a grassroots-level movement for sustainable agriculture. It helps farmers engage in sustainable agricultural practices involving rainwater conservation and harvesting. Although the farm pond technology is well known in the country, its adoption has been quite low due to number of constraints like high initial cost, short life of the lining materials, lack of suitable lifting systems and above all low awareness among farmers about its utility and cost benefit analysis. There is also lack of authentic literature on the design and performance of farm ponds in different agro ecological zones and soil types. Several programs of the Government of India like RADP (Rainfed Area Development Program), NHM, MGNREGS and IWMP have farm pond as one of the important components. The field staff involved in the implementation of such schemes often face difficulties in designing these structures at a given site considering the rainfall, slope and soil characteristics.

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INTRODUCTION

With an increased variability of monsoons and rapidly depleting groundwater tables, large parts of India are reeling under water stress. A number of peninsular regions like Bundelkhand, Vidarbha and Marathwada have been facing recurring drought-like situations. There is need to implement innovative water management measures, particularly the rainwater harvesting. Farm ponds can be a cost-effective solution and can transform rural livelihoods. Frequent episodes of drought can have a devastating impact on agriculture in affected regions. To reduce the impacts of drought, we need a sustainable agricultural system that uses water optimally and reduces expensive and environmentally challenging inputs such as fertilizer and pesticides. This farm pond program has been especially helpful in facilitating irrigation in drought-prone areas with erratic rainfall.

By improving access to water, farmers can now cultivate more than one crop a year, thereby increasing their revenue by 50 percent. These ponds are capable of supporting four crops of pulses and papaya in a year. The Farm Pond program has involved transforming the mindsets of farmers towards accepting the program. Initially, farmers had to be convinced about the potential benefits that farm ponds could offer them during droughts. Today, farm ponds have become popular, as they prove effective in ensuring abundant harvests across all seasons. Farmers increasingly approach for new farm ponds. This program has made a positive impact on the farming community and has given hope to regions where similar drought conditions exist.

What is farm pond?: "Farm pond is an artificial dug-out structure with definite shape and size for collecting and storing surface runoff water for secure irrigation whenever needed".

Farm ponds are square or rectangular holes made on the earth which harvest rainwater and store it for future use. The farm pond has an inlet that regulates the flow of water inside the pond while the outlet discharges excess water. The pond is surrounded by a small bund, which prevents erosion from the banks of the pond. Water from the farm pond can be used for the fields either manually or by pumping or both.

MEANING OF FARM PONDS

Farm ponds are small tank or reservoir like constructions, are constructed for the purpose of storing the surface runoff, generated from the catchment area. The farm ponds are the water harvesting structures, solve several purposes of farm needs such as supply of water for irrigation, cattle feed, fish production etc. Farm ponds also play a key role in flood control by constructing them in large numbers in the area. In addition, the farm ponds are also used for storing the monsoon water, which is used for irrigation of crops, and several other purposes, according to the need. A farm pond also has significant role in rainfed farming.

MAJOR GOAL

The major goal is to collect surplus run-off water through dug-out farm ponds for protective and life-saving irrigation during crucial crop stages in order to increase agricultural yield and income for resource-poor dryland farmers.

ADVANTAGES OF FARM POND

- They provide water to growing crops, without waiting for rainfall.
- They provide water for irrigation, even when there is no rain.
- They reduce soil erosion.
- They recharge ground water.
- They improve drainage.
- The excavated soil can be used to enrich soil in fields and levelling lands.
- They promote fish rearing.
- They provide water for domestic purposes and livestock.
- Pomegranate and farm pond remain the most successful model, and helped flourish its cultivation in the rain shadow regions of the Maharashtra state. It helps farmers to offer irrigation to plants when the ground water dries up during the crucial summer months between March and May.
- Digging farm ponds make for increase in farm incomes and improvement in farmers' livelihoods.
- Farm ponds lead to an increase in cropping intensity and higher productivity.
- Instead of single cropping, the beneficiaries now do multiple cropping and naturally, output has increased.
- Apart from improving water availability and efficiency of usage, the most impressive outcome has been the increase in the income of small and marginal farmers.
- An improvement in water availability.
- An increase in irrigated land.
- There was a marked enhancement in land-use efficiency too.
- After the construction of farm ponds, farmers cultivate more land, and their fields are occupied for a longer duration

