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In this issue

Coming Up!

27th National Conference
Oct. 25-27, 2018
Assam Agri. Univ., Jorhat

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International Conference 2019
A Joint Conference of
WASWAC, ISCO & SCSI
Nov. 5-9, 2019
At New Delhi

International Decade of Soils 2015-2024

From The President's Desk

Today, we are living in an environmentally unsustainable world and its repercussions have already become visible. Global warming and climate changes have a debilitating impact on the existing water resources, affecting millions of people around the globe. With India likely to have a shortfall of about 324 bcm (billion cubic meters) of water going by present per capita water consumption per year by the year 2050. The government will have to take immediate steps to prevent a crisis situation. Experts feel that with the present rate of water consumption, India is poised to have more Cauvery-Like disputes among states.

Conservation of this important natural resource is not something that requires huge planning or involves staggering costs. A little thought and concern will suffice, at least in taking the first step. In this regard, there is so much to learn from India's rich cultural heritage. Starting from the Harappan Civilisation to Sultanate and Mughal era, several successful examples are there in from of us where water conservation was taken up on priority basis.

With the availability of better technology and more resources in our contemporary period, this task can be taken up more efficiently.

Rainwater harvesting is a simple and economical method of water conservation and has been in practice in India for centuries. In the last few years, there has been a renewed emphasis on it to replenish the ground water.

In this technique, the rainwater that falls on the surface or rooftop is guided to borewells of pits to recharge the underground water which can be used later whenever required.

Water is a resource used by every living being on this planet. That makes it the responsibility of every individual to do their bit to conserve water. Government agencies alone can never fight this battle alone. The most important requirement is to spread awareness, especially among youngsters. It is necessary that all those concerned should come together and work in tandem to preserve this elixir of life.

Nutrient and Water Management through Organic Techniques

R.K. PATHAK

Soil fertility is crucial for survival of humanity at the planet earth. Plants obtain nutrients from soil, atmosphere and water act as medium for their availability. Conventional agriculture is based on fossil and imported source of energy which is dwindling and becoming expensive. Fertilizers currently available, hardly provide 5-8 nutrients, while more than 30+ nutrients are required by plants. There are few specific techniques capable of mediating the five ultimate source of energy freely available for agriculture.

At present the soils are tired, overworked, depleted, sick, poisoned by synthetic chemicals. Production and quality of food has suffered, and so has health. Chemical fertilizers cannot restore soil fertility. They do not work on the soil but are enforcedly imbibed by plants, poisoning both plant and soil. Only organic humus makes for life.

It is only fertile soil; rich in organic carbon i.e. high humus content can assures quality production, healthy animal, plant and human health. In ancient time people respected the five ultimate source of energy and these inturn provided there free energy in agriculture and allied activities.

Points to be considered for plant nutrition

Plants gets get their nutrition quantitatively from soil and qualitatively from atmosphere. Plants require 30 + elements in their production which can be provided only through soil humus. Almost 78% N is freely available in the atmosphere; plenty of P in soil in non available form is available. Potash and many others are non constituent element, burrowed from soil and return it back through bio mass. Large amount of plant nutrients in non available forms are available in deeper horizons of soil.

Soil humus is potent accumulator of solar & cosmic energy. Quality humus is produced by decomposition of organic and animal products without interference of agro-chemicals. Pests & erosion is indicator of reduced Aura energy of soil and plants. Healthy soil contains massive population of soil microbial consortia i.e. bacteria, fungi, actinomycetes and algae. The micro fauna are protozoa and nematodes. The small organisms (fauna) also include mammals (mice) spring tails, arthropods (mites, millipedes and centipedes), eel and earthworms all play important role in maintenance of soil fertility.

Strange to believe, but true that humus has capacity to transmutate any nutrient which are deficient are needed in large amount by plants. All efforts need to be directed for enhancement of humus and its maintenance.

