



# Newsletter



## TOWARDS CLIMATE RESILIENT AGRICULTURE

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### INTRODUCTION

CAR- Agricultural Technology Application Research Institute Kolkata having seventeen KVKs where different activities under Technology Demonstration Components of National Innovations in Climate Resilient Agriculture (NICRA) programme in various modules are carried out. Under Natural Resource Management module demonstration was conducted on improved drainage in flood prone areas, in-situ moisture conservation, construction/renovation of new water harvesting and recycling, structures/ farm ponds/ checks dams/tank roof water harvesting tank, land shaping and rainwater harvesting structures, improved drainage in flood prone areas, conservation tillage where appropriate, artificial ground water recharge and water saving irrigation methods, green manuring, 5% model of irrigation, crop residue management, bunding of field, Broad Bed Furrow, soil test based nutrient application, micro irrigation techniques, compost pits etc.

Under Crop Production module Introducing drought, salt and flood tolerant varieties, advancement of planting dates of rabi crops in

areas with terminal heat stress, water saving paddy cultivation methods, community nurseries for delayed monsoon, location specific intercropping systems with high sustainable yield index, crop diversification etc. Similarly under Livestock and Fisheries module various livestock centric interventions were carried out including use of community lands for fodder production during drought/flood, improved fodder/feed storage methods, improved shelters for reducing heat stress in livestock, management of fish ponds/tanks during water scarcity and excess water, breed up-gradation, balanced feed and fodder management through mineral mixture, feed blocks and silage making, azolla feeding, breed animal health management through deworming and vaccination, fish pond cleaning and fish farming, pig farming, clean milk and fodder production etc. Institutional Interventions including strengthening the existing or initiating new ones relating to seed bank, fodder bank, commodity groups, custom hiring centres, collective marketing group, introduction of weather index based insurance and climate literacy through a village weather station and awareness developed programme.

### KVK PORT BLAIR

#### **Water harvesting through lining of pond for life saving irrigation and pisciculture**

In many earthen ponds especially where rate of water percolation (seepage loss) is very high, fish culture is very difficult, as volume of

water drastically reduced from the ponds and additional amount has to be spent for filling or maintaining the water level. In order to control the seepage losses, ponds need to be lined with suitable sheets to avoid excess seepage and leakage. Central Island Agricultural Research Institute





has developed the technology of lining a pond, it not only prevents seepage loss but also ground water contamination. After restricts lining of the pond fish culture can be carried out in extreme condition of water. Pond was made by lining by silpauline covered by reinforced plaster (1:6) on sides and 15 cm thick soil layer at bottom. Water storage capacity of this pond is 1650 cu.m which was lost through seepage and leakage. Now this technology has

solved the seepage loss. Five hundred forty kg fish production (katla, rahu, mrigal:: 4:3:3) in this pond (0.25 acre) and farmers are benefitted from this



technology. This technology has been replicated in other five places across the villages of Badmaspahar and Port Mount.

## KVK AURANGABAD

### Water harvesting structures became a boon for draught prone farmers

In Harigoan village of Aurangabad district have no irrigation facility, before launching NICRA project. Most of the farmers belong to small and marginal groups who are fully dependent upon onset of monsoon. Rice and wheat is the mono-cropping



system of this village because lack of irrigation facility to produce the crop. In this village water table is very low during March to June and no any hand pump work properly for even drinking of water. Due to delay monsoon, farmers could not transplant the

paddy seedling of 20 -25 days. In rabi season farmers usually give only one irrigation in wheat crop due to scarcity of water. Keeping in view the extreme climate and dependency on rains,



the new and modern technology of rain water harvesting structures were introduced through NICRA project. Under this project 2.2 kilometre canal (Ahar) renovated and 9 ponds were excavated with the over whelming support from the farmers and their constructions were completed in different groups of farmers. After construction of 9 ponds and 2.2 km

ahar, About 270000 cu.m stored in canal (Ahar) and 7950 cu.m of water stored in ponds during rainy season. This stored water used for irrigation as well as drinking for animals. At present time about 70 ha area was irrigated through ahar and ponds. A quantum jump of produces of these villagers was observed during rabi season. So far, villagers farm is concern the



momentum was increased in yield of 35-40% in lentil and gram and 20-25% in wheat whereas 15-20% in paddy. With this, farmers of this village are very happy after introducing the new water harvesting technology.

