MERA GAON MERA GAURAV

(My Village My Pride):

Implementation and Experiences





भाकृअनुप
ICAR

Division of Agricultural Extension
Indian Council of Agricultural Research
New Delhi-110012

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FOREWORD

The agriculture sector plays a pivotal role in the country's economy and provides the livelihood security for a significant portion of the population. Small and marginal farmers form the backbone of Indian agriculture and their participation is crucial for ensuring inclusive growth and sustainable development in the sector. To facilitate the rapid growth of agriculture in India, it is imperative to provide small and marginal farmers with timely and relevant information and support. This includes access to investment opportunities, agricultural loans, basic amenities such as irrigation and infrastructure, market rates for their produce, extension services, and other facilities essential for agricultural productivity enhancement.

Indian Council of Agricultural Research, New Delhi launched "Mera Gaon Mera Gaurav" to promote the direct interface of scientists with the farmers to hasten the lab to land process by providing timely information and adoption of improved agriculture technology in efficiently manner.

This publication **Mera Gaon Mera Gaurav (My Village My Pride): Implementation and Experiences** is providing successful cases of technological innovation and dissemination process. I appreciate the efforts of ATARI Jabalpur in bringing this publication and hope will be useful to the planners, policy makers, researcher and field functionaries in accelerating the lab to land procedure in the benefit of the farming community.

Yours sincerely,

(Himanshu Pathak)

Dated the 18th, March, 2024
New Delhi

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PREFACE

Agriculture in India is a complex mosaic of distinct agro-ecosystems, differentiated by climatic, soil, vegetation and other natural features. About half of the Indians derive their livelihood from agriculture and allied activities. The growth of other sectors and the overall economy hinges on the performance of agriculture to a considerable extent through its backward and forward linkages. Transformation of agriculture without participation of small and marginal farmer can not be possible as they are majority and also not resourceful. Relevant technologies as per the need of the farmers situation and timely has wider adoption among the farming community.

In this direction ICAR has launched Mera Gaon Mera Gaurav during 2015 to enrich the farmers with latest technology and adopt latest improved technologies to increase production which will defiantly improve the economical and social status of the farmers. The objective of this scheme is to provide farmers with required information, knowledge and advisories on regular basis by adopting villages. The group of scientist of ICAR Institutes and SAUs adopts a village and provided technologies developed and refined by them to the farming community with continuous to monitoring of the adoption of agricultural technologies process of by the farmers.

The publication **"Mera Gaon Mera Gaurav (My Village My Pride): Implementation and Experiences"** depicting the progress of the programme by showcasing of successful cases. I hope that publication will provide inputs for policy and decision makers to hasten the lab to land process by enhancing scientist-farmer linkage.

(U S Gautam)

INTRODUCTION

1.1 Background

Empirical evidences showed that small and marginal farmers' needs scientists/opinion leaders support at the evaluation stage in the adoption process of a particular technology. In this context, participation of small and marginal farmers in the agriculture is very important. Small farmers put forth their desire on various forums to have timely information on investment in agriculture, loans, availability of other basic amenities, market rates, extension activities and facilities provided by different agencies, new research findings and technologies etc.

Presently, various agencies are working in agriculture and farmers are keen to know about the services provided by them. The technologies developed and refined by Research Institutes, Agricultural Universities, private and other organisations are accepted and adopted to various extent by farming community. Therefore, the awareness among farmers about the organisations and their programmes need to be created on regular basis. Also to accelerate the adoption of improved technologies among farming community required interaction of scientist and farmers.

An innovative initiative "*Mera Gaon Mera Gaurav*" was planned in 2015 to promote direct interface of scientists with farmers to hasten the lab to land process. The scheme aims at providing the required information, knowledge and advisories to the farmers on regular basis by adopting villages.

1.2 Implementation

Under this scheme, scientists of ICAR institutes and SAUs selected villages as per their convenience and remain in touch with the farmers in selected villages to provide information on technical and other related aspects in a time frame through personal visits, social media etc. Being a resource person for the village, the scientists are also expected to monitor the process of adoption of agricultural technologies by the farmers. The scientists may use community radio, local newspapers, mobile phones, video, exhibition, local media and make initiatives to have regular dialogue with the farmers in their local language. The cooperation of KVKs, ATMA, etc. has been effective in demonstration of technologies to the farmers. Besides providing information to the farmers on various agricultural organisations associated with agriculture production and marketing was given so that the farmers could contact these organisations for finding solutions to their agriculture related problems.

Scientists also created awareness among farmers about climate change, other customized services, protective measures and other issues of local and national importance. In this process of social transformation, scientists involved and created linkage with local Panchayats, development agencies, NGOs and private organisations. In addition, scientists encouraged the ideology of clean and good agricultural techniques for producing good quality agricultural produces and linked this to Swachh Bharat Abhiyaan.

In this initiative, more than 4,500 scientists of National Agricultural Research and Education System (NARES) are working directly with the farmers in the selected villages. At Institute/Agricultural University level, many groups of multidisciplinary scientists are constituted, one group may consist of four scientists and one group will adopt 5 villages.

1.3 Selection of village

The groups of four scientists at every Institute/University adopted villages within a radius of 50-100 km from their place of working. KVKs, Panchayats and other related departments may provided necessary cooperation to the scientists at local level in the selected villages. Scientists are provided with minimum necessary facilities by their organisations for travelling and conducting the programmes. A format was developed to analyse farming, climate, social and economic conditions of the selected villages.

