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-AN OPINION

Is Micro irrigation viable in helping small and marginal farmers? -need for an in depth scientific study

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ABSTRACT
Micro irrigation is considered the best irrigation technique, especially in water stressed arid and semi arid tracts. However, there are some impediments to make it a viable irrigation practice, due to some practical problems encountered by economically backward small and marginal farmers. In this write up an effort has been made to analyse various facets of micro irrigation.

PREAMBLE:

It is well established that per hectare yield in many parts of our country is abysmally low compared to developed countries and our farming community, comprising mostly small and marginal farmers, in general are struggling to overcome various hurdles, including insufficient water availability. When we look in to phenomenal strides made by Israel in producing different types of crops in arid tracts that have very limited water availability, we naturally feel that the existing belief that insufficient availability of water is the basic cause for farmers` plight may need a relook. The significant strides made by Israel have been achieved through implementation of micro irrigation practices. However, as Israel and India have different socio-economic structures and varied priorities, it is essential to take stock of various factors before arriving at any conclusion.

Irrespective of claims and counter claims, our backwardness, according to experts is mainly due to our adapting age old irrigation and farming practices that lead to not only wastage of water but also production of inferior variety of final produce, both in quality and quantity. While such an opinion is to a major extent true, one wonders why our scientific and technical experts are unable to solve the existing dismal scenario, especially in semiarid and arid tracts of our country. Having witnessed the plight of small, marginal and even middle class farmers and death of thousands of farmers every year in many states I have tried to understand basic reasons, apart from socio-economic, for these setbacks. While it is not prudent to say that this small exercise might provide answers to the vexed problem, where many experts faced hurdles at every stage of their studies, I have decided to present some details that could be used by committed experts in segregating the truth from false projections. I feel such a relook is essential as many new initiatives are being planned by the present government to strengthen our production capabilities in all the sectors, including agriculture.

Need for Suggested scientific study:

After going through some excellent reports and publications, I came to the conclusion that our scientific exercises in spite of producing valuable results are not translated properly as viable execution practices, due to various reasons including non-implementation of umpteen number of recommendations. The suggested study should first make use of wealth of valuable data already available in the form of technical reports and scientific publications. Once this is done and useful information is gathered it is essential to divide our water stressed semiarid and arid tracts in to sub divisions based on topography, average rainfall, and effective cropping pattern. Within semiarid tracts due to recent monsoon aberrations some segments that fall under rain shadow zones have become much worse with soil erosion and increased weather related aberrations. Since recent El Nino effect has adversely affected many parts of our country especially Telangana, Vidarbha and Rayalaseema apart from parts of Karnataka and Rajasthan it may be better to select two districts each from these states/ sub states for area specific pilot plant studies. Since our agriculture sector (as many others) is controlled by industrialists, business magnates, powerful administrators and influential politicians, all of whom do not give due importance to our scientific pursuits assuming our scientists are not capable enough of producing solutions to our problems even good studies and resultant useful results are not taken in to cognizance before preparing project reports and scheduling various time bound and area specific norms. Unfortunately, many learned members of our scientific community add fuel to the fire by stating our scientific pursuits are indeed mediocre, brushing aside all the studies (good and bad) as irrelevant, a way of receiving attention and focusing on their own superiority. Those who really want welfare of our masses always silently provide needed advises that are implementable at the field level.

In such a scenario our experts find it difficult to effectively take up pilot projects to wean off our farming community from age old irrigation practices. I say so as I am unable to understand why specific recommendations, made after micro irrigation studies, that have clearly shown the efficacy of micro irrigation technology are not put into practice on large scale as viable agriculture practices.

Out of many outstanding reports I am impressed by the excellent inputs provided by Vaibhav Bhamoriya and Susan Mathew in their technical report entitled "An Analysis of Resource Conservation Technology: A Case of Micro-Irrigation System (Drip Irrigation)" released in 2014. I am pained to say the details given in this report and couple of other reports on minor irrigation studies in Karnataka and Sri Lanka have not been properly made use of in propagating importance of Micro irrigation. The subject of the report by Vaibhav and Susan is very important in context of agricultural development and resource use efficiency. However, as the analysis is rated as qualitative in nature, relying on subjective judgments rather than quantitative measurements by the expert who reviewed it, my suggested study assumes greater importance and relevance. The suggested study, however, should make use of some excellent details given in the report cited above before fixing up specific objectives to make the study more useful and adaptable.