## KVK BANKA

### New varieties of fodder introduced

Under fodder production Barseem variety Vardan was introduced among five farmers of NICRA Village Merha in 1acre area. Cowpea cultivar EC/4216 (TL) cluster bean, BG-1, Stylo hamata

and Clitoria were demonstrated among six farmers of Merha village. Production of lobia was found 12 kg per sq.m. These fodder varieties were given to take more yield in less water in comparison to Sudan grass. Production of Guar was equal to

Sudan i.e. 5 kg per sq. m. Stylo and Clitoria were new introduction for barren land. Till first stage of cutting these were successful. It can be concluded that these fodder crops are suitable in less water condition and are boon for livestock farmers as these



farmers are getting 1.2 to 1.5 L more milk per day per animal. After feeding *Stylo* and *Clitoria* they reduced the concentration by 2-3 kg per day. Net profit increased by Rs. 36 per day per animal. Production of Bajra as green fodder was found 14 kg per sq. m.



## KVK BUXAR

### Renovation of Community water saving structures at Kukurha Village

In Kukurha village of Buxar district, renovation of 2320 m long irrigation cum drainage channel was done. Construction of hume pipe outlet in watershed was done first then construction of 90 m permanent water retaining wall along with 180 m high bund were made to check the water flow. Two iron gate with regulator on two outlets were installed. After the

renovation this drainage channel is now capable to irrigate about 128 ha



area under paddy cultivation and also useful for pre sowing irrigation in Rabi



of 55 ha. Farmers are getting more yield than other villages and cropping intensity was increased at 100% on the village.

## KVK JEHANABAD

### Location specific intercropping systems with high sustainable yield index

Before NICRA project farmer did only traditional farming Sakrorha of Jehanabad district, Bihar. After the project launched in Jehanabad to face draught like



situation. Farmers are continuously in touch with KVK and they were motivated by KVK scientists. The



KVK introduced intercropping/ mix cropping which helped them to cope up with water scarcity situation with less input management. During kharif season crops like red gram with millet

and jowar were grown in 20.5 ha area and in rabi season gram with linseed as border crop and lentil with mustard were grown in 34 ha area. Farmers adopted this technology and get more profit than traditional farming system. The increment of yields in the tune of 30-45% was observed in both the seasons.



## KVK NAWADA

### Farmers profitable for community (samudayik) nursery

In Majhila village of Nawada district

is an extreme drought area. Dry spell season is longer than other season and cropping intensity around 100%. Community Nursery was new

approach for this area to meet the requirement during the dry spell and non availability of the paddy seedlings. The community Nursery



of paddy seedling was developed by the farmers nominated by the VCRMC. The 165 Farmers have been so far after introducing the technology.

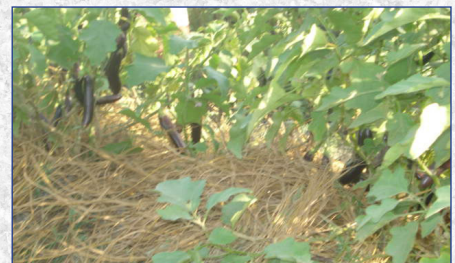


## KVK SARAN

### *Paddy straw as natural mulch in Brinjal*

Affaur, NICRA village is normally facing extreme drought in summer and water crisis is acute problem in the area. Cropping intensity of the village is poor (80% only). Length of irrigation times was drastically reduced by incorporating new approach i.e. mulching in various crops. For brinjal cultivation paddy straw mulching which reduce the number irrigations reduced from four to two, fertilizer application was reduced to 10%, weed density reduced from 79 to 11 per sq m and moisture retention increased by 10 days. This technology reduced

the cost of cultivation and farmers following the approach not only in Affaur other villagers also.



## KVK SUPAUL

### *New variety of jute introduced*

Sadanandpur, NICRA Village where farmers usually grow traditional variety of jute. KVK introduced a new variety of JRO-66 in an area of 2.5 acre. They got a higher yield of 28 q/ha against the traditional one (20-22 q/ha). They followed improved method of cultivation like balanced fertilizers dose with bio fertilizers like PSB and *Azotobacter* at the rate of 5 kg each per ha. The other villagers also following this intervention adopted in NICRA



village. The gross return of Rs. 60,000 per hectare with increase of 43% over traditional one has been achieved. The lands were left barren after the harvest

of jute are now getting cultivated with short duration paddy variety *Prabhat*. The income of the farmers has been increased significantly.