1.4 Responsibility of scientists under MGMG

- Identifying a village and strengthening interface with farmers.
- Periodically updating farmers about agricultural activities through phone and mobile messages.
- Providing technology handout as per the agro-ecological conditions of the village.
- Providing information to farmers about agricultural inputs, seed, fertilizer, chemical, agricultural machinery, climate, market, etc.
- Educating farmers through newspapers, community radio, etc.
- Creating awareness among farmers about the programmes being implemented by various organizations and institutions working at local level e.g. voluntary organizations, farmers' organisation, ATMA, other Govt. departments.
- Making farmers aware of the sensitive issues of national importance such as: *Swachh Bharat Abhiyaan*, climate change, water conservation, soil fertility, etc.
- Organising farmer's meet by visiting the selected villages as per need and facilitate the participation of specialists of the concerned institutes.
- Identifying technical problems at village level and make use of those in prospective research programmes.
- Generation of technical, social and economic data related to a village and to submit quarterly report of work done.

1.5 Operational mechanism

At national level, Assistant Director General (Agricultural Extension)/Principal Scientist, Division of Agricultural Extension, ICAR, New Delhi, is the Nodal Officer, whereas at Zonal level, Director, Agricultural Technology Application Research Institute (ATARI), formerly known as Zonal Project Director, is the Nodal Officer supported by one scientist of the Institute. At Institute/ Agricultural University level, a Principal Scientist/ Professor is nominated as a Nodal officer. Nodal officers at Institute/ University level submit their benchmark survey and quarterly reports to Director, ATARI who will send the consolidated report to Assistant Director General/ Principal Scientist (Agricultural Extension).

In nutshell, *Mera Gaon Mera Gaurav (MGMG)* an innovative flagship programme of ICAR is being monitored by eleven zones in India. ICAR institutes and SAU's are working under MGMG programme which is monitored at ATARI level.

Kisan goshti

Organization of field day

Field visit

2. PROGRESS MADE UNDER MGMG

Since inception of MGMG, total 1.68 lakh field activities were organized including visit to village by teams, interface meeting/gosthies, training, demonstration and general awareness programme. Total 1.63 lakh literatures were provided and total 2.84 lakh messages/advisories were sent to the farmers. Under this programme, in total 91.09 lakh farmers benefitted by field activities, literature support, message/advisories, linkage developed and input support.

Table 1: Year wise progress under MGMG

Year	No. of institutes/ universities involved	No. of Groups / team formed	No. of Scientists Involved	No. of villages covered	No. of field activities conducted	No. of literature support provided	No. of messages/ advisory sent	Farmers benefited (No.)
2015-16	122	1280	4910	5291	16805	13725	9520	626777
2016-17	126	1226	4774	5367	28646	63765	24401	1081900
2017-18	130	1343	5126	6873	45689	41224	40641	1279876
2018-19	114	1208	3546	3454	19730	10475	18467	3380515
2019-20	117	1200	4741	5077	26504	9603	35252	1784980
2020-21	112	1043	4614	4014	31358	24970	156045	955520
Grand total					**168732**	**163762**	**284326**	**9109568**