Earthworms are silent farmer's friend play basic role in decomposition of organic materials and many other materials. Local earthworms and uncountable microorganisms in the soil are the chief source of nutrition to plants. They eat the organic biomass, move upward and down ward, making capillaries in the soil and enhancing availability of nutrients and moisture in available forms to plants. Earthworms accelerate the decomposition of biomass by removing dead plant material from the soil surface. Their excrements contain 5 times more nitrogen, 7 times more phosphate, 11 times more potash and 2 times more magnesium and calcium than normal earth. Their tunnels promote infiltration of rainwater and thus prevent soil erosion and water logging.

Integration of plants and cow products are important component in maintenance of soil fertility. Plants play major role in mediating cosmic and solar energy. These take CO_2 from atmosphere, store in wood, roots in turn provide biomass. Hence play major role in maintenance of ecological balance. Deep penetrating roots helps in downward movement of water, provide nutrients to soil organisms and are helpful in upward movement of nutrients. Few practices such as farming system approach, multi-storey cropping, multi cropping, crop rotation, integration with leguminous plants, green manuring, cover crops, pump crops, auro green crops, mulching and regular use of bio enhancers are few techniques, helpful in maintenance of high humus thus soil fertility.

Maintenance of humus in tropical & subtropical regions during summer for crop cultivation is major constraints. This can be resolved by green manuring, cover crops, mulching during summer or immediate sowing of pump crops after first shower.

Cow is special creature, considered mainstay symbol of purification, health, wealth and prosperity. It is interesting to record that indigenous breed of cow with hump and horns have capacity of absorbing cosmic and solar energy. The belly of cow is mini cosmos. Feed which passes through rumen of cow are full of microbial consortia and free from any contamination.

Bio enhancers

Bio enhancers are organic preparations, obtained by active fermentation of cow products over specific duration. These are rich source of microbial consortia, macro and micronutrients and plant growth substances including immunity enhancers. Bio enhancers are available for all crop activities. Since as external source only cow is needed and with some basic skill up gradation, every farmer as per need can prepare specific bio enhancer and use it as per need.

Mulching is an integral component of organic farming practices. Soil organisms can't withstand scorching sun;

hence they are active during night hours. Mulch provides congenial micro climate for enhanced activity of soil organisms. Soil organic matter helps to create a good soil with stable crumb structure. Mulching plays a crucial role in weed management and preventing soil erosion. It is pertinent to mention that in fruit trees, own dropped foliage and pruned materials along with some foliage from weeds and legumes can provide bulk of nutrients in perennial plants. These mulches ultimately decompose and enrich the soil humus formation.

As result soil remains porous, encourage white fibrous roots, hence no need of cultivation which damages these roots. Hence in fruit trees, cultivation should be avoided.

If mulching is adequate and there has been use of bio enhancers used regularly, the biologic life in soil will manage to absorb from air about half liter water per square meter in one way or other, which will ensure their survival. Strange to record that higher the intensity of summer there is higher water absorption. This is nature's way of maintaining a perfect balance between heat and moisture for survival of the species under extreme circumstances. It will enhance development of white fibrous roots, essential for quality production.

Water management

Water is the driving force of all nature. It fact water is nutrition and act as medium for uptake of nutrients and moisture from soil. India gets enough rain water, but lot of water is wasted due to mismanagement and its pollution. Homa atmosphere and use of Agnihotra ash has shown some promise in resolving water crises and enhancing availability of nutrients.

Rain water harvesting, its conservation in suitable structure, in field, encouraging its movement to deep soil layers through infiltration, encouraging sowing on ridges, alternate row irrigation, mulching and integration with drip/ sprinkler irrigation are helpful in economizing water use. Greening of village through encouraging multi cropping, border wind breaks, hedge plants. Encourage crops with low water requirement such as finger millet, pearl millet, pigeon pea, chick pea, guar, cluster bean suited to dry situations and restriction for water loving crops such as rice, mint, sugarcane in areas with low rainfall.

Regular performance of Agnihotra, incorporation of Agnihotra ash in water bodies and in the field has been found to enhance water quality, availability. Agnihotra ash has profound impact in enhancing P-solubility, availability of N and other nutrients. activities such as a forestation all along river length, promotion of Homa farming, incorporation of Agnihotra ash in rivers, other water bodies are going to have long term impacts on soil fertility, water quality, minimizing environmental pollution thus heavy and healthy human being.