Proposed initiative:

Data shows that micro irrigation such as drip systems can reduce water losses and increase crop production -- if it overcomes some hurdles. It is well known that the limitation of this method is its high initial cost, which is beyond purchasing capacity of small and marginal farmers, that's why it is normally adopted by large land holdings farmers. As a policy to encourage the use of such system, the Ministry of Agriculture, Government of India, provides subsidy to the tune of 50% to small and marginal farmers under National Mission on Micro Irrigation. However, these subsidies benefit more the industrialists/ manufacturers of drip/ sprinkler irrigation gadgets than the small farmer. This set back can be overcome, if government ensures proper installation and maintenance in addition to easy availability of running costs. Introduction of solar panels to lift water from ground level to overhead tank will enthuse small farmers living at remote places. Success rate of its acceptance by small farmers depends on efficient interaction between extension workers and farmers.

Believing in micro irrigation importance, accepting recommendation of experts, Karnataka is planning the world's biggest micro irrigation project by bringing 7 lakh hectares of land under drip and other systems, and along with Maharashtra, is making drip irrigation mandatory for sugarcane cultivation. This didn't happen by accident; rather the unsustainability of conventional irrigation practices has forced policy makers to pay greater attention to micro-irrigation practices, which primarily involve the use of sprinkler and drip irrigation. These systems supply water efficiently and reduce loss due to seepage, run off and evaporation. While a sprinkler would spray water uniformly over the field, drip irrigation systems supply water in drops to the root area of the plant.

There has been a constant rise in area under micro irrigation in India. However, despite their increasing popularity thanks to huge government subsidies, micro-irrigation techniques still serve only 5.71 per cent of the total irrigated area in the country. (**Source**:http://www.indiawaterportal.org/articles/micro-approach-thats-big-enough-fight-growing-water-crisis)

While appreciating the bold initiative of Karnataka, to make micro irrigation an important irrigation component in different semi-arid tracts of our country I have decided to project some salient points included in the report of Bhamoriya and Mathew. Some of my own observations are also included, hoping the write up would be useful in taking stock of existing scenario and recommended initiatives to make Karnataka type projects to emerge in other states. Since none of us who want healthy growth of our agriculture sector likes to see the usual impediments/ hurdles to such welfare measures I solicit support of our scientist brethren to come out with more specific/ focused presentations to strengthen the movement.

Drip Irrigation is viewed as a promising technology for its ability to support farmers in raising incomes and reducing poverty. A number of benefits have been ascribed to the use of micro-irrigation. In addition to saving of water these include increased yield and productivity of certain crops (especially spaced crops), labour cost savings, electricity savings, lesser pumping hours and hence easier irrigation, better crop growth and also better soil health. Strong evidence exists claiming economic benefits from the adoption of micro-irrigation. However there exists little or sparse evidence of socio-economic benefits from the adoption of micro-irrigation. There are mentions of positive nutritional impact on adopting households as well but these are few and far apart. In spite of these advantages, the spread of micro – irrigation has been restricted to only a few pockets across India. The government has launched various schemes to promote micro – irrigation in the country. It set up the National Committee on use of Plastics in Agriculture (NCPA) which took up various schemes for the promotion of use of plastics, and in particular micro – irrigation systems. In agriculture, NABARD has been financing micro – irrigation systems since 1985. Maharashtra was the first state to introduce subsidies in 1986 – 87. Subsidies ever since have been a regular and dominant phenomenon in the efforts to spread the use of drip irrigation. There is a new debate concerning

the impact of micro-irrigation systems at various levels of water use for consideration of "water-saving" and also on the status of the resource (water resource) itself from the basin perspective. While these positives enthuse technical experts, negatives pose a problem as majority of our land holders have 1 to 10 acre holdings and introduction of these systems, on individual basis, in to small holdings is fraught with many setbacks. They according to me are; 1) lack of enthusiasm and motivation in part of small land holders in erecting and maintaining mechanised systems, when they are struggling to earn sufficiently to eke out a living; 2) absence of assured water source that ensures availability of water (even the limited); 3) dependence on outside expertise that needs running expenses; 4) non usability of the systems in producing staple food-rice/ wheat.