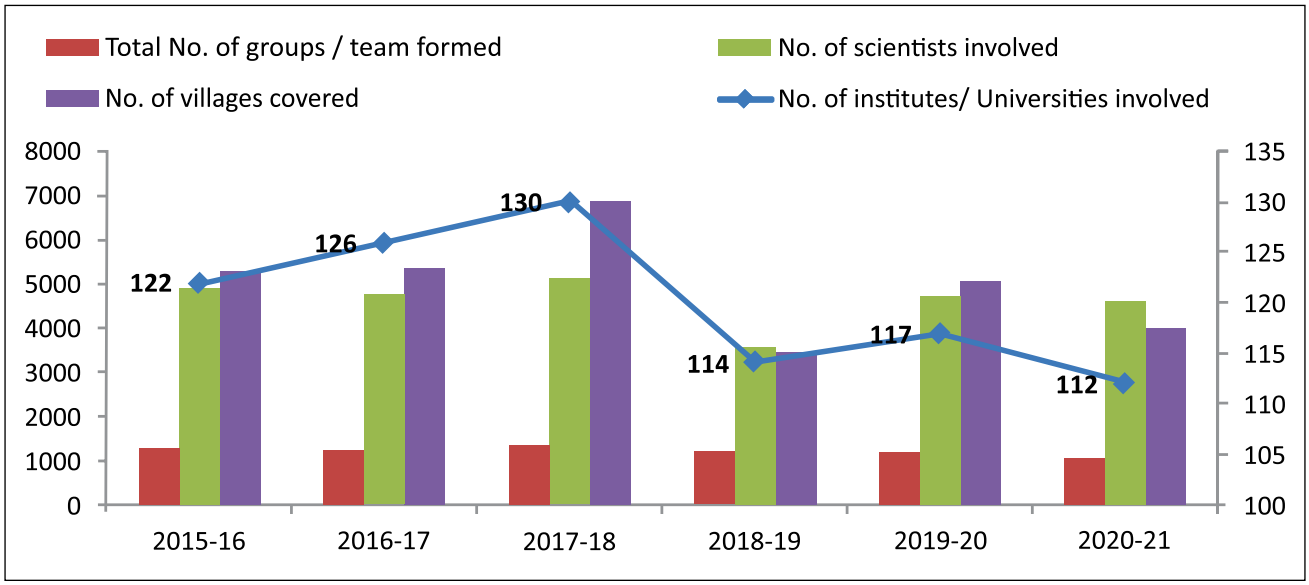


Fig 1: Year wise progress made under MGMG

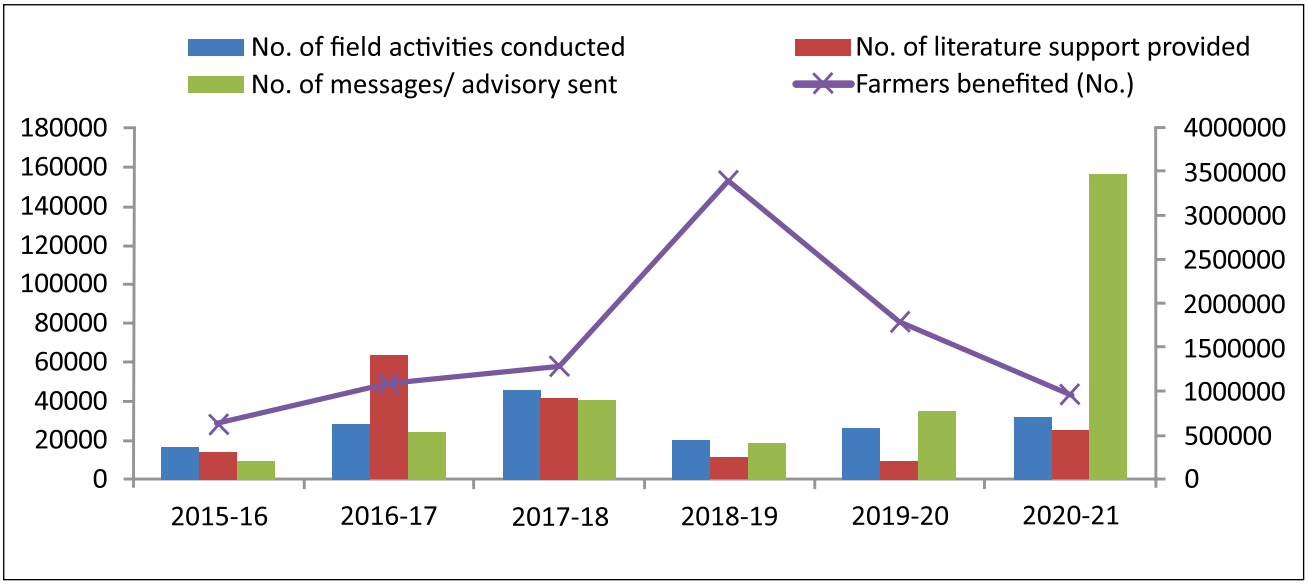


Fig 2: Year wise activities performed and farmers benefitted under different activities in MGMG

2.1 Major achievements under MGMG

2.1.1 Major achievements

Major achievements made under the programme are as follows as per the table 2 & 3

- A total of 7,43,203 farmers were benefitted by 42,351 visit to village made by scientific teams.
- Total 5,88,358 farmers were benefitted by 23,702 interface meeting /Gosthies conducted.
- Total 2,84,358 farmers were benefitted by 13,008 training organized in MGMG villages.
- Total 2,82,367 farmers were benefitted by 64,291 demonstrations conducted.
- Total 50,65,174 farmers were benefitted by 4,73,131 through mobile based advisories sent.
- Total 6,99,670 farmers were benefitted by providing 1,64,215 literature supports to them.
- Total 7,20,201 farmers were benefitted by 36,862 activities conducted as awareness programme.
- Total 3,73,932 farmers benefitted by under linkages developed with other agencies.

Table 2: Activities organised under MGMG

SN	Name of activity	2015-16		2016-17		2017-18		2018-19		2019-20		2020-21		Grand total	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
1	Visit to village by teams	5199	104067	8620	154040	12832	172876	3832	131721	6584	120791	5284	59708	42351	743203
2	Interface meeting/Gosthies	3109	74559	4997	124551	7878	179839	2384	66108	3172	94584	2162	48717	23702	588358
3	Training organized	997	18042	2115	62395	5242	85614	1126	30539	1624	50174	1904	37594	13008	284358
4	Demonstrations conducted	4463	32158	10350	41892	12670	57052	8163	29191	11997	88933	16648	33141	64291	282367

SN	Name of activity	2015-16		2016-17		2017-18		2018-19		2019-20		2020-21		Grand total	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
5	Mobile based advisories (No.)	9520	184326	24401	245932	41688	306245	18467	2884643	223005	961412	156050	482616	473131	5065174
6	Literature support provided	13725	108570	63765	172356	41677	149900	10475	62623	9603	127983	24970	78238	164215	699670
7	Awareness programme	3037	74738	2564	155315	18259	150526	4225	70867	3367	162696	5410	106059	36862	720201
	A: No. of activities conducted							B: No. of farmers participated / benefitted							

Table 3: Farmers benefitted by other activities organized under MGMG

S. N.	Name of activity	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Grand Total
1	Linkages developed with other agencies	24395	86402	131705	37901	54433	39096	373932
2	New varieties	2473	10191	7942	15731	22856	11455	70648
3	New technologies	924	8321	15172	15345	62214	15301	117277
4	Seeds provided	2383	18339	21545	26600	31002	30466	130335
5	New crops	142	2166	1460	7672	2734	4058	18232
6	Other (seedlings/sapling / biofertilizers/poultry birds/ fingerlings Nos.)	-	-	-	1574	5168	9071	15813

2.2 ATARI-wise Progress of MGMG

2.2.1 ATARI-wise progress under MGMG (2015-16)

During the year 2015-16, total 122 ICAR institutes and SAU's were involved under the programme and 1280 groups were formed by involving 4910 scientists who covered total 5291 villages, conducted 16805 field activities and 9520 message/advisories were sent to farmers. All activities performed under this programme benefitted 6.26 lakh farmers. Details of ATARI-wise progress are given below:

Table 4: ATARI-wise progress of MGMG during 2015-16

ATARI	No. of institutes/ universities involved	No. of Groups / team formed	No. of Scientists Involved	No. of villages covered
ATARI Ludhiana	23	351	1457	1459
ATARI Kolkata	18	86	339	419
ATARI Meghalaya	3	11	18	26
ATARI Kanpur	8	102	366	396
ATARI Hyderabad	19	102	412	399
ATARI Jodhpur	19	297	1048	1226
ATARI Jabalpur	18	168	583	683
ATARI Bengaluru	14	163	687	683
Grand Total	**122**	**1280**	**4910**	**5291**

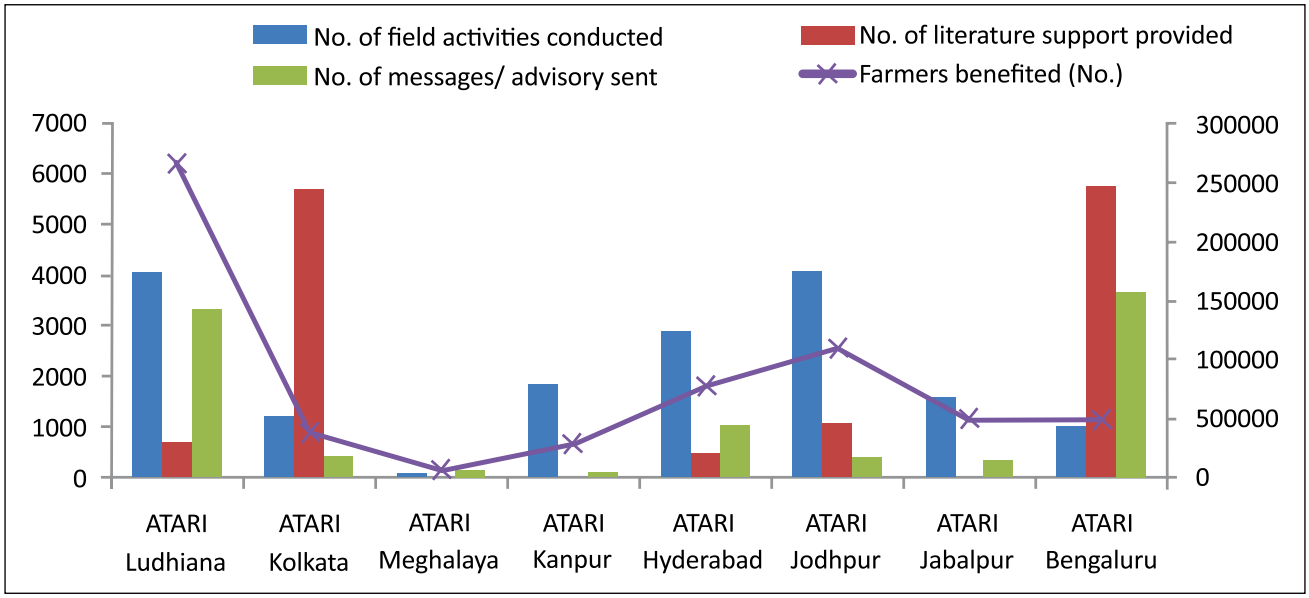


Fig 3: ATARI-wise activities performed and farmers benefitted under MGMG during 2015-16

Poly lined tank with pisciculture at Farmer's field

Method demonstration on soil sampling

Oyster mushroom cultivation

2.2.2 ATARI-wise progress under MGMG (2016-17)

During the year 2016-17, total 126 ICAR institutes and SAU's were involved under the programme and 1226 groups were formed by involving 4774 scientists who covered total 5367 villages, conducted 28646 field activities, 63765 literature provided and 24401 message/advisories were sent to farmers. All activities performed in this programme benefitted 10.81 lakh farmers. Details of ATARI wise progress are given below:

Table 5: ATARI-wise progress of MGMG during 2016-17

ATARI	No. of institutes/ universities involved	No. of Groups / team formed	No. of Scientists Involved	No. of villages covered
ATARI Ludhiana	25	369	1413	1401
ATARI Kolkata	18	86	360	621
ATARI Meghalaya	10	35	145	105
ATARI Kanpur	8	68	273	302
ATARI Hyderabad	14	106	423	471
ATARI Jodhpur	19	326	1190	1417
ATARI Jabalpur	18	73	283	367
ATARI Bengaluru	14	163	687	683
Grand Total	**126**	**1226**	**4774**	**5367**