> Strange to believe that all around us, great seas of energy of the cosmos i.e. from sun, moon, planets, earth and stars are freely available. Unlike chemicals sold in the commerce, this energy is free, and it isn't toxic; it's highly beneficial. For sustainable agriculture and food security, we conceived Cosmic Farming, based on mediating these energies for saving humanity at planet earth.

Conclusion

Systematic research on different aspect dealt above need to be initiated at few select institutions for detail explanation and its acceptance by policy makers and particularly farmers.

Bio enhancer has immense potential to improve soil fertility, crop productivity and pest management. It is paradox to record that most of information on these preparations has been experienced by few select farmers since ancient times with exciting response, but it could not catch attention of scientific fraternity. Since cow is essential input, hence assertive promotion of cow products will resolve many controversies, country is facing. The restoration of soil fertility, as per experience of organic farmers, would go long way toward solving problems of food, human health, floods and water shortages which cannot be solved until organic matter is restored to the soil. *One must learn to mediate cosmic energies; trap raindrop right where it falls, instead of washing top soil into the rivers.*

Encountering Poverty through Irrigation Wells: A Success Story

JAGAT VIR SINGH

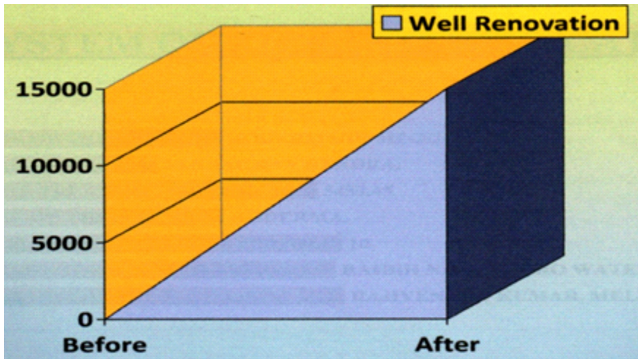
Shri Rajendra Bedia, harvested bumper crop of vegetables in the Lem micro watershed of Ramgarh IWMP project, north Chhotanagpur Division of Jharkhand through construction the irrigation well in the micro watershed.

In the *lem* village, similar to other families, a 48 year man named Shri. Rajendra Bedia, an active farmer but struggling for irrigation facilities as farming was his only opportunity to grow as farmer. His father was a daily wage labour but many instances his father was unable to fulfil his expenses due to the unavailability of labour work. This was a tricky situation for Mr. Rajendra and was worried to overcome this situation to raise income.

As his son and daughter were continuing study, he wanted his income level to rise. However, to raise income

he was worried to take risk to work as daily wage labour work in nearby town which could not have met his expenses. He was worried to dig a well for irrigation purpose. He had only two options for getting it done, either it would have been from MNREGA or from Integrated Watershed Management Project (IWMP). Mr. Rajendra had hesitation over MNREGA. Finally, he approached the Watershed Committee Secretary of Lem. On meeting the secretary, Mr. Sulendra Munda of Lem, beneficiary was bit hesitant & had doubts in his mind. With a suspected mindset, he met Mr. Sulendra Munda who very patiently welcomed Mr. Rajendra and asked about the reason of his coming. Mr. Rajndra Bedia hesitantly replied, *"My family is going through a hard time due to insufficient income and I don't want to give up in life. So can I request for irrigation well in my plot".*

Mr. Sulendra advised him to propose it in the Gram Sabha. Hence, few weeks later he attended and proposed irrigation well for approval by Gram Sabha. Finally it was sanctioned in the Gram Sabha in the F.Y. 2013-14. WDT team visited the field and technically assessed the land just to ensure the availability of water. After site verification the construction work started. The work was initiated under the supervision of Mr. Rajendra and he used to continuously monitor the proceedings for result as his all hope rested on this Well. More the depth of the



Shri Rajendra Bedia's income through Renovation of Well

Well was getting deeper, he was getting happier. Reason was that the water was getting recharged at a fast pace. Again he further had to go another five feet with the help of labour. At the last, he finally was able to get it done. And soon he brought all the materials required for construction of well, Labours also showed interest and completed the work within 20-25 days. After completion, he thanked Mr. Soman Mahto- WDT of Patratu and the Watershed Committee Lem for their immense cooperation. And why not, in-fact today his dream has translated into realty which he never imagined.