- If a farm pond maintains water for 80 percent of the year it can also be used for raising fish.
- Farm ponds are used as one of the strategies to support water conservation. Much of the rainfall runs off the ground. The run off not only causes loss of water but also washes away precious top soil.
- Farm ponds help the farmers to store water and to use it for irrigation.
- Farmers having farm ponds harvest more than 1 crop every year with cash crops like sugarcane and also horticulture that grants surplus income.
- Farm ponds act as flood control systems and drought mitigation tools - rise in extreme events like these due to climate change are a serious threat to agriculture in recent times.
- Animals can be domesticated if cultivation is perennial with assured water availability and fodder, creating additional income.
- Increase in farm productivity means more crops.
- Increase in land productivity as well value of agriculture land.
- With availability of water, increase chances to grow cash crops through irrigation technologies.
- Increase in income of farmers.
- Farmer can do fish farming in the pond, which will provide them more opportunity to grow their agriculture business.
- Improve the quality of crop yield.

Limitations of farm ponds

- Farm ponds reduce water flow to other tanks and ponds situated in lower-lying areas.
- They occupy a large portion of farmer's lands.
- The government provides a huge subsidy on electricity, making it almost free and thus farmers continue to pump water and use it to grow cash crops and for orchard cultivation thus, helping them earn large amounts of profits, but at the cost of overextraction of groundwater. Restructuring of electricity subsidy schemes to discourage farmers from extracting groundwater for farm ponds is also important. Exploitation of groundwater affects the groundwater table negatively, increases the presence of heavy minerals in the water.
- Also, evaporation losses are greater in farm ponds due to exposure of a large surface area to scorching heat during summer. Hence a vicious cycle is created where losses create the need to pump more water to meet the needs of water guzzling cash crops.

TYPES OF FARM POND:-In broad sense, the farm ponds are divided in following two general categories:

- **Embankment Type:-**Embankment type farm ponds are generally constructed across the stream or water course. Such ponds consist of an earthen embankment, which dimensions are fixed on the basis of volume of water to be stored, mainly. These farm ponds are usually constructed in that area where land slope ranges from gentle to moderately steep; and also where stream valleys are sufficiently depressed to permit a maximum storage volume with least amount of earthwork.

- **Excavated or Dug Out Type:**-Dug out type farm ponds are constructed by excavating the soil from the ground, relatively in flat areas. The depth of pond is decided on the basis of its desired capacity, which is obtained almost by excavation. The use of this type of pond is suitable, particularly where a small supply of water is required. The size and depth of the farm pond is depend upon catchment area and volume of water to be stored. These type of farm pond are used for irrigation and fish farming purposes. Dug out type farm pond is designed on the basis of rainfall, land slope, catchment area, run off and seepage characteristic. Seepage is counted as important factor for design of the pond. In the areas of high gypsum the seepage loss is much more, causing construction of farm pond impractical.

Apart from above two types, the farm ponds are also of two more types, i.e. the spring or creek fed and off-stream storage pond, depending on the sources of water available for feeding them. The spring or creek fed ponds are generally found in hilly areas, where natural creeks or springs are available to supply the water. Since, the source of water supply to these ponds is the creek or spring, therefore, they are named as spring or creek fed pond. Off-stream storage ponds are constructed in the side of ephemeral streams, in which water flows seasonally. This seasonal water is stored in these ponds. This type of ponds are provided with a suitable arrangement for safe conveyance of flow into the pond and supply of water to d/s channels.

How to create a farm pond for water storage: The ideal farm pond should be dug into the ground in a naturally low-lying area. Some of the soil that is removed can be used to construct an earthen berm around the pond, which should be planted with trees and grasses for stability. The shade and wind protection provided by the raised mound and vegetation will reduce evaporative losses. Greater depth of the pond and less surface area will also reduce evaporative losses. However, digging deeper than 5 meters will increase the expense of the digging, and increase seepage loss due to increased water pressure on the ground. A pond that is about 10 meters by 10 meters and 3 meters deep is an ideal size. The pond should have an inlet and an outlet lined with rock to prevent erosion. These features will need to be linked into a larger drainage plan which directs water into the pond, and receives any overflow water. A small settling pit at the inlet will help remove silt, and can be more easily cleaned than the whole pond. The sides of the pond should be sloped for stability.