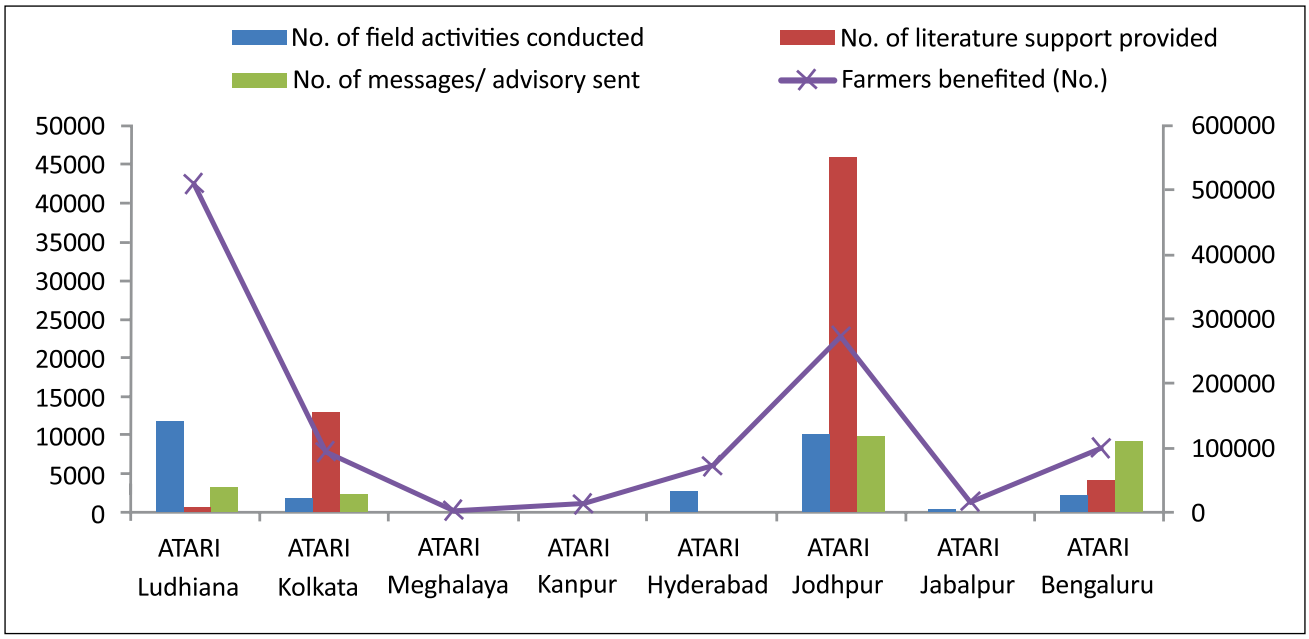


Fig 4: ATARI-wise activities performed and farmers benefitted under MGMG during 2016-17

Field visit to adopted villages

Kisan gosthi

Parthenium awareness week

2.2.3 ATARI-wise progress under MGMG (2017-18)

During the year 2017-18, total 130 ICAR institutes and SAU's were involved under the programme and 1343 groups were formed by involving 5126 scientists who covered total 6873 villages, conducted 45689 field activities, 41224 literature provided and 40641 message/advisories were sent to farmers. All activities performed in this programme benefitted 12.79 lakh farmers. Details of ATARI- wise progress are given below:

Table 6: ATARI-wise progress of MGMG during 2017-18

ATARI	No. of institutes/ universities involved	No. of Groups / team formed	No. of Scientists Involved	No. of villages covered
ATARI Ludhiana	14	139	458	363
ATARI Jodhpur	26	446	1530	1617
ATARI Kanpur	6	42	175	146
ATARI Patna	13	61	144	318
ATARI Kolkata	18	86	360	635
ATARI Guwahati	3	43	258	1474
ATARI Umiam	2	17	75	70
ATARI Pune	18	214	895	949

ATARI	No. of institutes/ universities involved	No. of Groups / team formed	No. of Scientists Involved	No. of villages covered
ATARI Jabalpur	10	87	326	397
ATARI Hyderabad	10	82	353	339
ATARI Bengaluru	10	126	552	565
Grand Total	**130**	**1343**	**5126**	**6873**

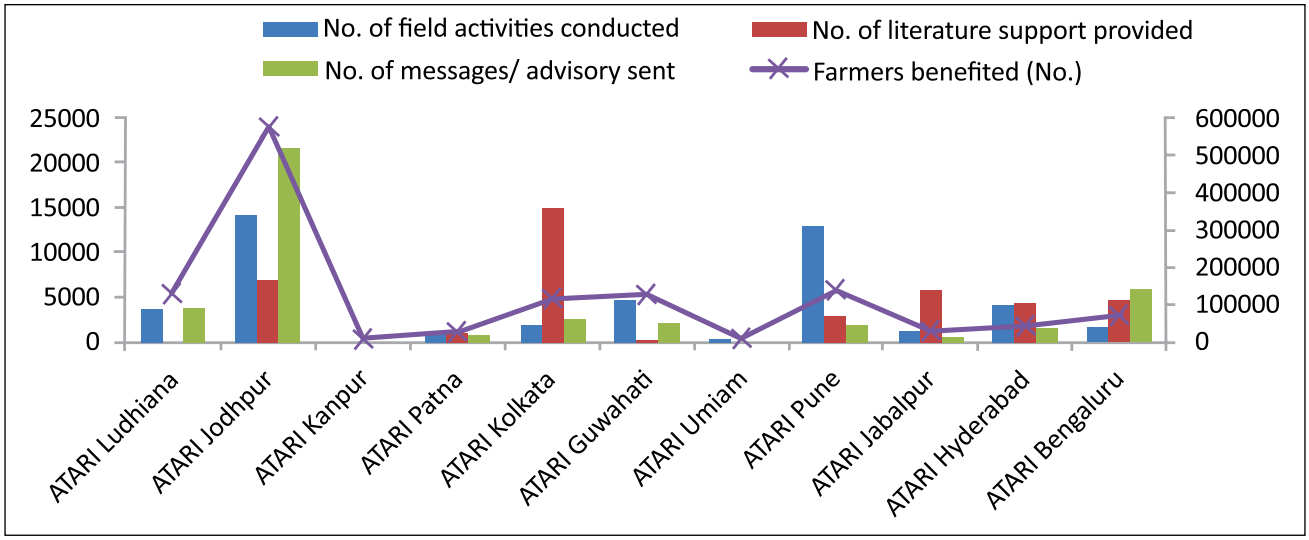


Fig 5: ATARI-wise activities performed and farmers benefitted under MGMG during 2017-18