On his way to success he had won half the battle but still had a long way to go to raise his income. He didn't want to lose any opportunity of harnessing production from the wasteland nearby the well. In the paddy season for transplanting, he had fetched water for irrigation purpose while other villagers were facing water crisis. So he was more conscious about irrigation for the concerned crops. Now paddy season had gone off and Rabi season was just on the doorsteps. He was looking further to harness the crops through the constructed well. He started preparing fields for Rabi crops. And soon he had sown the crops which were carefully looked after. Result was very satisfying. Successfully cultivated bottle gourd, onion, chilli, sunflower and cucumber on his fields. He has earned near about Rs.20,000/- from sale of vegetables. He is expecting to earn Rs.50,000/- in this season. Villagers are amazed to see the level of effort by Mr. Rajendra Bedia and many villagers are inspired to see this growth and want to follow his footsteps in the field of agriculture.

Doubling Farmers' Income through Pulse Based IFS Model under On Farm Reservoir in SAT Regions: A Success Story in Tribal Region of Telangana, India

K S REDDY, V MARUTHI, P K PANKAJ, M KUMAR, PUSHPANJALI, K NAGASRI and T SAI KRISHNA

The tribal regions in Telangana are endowed with land degradation, acute shortage of water for both agriculture and drinking, low income, subsistence farming and malnutrition covering almost 1174 villages with a total population of 31.78 lakh accounting for 9.08% of the total state population. In these areas, rain dependent agriculture is extensively followed by the tribal farmers with productivity levels far less than state average of 0.8-1.0 t/ha. The weather aberration in terms of increased dry spells immediately after germination of the crops during rainy season, changed pattern of rainfall with high intensity for short durations, shift in the occurrence of monsoon rainfall, decrease in rainy days etc. are very common due to the climate change impacts in the region. The resource base including soil is very poor in the tribal regions. The tribal farmers have the land holding varying from 1 to 5 acres with both patta and assigned lands distributed by the government. The soil depth is very limited to 20 cm, below which stones are predominant in the sub-surface layers with sandy loam texture. The infiltration capacity of the soils in the region is ranging from 50 to 70 mm/hr with low organic matter.

Institutional mechanism

A systematic approach was followed to improve the water resources and its management through capacity building measures (CBMs) and FFS for awareness among 60 local households of Chenchu primitive tribes in the watershed for adoption of technology. A village level institution, namely Integrated Rainwater Management Association (IRWMS) was formed for taking the decisions in the village towards planning water resources development and management of water in the village, Petrallachenu. The association has 15 members group chaired by the head of the village.

During initial stage of the project implementation (2016-17), the association decided to implement the construction of On Farm Reservoir (OFR) in the Chenchu farmer field, Shri M Pedda Yellaiah with 3 acres agricultural land having sandy loam red soil with 20 cm soil depth. He has 4 family members with 2 school going children. Traditionally before the project, the farmer used to grow sorghum and cotton alternatively under rainfed conditions with debt in his hands for agriculture and education of children.

Soil Health Management

Soil samples from the agricultural fields of 10 Chenchu farmers were collected in participatory mode with the help of IRWMA and tested in the ICAR-CRIDA soil science laboratory for major nutrients like NPK and micro-nutrients. Soil health cards were prepared and distributed to the farmers along with recommendations for major nutrient deficiencies in the soil. Based on the test results, the soils were found low in Nitrogen (49 kg/acre) and organic carbon (0.2%); very low in phosphorous (4.8 kg/acre) and medium in potash (65 kg/acre) with insufficient micro-nutrient except zinc and manganese. The farmers were advised during the crop season to apply the required quantities of fertilizer for the crops grown by them in the village namely, sorghum, cotton, maize, chillies, red gram, green gram, black gram and forage crops.