DESHPANDE FOUNDATION: The Deshpande Foundation started work in 2014 in Navalgund Taluk, Dharwad, to help farmers in the drought-prone area cope with erratic availability of water. Initially it was funded with CSR allocations but soon enough, it turned into a demand-driven programme when farmers experienced benefits. So far, more than 6,200 farm ponds have been dug, the latest ones with bank loans which are till now being promptly repaid. The Foundation is also involved in promoting micro entrepreneurs, skilling of rural youth and encouraging start-ups from its India headquarters in Hubli. The latest in the initiatives of the Foundation is a Rural Transformation Technology Centre in Hubli which gathers real-time data with IOT devices, satellite imagery to understand ground conditions, provide accurate and actionable technical advice

to farmers in addition to helping in other objectives like micro-entrepreneurship, start-ups and skilling of rural youth. The Centre, which employs the latest technology, is ready for operations and is open for preview now.

The Chief Executive Officer of the Foundation, Vivek Pawar, narrates the evolution of the farm pond concept: "Frequent episodes of drought can have a devastating impact on agriculture in affected regions. We need a sustainable agricultural system that uses water optimally and reduces expensive and environmentally challenging inputs such as fertiliser and pesticides. The farm pond initiative is one such programme initiated in 2014 by the Deshpande Foundation in association with the Ratan Tata Trust."

Water Sources: There are several possible water sources for your pond, though you may need a combination of more than one to keep your pond full year-round. Here are some of the pros, cons and important facts concerning each:

Surface Runoff: Ponds that are filled by rainwater that flows into them over the surface of the land are the easiest to get a permit for because they generally don't have any adverse impact on streams and aquatic organisms. As a general rule, you will need at least 3 acres of land draining into the pond for each acre-foot of pond volume. (An acre-foot is just what it sounds like – the volume of water contained in an acre of water that is 1 foot deep.)

Groundwater: On its own, groundwater is usually not sufficient as the sole source of water for a pond, but it can make a significant contribution to ponds fed by surface runoff, meaning a smaller drainage area is required. The most groundwater is available in low-lying areas with a high water table.

Springs: Springs occur where seepages have sufficient volume to come above ground in a continuous flow. Spring-fed ponds may not require any surface runoff to keep them full, meaning they will be clear, clean and cold. Using spring water to fill your pond may trigger permit requirements in some locations, but it is the ideal source of water for a farm pond.

Streams: It is very difficult to get a permit for building a pond directly in a stream (there are important environmental reasons for this). More often, a portion of streamflow can be diverted to help fill a pond in an adjacent area.

Wells: You can pump well water to fill a pond, though the electricity to do so is costly unless your pump is solar-powered. Well water is generally considered a practical source only for small ponds, or to top off large ponds during dry spells.

Importance of Farm Pond for Agriculture and Farmers: If you have an agriculture land and want to improve your production and earning, then Farm pond is the right tool for you. Agriculture land has no value without water. Water is the key driving force of nature for crop and food production. In present scenario, while the world is facing the problem of water scarcity, Farmers are also facing problems in farming like lack of crop production, less earning due to uncertainty in rain and water cycle. Changes in the climatic conditions are resulting in the uncertainty in rainfall distribution.

Hence high rainfall areas are receiving low rainfall and vice versa. So throughout the year farmer are able to grow crop in only rainy season. In absence water they can't think about the crop in other than rainy season. So to utilize the arable land resource in growing high income crops, water is necessary for farmers. From the ancient time, farmers have used wells for irrigation purposes but now farm ponds have emerged as a great source of water for farmers. Farm ponds are water storage tank or reservoir, designed for rain water harvesting in agriculture land for irrigation purposes, cattle feed and fish farming. There are many government schemes which provide subsidies to farmer for farm pond construction. Farm pond helps farmer to increase land productivity by 200% as well increase the farmer income.

Why You Should Build a Farm Pond: A farm pond is used for irrigation, livestock feed, aquaculture, fire protection, erosion control, or recreational purposes.