Animal health camp

Kisan gosthi

Demonstration of paddy transplanter

2.2.4 ATARI-wise progress under MGMG (2018-19)

During the year 2018-19, total 114 ICAR institutes and SAU's were involved under the programme and 1208 groups were formed by involving 3546 scientists who covered total 3454 villages, conducted 19730 field activities, 10475 literature provided and 18467 message/advisories were sent to farmers. All activities performed under this programme benefitted 33.80 lakh farmers. Details of ATARI- wise progress are given below:

Table 7: ATARI-wise progress of MGMG during 2018-19

ATARI	No. of institutes/ universities involved	No. of Groups / team formed	No. of Scientists Involved	No. of villages covered
ATARI Ludhiana	14	139	458	363
ATARI Jodhpur	25	392	1469	1170
ATARI Kanpur	6	34	107	92
ATARI Patna	13	63	157	494
ATARI Kolkata	15	83	336	350

ATARI	No. of institutes/ universities involved	No. of Groups / team formed	No. of Scientists Involved	No. of villages covered
ATARI Guwahati	1	2	4	2
ATARI Umiam	3	21	92	94
ATARI Pune	9	270	15	20
ATARI Jabalpur	10	10	80	60
ATARI Hyderabad	8	68	276	244
ATARI Bengaluru	10	126	552	565
Grand Total	**114**	**1208**	**3546**	**3454**

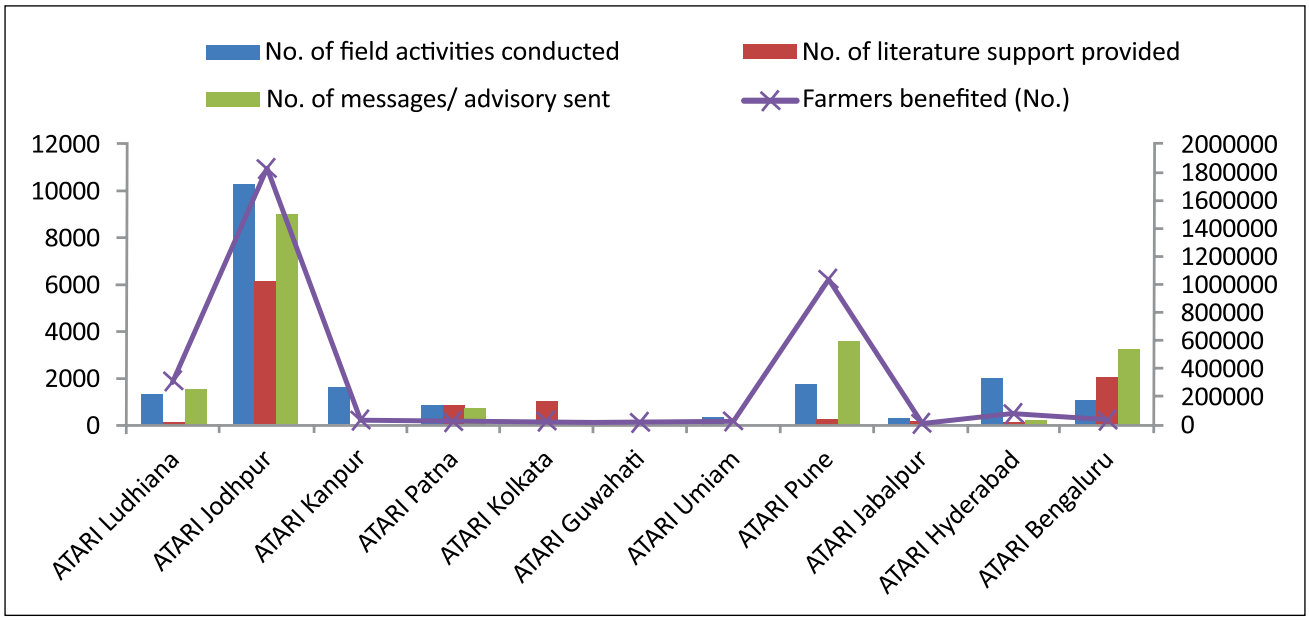


Fig 6: ATARI-wise activities performed and farmers benefitted under MGMG during 2018-19

Demonstration on portable rain gun in vegetables

Demonstration on accelerated retting of jute

Field release of tricho card

2.2.5 ATARI-wise progress under MGMG (2019-20)

During the year 2019-20, total 117 ICAR institutes and SAU's were involved under the programme and 1200 groups were formed by involving 4741 scientists who covered total 5077 villages, conducted 26504 field activities, 9603 literature provided and 35252 message/advisories were sent to farmers. All activities performed under this programme benefitted 17.84 lakh farmers. Details of ATARI-wise progress are given below:

Table 8: ATARI-wise progress of MGMG during 2019-20

ATARI	No. of institutes/ universities involved	No. of Groups / team formed	No. of Scientists Involved	No. of villages covered
ATARI Ludhiana	16	161	584	491
ATARI Jodhpur	26	372	1406	1491
ATARI Kanpur	8	74	314	345
ATARI Patna	7	41	204	55
ATARI Kolkata	16	86	372	385
ATARI Guwahati	3	9	11	15
ATARI Umiam	2	7	12	10
ATARI Pune	11	162	633	862
ATARI Jabalpur	10	98	386	595
ATARI Hyderabad	8	63	275	237
ATARI Bengaluru	10	127	544	591
Total	**117**	**1200**	**4741**	**5077**