Action Research in the tribal farmer field

A watershed of 47 km^2 area (4700 ha) in the lower Krishna basin under Nagarkurnool district covering four tribal dominant villages (Petrallachenu, Udimala, Padara, Chitlam Kunta) was selected for the present study in order to enhance their water availability through rainwater

Community meeting at Petrallachenu village

harvesting, water productivity through efficient irrigation system, nutritional productivity through crop diversification and OFR based integrated farming system modules at small landholder field (3.0 acres). In this area, for planning rainwater harvesting structures like OFR and check dam, rainwater harvesting potential was estimated using SWAT model. Annual total runoff was estimated to be 573 ha m with an average annual runoff depth of 122 mm out of an average annual rainfall of 734 mm giving a scope for harvesting 401 ha m through OFR in the watershed. The seasonal runoff for both *kharif* and *rabi* varied from 90-174 mm and 77-134 mm, respectively in the watershed. The runoff coefficient during *kharif* varied from 14-28 % and during *rabi* varied from 23-41 %.

On Farm Reservoir (OFR)

The design and construction of OFR for small farmer having 3 acres of agricultural land was done based on the run off coefficient values and catchment area. The IRWMA implemented the construction of OFR at the lowest corner of the field with dimensions of 20x10x3.5 m having 600 m^3 capacity storage. The OFR was constructed under the project "Agri Consortia Research Platform on Water (ACRP-W)". The farm of 3 acres catchment was remodeled with soil and water conservation measures like contour bunds and field channels connecting to inlet of the OFR.

OFR with capacity of 600m^3

Portable Raingun Irrigation System (PRIS)

For efficient water application to the crops from the OFR, a 5 hp diesel engine mono-block pump set along with 40 HDPE sprinkler pipes and a PRIS was designed and implemented through the IRWMA in the farmers' field. The raingun had the specifications of 240 lpm discharge at 2.5 kg cm^{-2} operating pressure with 48 m spraying diameter covering an area of 1089 m^2. This system was implemented looking into the silt load in the surface water harvested through OFR and the filtration requirements. Since, raingun has larger orifice, the filtration requirements are minimum reducing the cost. The PRIS was used by group of farmers under the bore well system also due to its portability and acceptability

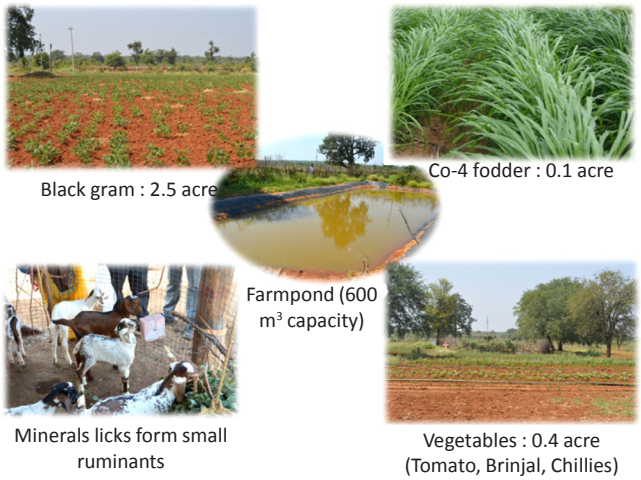
PRIS under field operation in the vegetables

of the farmer in terms of ease of operation, reduction in the irrigation time and wetting of the soil.

Pulse based integrated farming system (2016-17)

Before the project intervention, farmer was adopting mono-cropping with sorghum and cotton grown alternatively leading to chronic economic losses. After convincing the farmer about the potential benefits of diversification through capacity building and FFS, the IRWMA suggested to go for crop diversification with pulses, vegetables, fodder, small ruminants, etc. with OFR as water source. During 2016-17, a pre-monsoon rainfall event of 60 mm in one spell filled the OFR. Onset of monsoon failed in the month of June and continued to July with long dry spell and sparse rainfall events.

During such moisture deficit conditions, Pulse based (Black gram (2.5 acres) + vegetables (0.4 acre) + fodder (0.1 acre) were implemented in the farmers field with critical irrigation strategy using OFR water through efficient rainwater application system (PRIS).