## KVK CHATRA

### *Pea cultivation through utilization of residual moisture*

Supervision of the scientists of KVK, farmers began with land preparation and first of all examined and did shallow ploughing of the field for proper utilization of

residual moisture. Farmers applied FYM and destroyed the weeds. After land preparation pea variety *Arkel* with balanced dose of nutrients ( $N_{40}P_{40}K_{20}$ ) was sown in the last week of November. *Arkel* variety was early harvested the advantage of high yield with quality of vegetable pea which





was relatively earlier in the market. After two months of sowing with one irrigation, "flower blooming" started and followed by profuse fruiting. Farmers started picking of pods in the month of January on five day interval and sold in the market @ Rs. 30 to 35/kg. In the month of January, earning of Rs. 1,15,000 by sale of 35q of pods in one ha of land. Farmers spent Rs. 52,000 and earned about Rs.

1,35,000 lakh/ha with a net income of Rs.73,000/- per ha in a short span of time by cultivation of vegetable peas through utilization of residual moisture. Now the farmers regularly in touch with the KVK scientists for getting more information related to moisture conservation technique and also motivated other farmers for cultivation of vegetable pea after harvesting of paddy.



## KVK EAST SINGHBHUM

### Introduced new drought tolerant variety of pulses

KVK introduced a new pulse variety *Asha* (drought tolerant arhar variety). It was Cultivated 20 acre area under NICRA village and increased in yield has been observed



85% more than local pulses crop. Moong and Urd crop has been taken to cope out late onset of monsoon, prolonged breaks during the season and early withdrawal of monsoon and uncultivated land of 20% were

covered by these crop. Twenty percent additional yield obtained by farmers, nitrogen application of next crop has been reduced by 25% and soil fertility has been improved for pulses cultivation.



## KVK GODDA

### New chickpea variety introduced against wilt

Belwa and Gunghasa are two NICRA adopted villages of KVK Godda. Wilt, root rot, color rot are major problems in these area which affect a huge loss of pulses. KVK scientists introduced a new variety of chickpea. *JAKI - 9218* was demonstrated in 12 acre area and yield has increased 50% over the

traditional ones. This variety has been demonstrated other areas of these villages.



## KVK GUMLA

### Up scaling of integrated farming system in Tribal areas

Gumla is a tribal dominated district of Jharkhand. About 70% farmers belong from scheduled tribe community. Farming situation is entirely rainfed. Rice,

Maize, Ragi, Blackgram, Niger and groundnut are the major crops. In general land holding is marginal and their livelihood mostly depends on forest based products, Livestock rearing and Crop production. By nature they are meat lovers and hence huge demand exists for poultry, pork

and goat. Hence in order to maximize farm productivity and income the technology interventions through Integrated farming system were developed in participatory mode by the KVK Gumla on farmer's field. Considering the physical, social and economical limitation of the district,



a small Integrated Farming System model was developed in the field of Belagarha village of Ghaghra block. The model comprises in two ha area in the vicinity of tribal settlement and integrated with six components. The



critical input assistance was provided under the project. Technological intervention was made through three piglets (Cross breed T & D), Fifty thousand Fingerlings for fish production, high yielding paddy variety (*Lalat*), Maize (*Suwan-1*), Plantation of sixty Mango fruit plant, Vegetable seed crop Pumpkin (*Arka Suryamukhi*), One vermicompost unit for waste recycle and renovation of well (one unit). The capacity Building programme and technological backstopping was provided to the villagers in whom the beneficiary farmers also participated. Besides

all these components priority was given on pig farming intervention as per their interest and enthusiasm,



and accordingly the well managed housing facilities with all the necessities were developed under NICRA in his homestead in.