- **Farm Ponds Provide Irrigation:-** Perhaps the most obvious reason to build a pond is for irrigation. Ponds can capture, store, and distribute water for a variety of agricultural purposes. They irrigate crops, support aquaculture, or provide water for livestock. Naturally replenished by precipitation, farm ponds can also provide a more cost effective and sustainable alternative to city or county provided water. One calculation found that one 2-acre pond could irrigate 30-acres of crops. Though frequently used to water crops, farm ponds are also water animals. Aquaculture such as fish, shellfish, aquatic plants, or algae can grow in the pond itself. For non-aquatic animals, pump pond water into troughs to water your cattle. Cows and horses require up to 12-15 gallons each day!
- **Farm Ponds Provide Protection:-**Farm ponds also protect against the elements in the form of frost, fire, or erosion control. Particularly important in vineyards, farm ponds can protect grapevines during the winter by forming a thin layer of ice (via irrigation) that can protect fragile plants against frost. Similarly, for areas prone to forest fires, farm ponds can provide a water barrier that will keep flames at bay. Not to mention, in especially rural areas, fire departments can draw from these ponds in the absence of fire hydrants.
- **Farm Ponds Provide Recreation:-**Not just for functional use, farm ponds can be great for recreational use as well. Avid fishers can stock their ponds with largemouth bass, bluegill, catfish and other varieties for endless days spent fishing out on the lake. Water features also add aesthetic appeal to your backyard. Whether you are out in a boat or are sitting on a dock, farm ponds can provide an idyllic setting for summer BBQs, outdoor picnics, or even swimming.

Farm ponds reduce farmers' suicide: - The state of Maharashtra falls under the medium to high water stress category in terms of water availability in the country. Marathwada and Vidarbha, parts of Maharashtra that fall under the rain shadow region of the South-west monsoon, receive less rainfall compared to the western part and often face water scarcity. Marathwada region has often been in the news for recurrent droughts over the last few years. Besides poor rainfall, inefficient water use, undesirable cropping patterns (focus on water guzzling crops like sugarcane, rice

etc.), diversion of agricultural water to industries, increased water demand, and climate change have been found to worsen the water scarcity in the region. To conform to the demand for irrigation, the Maharashtra government, in 2017 launched the Demand-based farm pond scheme as lack of irrigation facilities often result in low yields causing less profitable agriculture, and keeps pushing farmers into a debt trap. For example, as high as 12021 farmers committed suicide in Maharashtra between 2015 and 2018 because of debt problems. The farm ponds scheme was launched to curb this, with a hope to provide a permanent solution to the recurrent water scarcity faced by farmers thus helping to increase produce, enhance incomes and reduce suicides among farmers.

Protection of Farm Pond:-A farm pond should be protected against erosion, wave action, livestock and other sources of damage. Ponds without such protections have short life and high cost of maintenance.

- **Protection against Erosion:-**In general, the exposed surfaces of the dam, spillways, berm areas and other surfaces are badly damaged due to soil erosion. These can be checked by establishing a good cover of sod-forming grasses. The planting of grasses should be done based on the local guidelines.
- **Protection against Wave Action:-**Time to time there should also be used the measures for protection of earth dam against wave action. Following measures are generally used for protecting the earthen embankment against wave action:

Berm:-The protection of earthen embankment can be done by providing a berm of 2.5 to 3.0 m in width at normal pond level. In addition, the face of dam above the berm should also be protected by establishing the vegetations.

Boom:-A boom consist of one or two rows of logs, chained and securely anchored at the toe end of the dam- The logs should be tied by end to end. There should be enough slack in the line so that the boom may be adjusted according to the fluctuation of water level in the pond. Double row logs should also be framed together to act as one unit. The boom should be so placed that it can float at the distance of about 1.8 m towards upstream from the face of the dam, for best result. Boom provides high degree of protection and relatively less expensive. This method is technically feasible, especially for those areas where timbers are readily available in nearby area.

Riprap:-The rock ripraps are generally preferred in that condition, when water level in the pond is expected to fluctuate very widely, or where a high degree of protection is required. Riprap should be extended from the top to the bottom of the dam towards upstream face. At the bottom side, it should be done at least 1 m below the lowest expected level of the water in the pond. The rip-rap may be done either by machine or by hand in the thickness of at least 30 cm. Stones to be used should be durable and large in size, so that they could not get displaced by wave action of pond's water. In addition, when it is not possible to do the riprap up to the toe of upstream face, then a berm of suitable width can be provided on the upstream face for supporting the riprap.