Pulse based IFS module

During the first year, introduction of vegetables was initiated which contributed to supplement the nutrient basket of all 60 Chenchu households in the colony. The farmer earned Rs.10,000/ net income by selling within the community with food and nutritional security among the community and reduced migration to forests. Growing fodder in small area of 400 m^2 helped the farmer to feed animals and small ruminants which added to the benefits

further. Critical irrigation of 30 mm depth was ensured from OFR at critical stages of black gram through PRIS and irrigation for vegetables were planned at weekly intervals for 3 months period using water conjunctively. In 2016-17, with 2 times filling of OFR, water productivity of black gram with 3 q/ha yield was 0.21 kg/m^3 as compared to rainfed as 0.13 kg/m^3. The water productivity for chillies was 0.5 kg/m^3, tomato - 4.6kg/m^3, brinjal - 9.2 kg/m^3 and fodder 27.52 kg/m^3.

Economic Impact

The cost economic analysis for IFS modules with OFR construction, irrigation system and its operation and maintenance, interest rate at 7% per annum, cost of cultivation, yield and market prices were considered for pulse based IFS modules for small holders in the tribal region. These results were compared with existing rainfed system with mono-crops as sorghum and cotton, which were generally grown by the same farmer before the project. The analysis indicated that the pulse based IFS model gave the net benefits varied from Rs 6,000/- to 11,500/- per acre for various cost considerations. In the rainfed system of mono cropping with sorghum and

Economic analysis of OFR based IFS modules for small farm holdings in tribal area

Pulse based IFS module (Green gram - 2.5 acre+ Vegetables - 0.4 acre+ fodder - 0.1 acre and 10 small ruminants) during 2016-17

Cost details		Full cost (Rs.)	50% subsidy (Rs.)	100% subsidy (Rs.)
A	Capital Cost			
	OFR construction & Lining (20 years life)	95000	47500	0
	Irrigation systems (15 years life)	83300	41650	0
	Total capital cost	**178300**	**89150**	**0**
b	Annualised cost @ 7% interest	18100	9050	0
c	Variable cost (irrigation + Maintenance) per year	8300	8300	8300
d	Cost of cultivation per year	16000	16000	16000
	Total Expenditure (b+c+d)	**42400**	**33350**	**24300**
e	Gross benefits based on prevailing market rate	59625	59625	59625
f	Net Benefits	17225	26275	35325
g	**B:C ratio**	**1.40**	**1.79**	**2.45**
h	**Pay back period (years)**	**2.5**	**1.3**	**0.7**
Rainfed System		Cotton	Sorghum	
Gross benefits per year		44400	30000	
Cost of cultivation per year		48000	18000	
Net Benefits		-3600	12000	
B:C ratio		0.925	1.67	

BOX-1

Name of the farmer : **Shri M Pedda Ellaiah**
Village : Petrallachenu, Chenchu colony
Mandal : Padara
District : Nagar Kurnool
Geo Coordinates : 16°27'N and 79°01'E

The farmer was selected for the implementation of the project interventions based on the decisions of IRWMA of the village. Traditionally the soils are sandy loam with limited depth of 20 cms with low organic C content (less than 0.2%), Nitrogen (49 kg/acre), very low phosphorous (4.8 kg/acre) and medium in potash (65 kg/acre) with insufficient micro-nutrient except zinc and manganese.

In order to maintain soil health and quality, the soil health card was prepared and recommended the dosage of correct fertilizers, FYM and micro-nutrients. The farmer adopted two IFS modules during 2016-18. Before that the farmer was provided with an OFR structure of 600 m^3 capacity with dimensions of 20x10x3.5 m along with 500µ HDPE geo-membrane film as lining material. The farmer was also provided 5 hp diesel pumpset with 40 sprinkler pipes and portable raingun system as a combined package. During 2016-17, due to late onset of monsoon rainfall, the farmer adopted pulse based system with green gram as main crop in 2.5 acres, vegetables in 0.47 acre and fodder in 0.1 acre. There were two dry spells which was managed by providing critical irrigation of 30 mm through portable raingun irrigation system (PRIS) and vegetables and fodder with 5-6 irrigations at weekly intervals for supporting his family as well as 10 goats. The farmer says he got net benefit of Rs. 40,000/- excluding the cost of the infrastructure which otherwise was provided by the project.