## KVK KODERMA

### *Jalkund is a life saving irrigation*

Two empty engine oil drum are used for developing *jalkund* (water tank) in the river. Removing both the upper and lower lids of drum and making small pore on the body of the drum and joining two engine oil drums. Then these drums are inserted in the sand bed by

removing the sand inside the drum manually. Two HP pump was operated more than 6 hrs and 2000 sq. m area of which could possible irrigation to



wheat grown on, the water depth in kund was maintained upto  $>2/3^{\text{rd}}$  of the kund, with replenishment of water from river bed. The regular availability of water in Kund will help in increasing the area of cultivation with other crops after rice. Jalkund was adopted by 42 farmers of Koderma district and approximately 75 ha. of land irrigated by this technology.

## KVK PALAMU

### *Market Linkages established by KVK, Palamu for Lac cultivation*

KVK Palamu took initiative in reviving of Lac cultivation at Dulsulma and Murma village in Satwarba block from last three year. The cultivation practices spread to 10-12 adjoining villages.

The spell of produce become a major issue and during the period KVK has

been observed a local market /bazaar system in Satwarba block which runs twice in a week. Middle level purchaser, who often visit KVK. KVK promote them to purchase brood lac at local market level at the same time villagers are promoted to brought their produce at Satwarba block market. The number of these type of middle level purchaser is about 8-10 in numbers and approximately 80-

100 kg of blood lac are sold by 20-25 villagers on two market day in a week and about 10-12 q of produce sold on monthly basis during peak harvest season.



## KVK COOCHBEHAR

### *Disease management of potato*

Late blight disease of potato is very destructive in Coochbehar district of West Bengal. Weather is very suitable for late blight disease in Coochbehar and causes very low

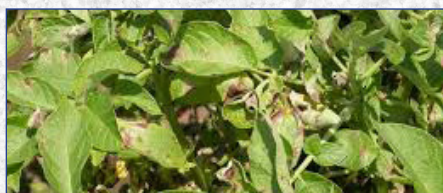
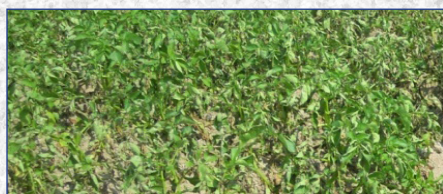
yield. Last 6-7 years this disease is highly attacked of potato plant in Coochbehar. Fungicides and other method cannot control this disease. So KVK and university scientists helped the farmers to solve the

disease management.

Advancement of planting date of potato by promotion of medium duration rice cultivar, promotion of late blight tolerant variety and restricted spraying of chemical.



Scientists introduced a new variety of potato is *Kufri jyoti*. This variety is tolerant against late blight.



## KVK MALDA

### *Crop diversification through inter-cropping*

Inter-cropping is a multiple cropping practices involving growing two or more crops in proximity. The most common goal of intercropping is to produce a greater yield on a given piece of land by making use of resources or ecological processes that would otherwise not being utilized by a single crop. KVK scientists introduced this technology at NICRA adopted villages. KVK

demonstrated this technology on 2.0 ha and benefitted 30 no of farmers in NICRA adopted village and now the benefitted farmers are giving training to other farmers of NICRA villages to follow the techniques.



## KVK SOUTH 24 PARGANAS

### *On-Floating seedbed of paddy to escape early season flooding*

The village falls under the coastal agro-ecological zone and suffers from occasional torrential rain during Monsoon. Paddy is the major crop during Monsoon season. More than 75% of the agricultural lands are



loss. The seedbed floats over the standing water and thus escapes any immediate damage. Moreover, seedbed preparation is neither delayed nor hampered due to heavy precipitation during initial phases of monsoon. The seedlings of floating seedbed were ready for transplantation at 24 days after sowing compared to 30-35 days in case of traditional method.

- Timely preparation of seedbed
- Escape from submergence
- Early transplanting

The entire seedbed is prepared on a bamboo frame that can float over water so that the paddy seedlings are protected from submergence during excess rainfall.



low lying and hence the Kharif paddy suffers prolonged submergence after any intensive precipitation (>60 mm per day). Due to climate change there is an increase in intensity of precipitation during the initial monsoon days (June-July) resulting into prolonged submergence (10-12 days). This causes havoc damage to the seedbed preparation as well as to the standing seedbeds of paddy.

The intervention helped to save the paddy seedbeds from prolonged submergence and subsequent crop

- \* A polythene sheet is covered over the bamboo frame
- \* A thin layer of top soil is spread over it.
- \* The frame is either fixed with bamboo poles at four corners and manually lifted with the rise of water level or fixed with empty plastic vessels to keep it floating.