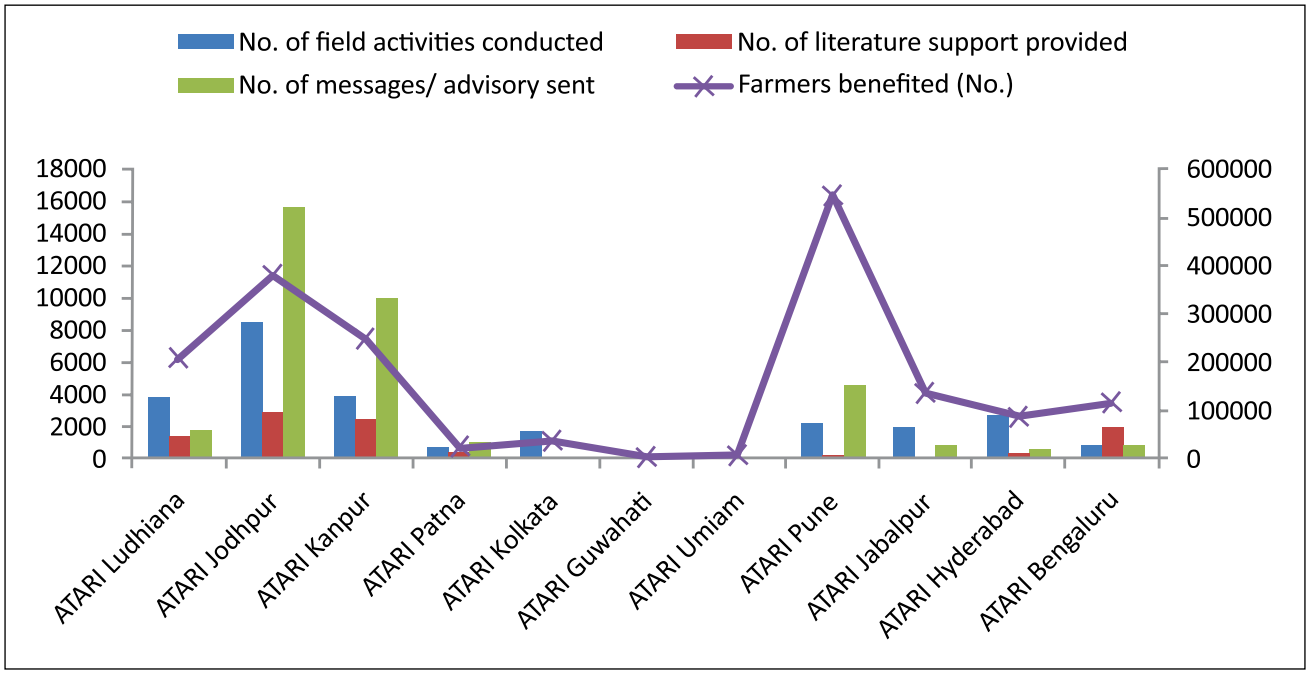


Fig 7: ATARI-wise activities performed and farmers benefitted under MGMG during 2019-20

Demonstration on spraying with drones in Horticulture crops

Scientist- farmer interaction

Scientist inspecting farmers field in MGMG village

2.2.6 ATARI-wise progress under MGMG (2020-21)

During the year 2020-21, total 112 ICAR institutes and SAU's were involved under the programme and 1043 groups were formed by involving 4614 scientists who covered total 4014 villages, conducted 31358 field activities, 24970 literature provided and 1.56 lakh message/advisories were sent to farmers. All activities performed under this programme benefitted 9.55 lakh farmers. Details of ATARI-wise progress are given below:

Table 9: ATARI-wise progress of MGMG under 2020-21

Institute	No. of institutes/ universities involved	No. of Groups / team formed	No. of Scientists Involved	No. of villages covered
ATARI Ludhiana	16	145	507	462
ATARI Jodhpur	26	273	1552	1111
ATARI Kanpur	8	71	251	274
ATARI Patna	7	40	193	58
ATARI Kolkata	16	86	372	395
ATARI Guwahati	3	3	14	8
ATARI Umiam	4	27	131	56
ATARI Pune	7	159	591	633
ATARI Jabalpur	5	38	157	332
ATARI Hyderabad	10	75	294	120
ATARI Bengaluru	10	126	552	565
Grand total	**112**	**1043**	**4614**	**4014**