Fencing:-The complete fencing of embankment type pond is generally recommended for that area, where livestock's are allowed for grazing in adjacent areas of the farm pond. The fencing provides protection and also helps in maintaining the vegetative cover over the dam section.

Other Methods:-The other methods for protecting the earthen embankment of farm pond include increasing the top width of the dam, flatter the front slope and applying a layer of coarse sand and gravel on 1:1 slope. These methods are generally suitable in the arid zone areas, where rocks or timbers are not readily available.

How farm ponds can benefit Indian agriculture?

- **Water Harvesting:** Farm ponds aid in superior water control through the harvesting not just of rainfall but also of surface run-off and subsurface flows.
- **Recharge points:** They function as recharge points, contributing to groundwater replenishment.
- **Irrigation:** They can help in providing supplemental irrigation in the kharif season and an enhanced irrigation coverage in Rabi season. The yield of paddy can thus contributing to greater food security.
- **Retention of water:** Farm ponds can retain water for 8-10 months of the year; thus farmers could enhance cropping intensity and crop diversification within and across seasons.
- **Promote commercial crops:** The area used to cultivate vegetables and other commercial crops also increased. They also support cultivation of water-intensive and more profitable commercial crops like papaya, beyond the traditional cotton, onion, etc.
- **Cost-Effective:** Ponds are financially viable plan, with a fairly high Rate of Return, of about 19%, over 15 years.
- **Increased income of farmers:** With zero maintenance cost and no requirement of intensive technology, farm ponds can provide extra income to farmers not only through better crops but also through other methods like aquaculture and fishery in farm ponds.

Although farm ponds can help in improving agricultural output, there are many issues faced by agricultural sector. These issues require innovative solutions.

Some Measures to improve agricultural issues in India

- **Irrigation facilities:** Small land farmers are unable to arrange irrigation systems. They need proper irrigation. So government should have to take initiative for providing irrigation to the small land owners.
- **Education to farmers:** Many farmers are not aware about crop rotation. Though education in urban areas has improved a lot, the government has ignored the same in rural areas in general & in agriculture sector. So Government agencies should start efficient mechanism in this regard.
- **Need for better water management:** Currently available irrigation facility do not cover the entire cultivable land. In most cases, it is not the lack of water but lack of proper water management that causes water shortage. Improved modern methods of rain water harvesting should be developed. Farm ponds are a viable solution. Surplus water from perennial rivers can be diverted to the needy areas. Connecting the rivers throughout the country will solve this problem. Construction of national waterways will improve the irrigation facility, which in turn can save the farmers, if the monsoon would fail.
- **Processing industries and cold storage facility:** Today 90% farmers want processing unit and cold storage facility in the villages, especially for vegetables and fruits. So that farmers will get proper marketing & rates. This will reduce middlemen exploitation. Government should incentivise industry to open food processing units and cold storage facility near villages.
- **Developing alternate source of income for farmers:** The Government should take up the responsibility for providing training to the farmers to acquire new skills to reduce the dependence on agriculture. New areas like horticulture, aquaculture, fishery should also be promoted.
- **Sustainable farming methods:** Organic farming is the way out for sustainable farming. Organic certification process should be more faster. Precision farming helps to get out of drought adversities by targeted input delivery. It requires minimum input and also reduces cost of production. Already Micro-irrigations are helping rained farmers in drought conditions. These methods should be promoted.
- **Women support:** Women farmers don't enjoy entitlement to their land. GoI is in process of digitisation of land records. In that process women farmers of that family can also be done to get their Rights. Further smart farm tools and machineries must be gender neutral in its accessibility.
- **Climate Resilience farming (CRF):** It depends mostly on technological tools like smart weather

forecast using Big data analytics. Plant biotechnology by developing short duration varieties, submerged crop varieties for coastal regions, drought resistant varieties for arid areas can further promote CRF.

In Maharashtra, the State government is promoting farm ponds under a flagship programme that aims to dig over one lakh structures by offering a subsidy of up to ₹50,000 per farmer. They can help enhance water control, contribute to agriculture intensification and boost farm incomes. However, this is possible only if they act as rainwater harvesting structures and not as intermediate storage points for an increased extraction of groundwater or diversion of canal water. The latter will cause greater groundwater depletion and inequitable water distribution.