- \* Paddy seeds are sown on the floating seedbed

### *Specifications of the practice*

Seed rate of paddy: 50kg/ha  
Floating seedbed size: 10ft x 4ft  
No. of floating seedbeds: 25no./ha  
Age of seedling at transplantation: 24 days

The farmers used of paddy Variety Dudheswar @ 33 q/ha and have profit 27000.00 /ha/ year

- \* A 10ft x 4ft size bamboo frame is prepared



## ZONAL LEVEL REVIEW WORKSHOP OF NICRA-TDC OF HELD AT KALIMPONG ON DECEMBER 15-16, 2016

The Zonal Level Review Workshop of National Innovations on Climate Resilient Agriculture (Technology Demonstration Component) of ICAR-ATARI Kolkata was held at Darjeeling KVK Kalimpong on December 15-16, 2016. The workshop was chaired by Dr. Chirantan Chattopadhyay, Vice Chancellor, Uttar Banga Krishi Viswavidyalaya, Coochbehar, Co-Chaired by Dr. Ch. Srinivasa Rao, Director ICAR-CRIDA, Hyderabad and Dr. S. K. Roy, Director, ICAR-ATARI Kolkata. The workshop was attended by Dr. Md. Osman, NICRA-TDC Coordinator, CRIDA, Hyderabad, Dr. H. Bhattacharya, Director of Extension Education, UBKV, Coochbehar, Dr. S. Chakraborty, Professor Incharge, RRS-UBKV Kalimpong, Dr. F. H. Rahman, Principal Scientist-cum- NICRA Nodal Officer, ICAR-ATARI Kolkata, Scientists Incharge of IARI-Regional Station at Kalimpong, CISH-Regional Station at Malda, and all the Programme Coordinators of NICRA implementing KVKs of Zone II.

One CD on "Success Story of NICRA Project of KVK Chatra" published by Birsa Agricultural University was released during the workshop.

The workshop started with welcome address by Dr. F. H. Rahman, Principal Scientist-cum- NICRA Nodal Officer, ICAR-ATARI Kolkata. In his welcome address Dr. Rahman presented the highlights of the salient achievements carried out by the 17 NICRA- KVKs of the zone.

Dr. S. K. Roy, Director, ATARI while addressing his speech he asked all the NICRA-KVKs to prepare case studies/ success stories based on the most successful and scalable technologies

and those should be replicated in nearby areas. He mentioned that the intervention under NICRA should read vulnerability with existing cropping practices and preventing this vulnerability through NICRA intervention is to be a priority.

Dr. Ch. Srinivasa Rao, Director CRIDA, Hyderabad showed his satisfaction on the performances of KVKs' activities. He mentioned that the KVKs should focus on details of district on climate resilient information. He remarked that some of the presentations were excellent and few of them need improvement which should focus only on climate resilient activities. He emphasized that the successful technologies should be transferred from one KVK area to other areas of KVKs involving other stakeholders. He further mentioned that performance of NICRA activities would be evaluated and as per the report the project may be extended further.

Dr. Chirantan Chattopadhyay, Vice Chancellor, Uttar Banga Krishi Viswavidyalaya, Coochbehar, while addressing the inaugural speech he mentioned that the intervention under NICRA should read vulnerability with existing cropping practices and preventing this vulnerability through NICRA intervention is to be a priority. He spoke about the climatic issues exists in Darjeeling district and problems of water crisis are being faced by the people there. Dr Chattopadhyay proposed to include Darjeeling KVK in the NICRA-TDC programme in the coming years.

Dr. Md. Osman, Coordinator, NICRA-TDC, CRIDA, Hyderabad informed the overall performance of NICRA KVKs of this Zone is quite good. He

emphasized that intervention should be taken on farmers' field based on the variability of environmental condition and extent of climatic variability should be available in each of the NICRA-KVK.

In the technical session all the Programme Coordinators/PIs of the KVKs have presented one by one their salient achievements of out scaled technologies during the last five years.

The workshop ended with vote of thanks proposed by Dr F. H. Rahman, Pr. Scientist-cum- NICRA Nodal Officer, ICAR-ATARI Kolkata.



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