The overall impact of the interventions, like OFR, PRIS, crop diversification (cropping system, vegetables and fodder with small ruminants) combined with social engineering through capacity building measures and participatory institutional mechanism resulted into not only doubling the farmers' net income through technological package, but also improved the overall water productivity of crops by 77%, improved nutrient availability in terms of protein (pulses and goat meat) and micro-nutrients (vegetables and goat meat), reduction in forest migration, reduction in mortality and morbidity of livestock, improved biomass for animals and small ruminants, etc.

cotton in 3 acres land, the net benefits were found negative in the cotton and positive in case of sorghum with Rs. 4000/ per acre. In this case as adopted by the farmer, the advantage of having OFR for dry spell management in the rainfed regions provided enough water to meet 2 critical irrigations of main crop and 5-6 irrigations with 30 mm at weekly or 10 days interval for vegetables over small landholding of 0.4 acre. Growing fodder in small area helped the farmer to feed the animals and small ruminants. The OFR could be promoted as technology for water resource development in the farmers fields to alleviate the drought and enhancing water productivity at the field level. The B:C ratios were also found to be better than the rainfed system in spite of the expenditure for additional investments towards irrigation system besides OFR construction and lining. The present investigations in the tribal farmers fields clearly showed that there is a potential for doubling the income of the small farmers of semi-arid tropics (SAT) through the implementation of OFR technology with irrigation systems as a total package for the farmers with subsidy incentive.

Therefore, replication of such modules in the SAT regions of Telangana as a technology package can bring green growth, resilience, improved nutrition and water security with more profits for sustaining the livelihoods.

Policy Framework

Convergence of such modules along with OFR/ farm pond technology as package intervention in the government schemes for upscaling in the SAT regions of the country at farmers field will enable prosperity among rural rainfed farmers.

Formulation of mission mode projects on development module under the theme of doubling farmer's income and PMKSY for realizing on farm water, food and nutritional security particularly in the down-trodden tribal regions where malnutrition is very common among the children and women.

Convergence of the state Agriculture/ Horticulture departments with research organization like ICAR-CRIDA, ICAR-IIWM and ICAR-IISWC for providing technical back up with scientific planning in water resource development in the farmers field in rainfed or SAT regions.

27th National Conference

Sustainable Management of Soil and Water Resources for Doubling Farmers' Income

25-27 October, 2018

Venue: Assam Agricultural University, Jorhat, Assam

Organized by

Soil Conservation Society of India (SCSI), New Delhi

In collaboration with: **Assam Agri. University, Jorhat**

THEMES OF THE CONFERENCE

- Soil health – sustainable productivity management under
  - Field crops based land use system
  - Horticultural crops based land use system
  - Integrated farming system based land use system
  - Hill ecosystems
- Technological solutions towards soil erosion, soil degradation and soil pollution
- Soil and water management under climate change situations
- Approaches for doubling farmers income through sustainable agriculture
- Awareness building on sustainable soil and water management
- High-tech technologies for increasing soil and water productivity through precision farming, application of drone, RS & GIS *etc*

Call for Papers: Submission of Papers and Abstracts

Abstracts are invited on any of the above theme areas or related areas. The abstracts should not exceed 500 words, should be typed in double space leaving 2.5 cm margin on all sides on A-4 paper. Three to five key words should be given below the abstract in italics. The font should be Times New Roman in 12 pt. size. The abstract and full paper, in MS word format, should be sent through e-mail: **ncswc2018@rediffmail.com**. Details are available at www.scsi.org.in

Important Dates

Last date of abstract submission	:	**31st July 2018**
Intimation of acceptance of abstracts	:	**10th August 2018**
Submission of full length papers	:	**31st August 2018**
Last date for Registration (without late fee)	:	**20th September 2018**

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