In addition to this negative mind set and practical problems some experts opine that "water-saving" is notional. They point out that while a farmer may save water for growing a given crop on a given plot in a given season however it may not necessarily result in water savings even at the farm level as the farmer is likely to use the "saved" water in a nearby plot to grow another crop. As a result there might be increase in crop output but no net water saving may result. There may also be a case wherein a farmer may save water on his farm but other famers draw out and use water from the aquifer resulting in no savings. Some researchers and practitioners therefore believe that the commercialization of agriculture and increasing area under irrigation and / or intensifying agriculture with the aid of micro-irrigation might lead to unsustainability of agriculture in the long run enabling use of even the marginal water quantities and sources rather than their conservation. Such complicated issues are resulting in a debate on the impact of micro-irrigation on agriculture and water resources. Understanding the impact of adoption of micro-irrigation is crucial for different states of India like Gujarat, Andhra Pradesh, Telangana, Karnataka and Rajasthan giving a massive push to promote micro irrigation for water resource conservation is essential. The erstwhile Andhra Pradesh Micro-Irrigation Project (APMIP) claims to have brought 1.66 lakh ha. area under micro-irrigation during 2.5 years. At the same time there are pockets like Jalgaon and Nashik in Maharashtra, Narsinghpur and Maikaal in Madhya Pradesh where the market forces are leading to high adoption rates. In some pockets high adoption rates are observed even in the absence of government subsidies.

There is a need to understand the impact of micro-irrigation technology vis-a-vis resource conservation and other claimed benefits, before present Status of Drip Irrigation Adoption is implemented. Such a development is possible only if our committed scientific and technical community comes forward to lead the movement.

Micro-irrigation technologies are supported largely for one or more of the following profits: means of saving water in irrigated agriculture and averting the impending water crises, as a strategy to increase income and reduce poverty among the rural poor; to enhance the food and nutritional security of rural households; and as means to extend the limited available water over a large cropped area. The financial paybacks have been proved in many studies. Puran et al., (2010) have reported that the incremental increase in irrigated areas was about three-fold and the decline in labour use per hectare was by 78%. Also the economic returns to farmers` investments in micro-irrigation technologies are substantial. Financial resources and crop suitability are the stimulus for adoption of drip irrigation. Though a key argument is that membership in a high caste group, poverty index and share of income from off-farm and non-farm activities, have a significant effect on the decision regarding the adoption of micro-irrigation technology (Mamara et al., 2005). Under these situations, it is highly required to analyse the issues, facts and constraints that are hindering the adoption and spread of micro-irrigation in different states, which will give appropriate signals for the expansion of the Micro-irrigation in the country, wherein researchers, extension workers and policy makers could play a key role (Palanisami et al., 2011).

Needed precautions in introducing time bound mega micro irrigation projects

Since any mega irrigation projects, while implementing within a stipulated time, could lead to some setbacks Karnataka and Maharashtra initiatives of taking up micro irrigation in lakhs of hectares need some execution strategies. The following precautions are essential to ensure high percentage of success.

1. Area specific geomorphic aspects need to be taken in to cognizance in selecting and erecting drip irrigation components. The standard practice of incorporating a uniform design should be avoided.
2. Soil structure, texture and composition in an agro-met unit needs to be taken in to consideration in selecting drip irrigation design including height, location and volume of overhead tank and design of distribution channels and velocity and droplet dimensions. In addition the type and quality of drip irrigation components needs to be given due importance. Surface and subsurface water input availability, mode of pumping from input storage facility to overhead tank need to be evaluated in advance taking in to consideration frequency and magnitude of extreme weather events in the region, using past statistics.
3. Data pertaining to area specific evapotranspiration variations- wind velocity/ moisture content

should be given due importance, to make on spot variations in the design

4. Cropping pattern has to be decided depending on various aspects, including socio-economic factors, availability of quality seeds/ seedlings, frequent technical advisories including midcourse corrections to circumvent natural hazard related setbacks, final product storage and marketability.
5. Assured maintenance through trained personnel is vital for success of the project.

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