CLOUD SEEDING: The situation is particularly bad in Marathwada and Vidarbha regions. Keeping in mind the rain shortfall, the state government has approved a 30-crore fund for cloud seeding plan to trigger artificial rain in these areas.

Impact of farm ponds on the lives of women: Women of Manjhari in West Singhbhum said they used to go to a lowland stream earlier. With the construction of farm ponds, women said they no longer walk miles to fetch water. One of the women in Sargu village of Ghurabanda administrative block said, "Earlier we had to bring water from a stream 2kms away and so I used to bathe on alternate days."

With a farm pond near her house now, she bathes every day. Women confirmed that after the construction of farm ponds, they don't spend much time in collecting water. Where they used to spend an hour to three hours, now they are able to do the same task in 20 minutes to half-an-hour, since they are able to bathe and wash clothes in the farm ponds. Some women joked that the spare time has enabled them to socialize with their neighbors. Some said now they are able to take a nap in the afternoon after lunch. Taking nap was a luxury which a woman couldn't afford earlier. For their livestock also, they take water from the pond. The ponds cater not only to the needs of the animals of the farm pond owners, but also those of other villagers. The number of complaints of back pain has also come down. Young women were relieved that they could wash their soiled menstrual cloth at their own convenient time. Involving women while planning for water harvesting structures is a challenge that needs to be overcome. Also, while constructing farm ponds one may look at the option of construction of closed private bathing spaces for women. During the FGDs, women expressed their desire to have an enclosed bathing space that would ensure privacy. As the pond water is stagnant, the water is likely to get dirty by frequent use. Small private bathing spaces near the ponds would ensure that the water remains clean. Whenever water-harvesting structures are constructed, the main focus is on farmers who are generally perceived as men. The farmers reap the direct benefit of assured water supply by increasing their cropping intensity. However, one generally ignores the impact water has on the lives of women. Apart from reduction in drudgery, time saved in collecting water has positive effect on the health of women. It is clear that one should look beyond economic parameters and consider the social impacts while constructing water-harvesting structures

CONCLUSION

Although the important function of a farm pond is to harvest rainwater, most farm pond owners extract groundwater from dug wells and borewells and then store it in farm ponds, thus defeating the very purpose of its construction. Moreover, there are major faults in the way the farm ponds are constructed like the absence of inlet and outlet valves to receive and discharge rainwater. Farm ponds help groundwater recharge through percolation of the stored rainwater. However, in practice, high micron plastic paper is applied in almost all functional farm ponds to stop the seepage of stored water. This reduces the possibility of the percolation of water from the farm pond to recharge groundwater. According to Union Budget 2017-18, Centre expected to see one million farm ponds being built by March 2017. If the government continues to chase unprecedented targets, it might turn into an exercise in vain. Farm ponds are small tanks, usually occupying a part of the farmland, to store rainwater for irrigation. The Centre decided to construct farm ponds on priority under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), following which the states submitted their own targets and programmes. While enhanced irrigation coverage has been hailed as an important way to improve agricultural productivity, it continues to lag behind in India and agriculture continues to be rainfed, subject to the vagaries of the monsoon. High groundwater dependence for irrigation has not only led to its depletion and quality deterioration, but has also raised questions about its sustainability in the long run. In this context, small water harvesting structures such as farm ponds have been looked upon as miracle strategies to help increase water availability at the local level and bring about positive changes in the agrarian landscape of the area. The article ends by making the following policy recommendations to effectively deal with the situation:

- The need for a ban on extraction of groundwater for storage in farm ponds in notified areas, exploited watersheds, and water scarcity zones.
- Setting limits on the number of farm ponds that can be constructed in a village or watershed area taking into consideration the carrying capacity of the village/watershed.
- Controlling the size of farm ponds and ensuring that farmers abide by the sanctioned design appropriate for the village or the watershed area.
- Focus on small farmers for the provision of subsidy.
- Explore alternatives to the plastic lining currently used for lining the farm ponds.
- Encourage construction of common farm ponds and community sharing to secure drinking water needs and better water management.
- Explore strategies to reduce the rate of evaporation of water stored in the farm ponds.

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