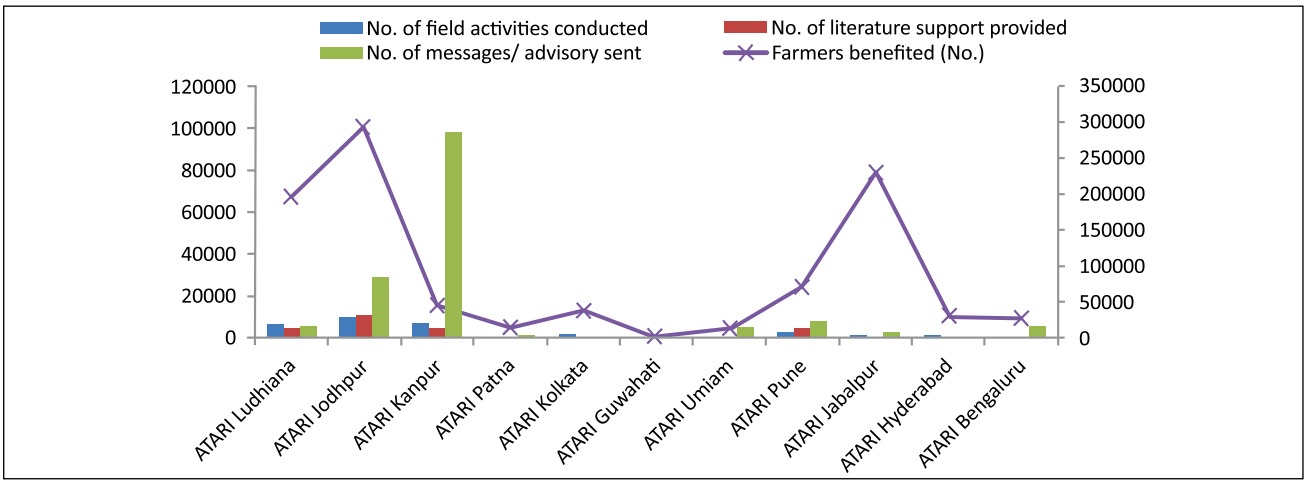


Fig 8: ATARI wise activities performed and farmers benefitted under MGMG during 2020-21

Training programme on irrigation water management in oil-palm

Herbicide application in wheat crop

Seed distribution

3. CASE STUDIES

3.1 Water harvesting through locally made block covered LDPE polytanks making a difference

ICAR-ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora

Background Information:

Water is a critical and limiting factor in post-monsoon season in the hills of Uttarakhand where rainfed agriculture is predominant. Besides this, the rainfall variability and early or mid-season droughts during crop season cause either poor performance of the rainfed crops or even failure of rabi crops. The farmers of Naula and Salla Rautela villages, Hawalbagh block, Almora district were unable to take off-season vegetables and irrigate rabi crops due to lack of water.

Technological interventions:

The ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora adopted Naula and Salla Rautela villages in 2015 under the Mera Gaon Mera Gaurav programme. Different technologies developed by the institute including water harvesting through locally made block covered polytank, improved varieties and production technologies were demonstrated at farmer's fields in these villages. During the PRA survey and focused group discussions (FGDs), water harvesting in LDPE polytanks for efficient utilization of rain/spring water was identified as a suitable intervention and climate resilient technology to enhance productivity, income and livelihood of the farmers in the villages.

Five farmers volunteered to adopt the LDPE polytank water harvesting technology and constructed locally made block covered polytanks for rain/spring water harvesting. The run off as well as discharge from springs/ small streams was harvested and efficiently used as supplemental irrigation to manage mid-season drought as well as to cultivate off-season vegetables. Further, they also came forward to adopt the same technology for fish rearing. The capacity of polytanks varied from 50 to 100 cu m. It was estimated based on discharge of water source that 0.75 ha area can be irrigated through flood system and if farmers adopt drip system than 1.25 ha area can be irrigated.

Before the intervention, the farmers used to take up only mixed cropping mostly during *Kharif* (fingermillet/ barnyard millet + horse gram + black soybean) and rarely during *rabi* season (wheat + lentil/toria/mustard) and leaving most of their fields fallow during *rabi* season whenever rains failed. Even in the mixed cropping of crops, mid-season droughts used to affect the yields. It used to result into poor yields and often failure of *rabi* crops also. Due to availability of water in the polytanks, the farmers diversified the existing cropping pattern to line sowing, adoption of improved varieties, off-season cultivation and fish rearing. They also adopted the gravity based micro-irrigation system. Efficient use of polytank water to *Kharif* crops during dry spells and pre-sowing irrigation to *rabi* crops and efficient micro-irrigation method (drip) to off-season vegetables made agriculture a profitable venture for them.

Innovative extension methods used: Farmer's participatory approach

Linkage developed through Govt. sponsored schemes: 10 beneficiary farmers

Success derived:

The income from different components (100 sq m area) showed that farmers earned Rs. 1,654/- from agriculture under rainfed conditions (Rs/100 sq m) as compared to income of Rs. 3,110/- from agriculture using harvested water (Rs/100 sq m). Fingerlings have been introduced @ 500 fingerlings/100 cu. m. water. It is expected that 300 kg/100 cu. m. yield will be obtained in two years and income will be around 60,000 per 100 cu m.

Lessons Learned:

Low cost polytanks may damage or their life may be very short. Therefore, it was learnt that poly-cement tanks having long life may be a good replacement of these polytanks.

Releasing fingerlings in polytank

Water storage in polytank

3.2. Integrated Fish-cum-Horticulture Using Polytanks: A Climate Resilient Practice in Mid Hill Region

ICAR-Directorate of Coldwater Fisheries Research, Bhimtal

Background Information:

The selected site, Doonagiri, Almora lies in the drainage of river Kosi, which originates from Pandukhola. Rawat (2007) reported the 184.41 kms shrinkage of the catchment of the Kosi in 40 years at the rate of 4.5 Kms / year due to down fall of water table in the underground aquifer. The originating point of the river has been shifted down about 200 mts (1997-2004). This was a snow falling area, but during last decade, snow fall has reduced drastically. Therefore, the selected site is prone to climate change with increasing temperature and draught like situation. In this situation, horticultural practice is subject to shifting in terms of production and suitability of varieties. But, changing scenario is favourable for the polyculture of the exotic carp.

Technological interventions:

Exotic carps; Silver carp (*Hypophthalmichthys molitrix*), Grass carp (*Ctenopharyngodonidella*), Common carp (*Cyprinus carpio*) and minor carp (*Labeodyocheilus / Banganadero*) has been tested in 10 polytanks and seed was stocked @2.5-3.0 nos/m^3 with species ratio 20:40:20:20 respectively. Fish were fed with rice polish and mustard oil cake coupled with fresh *azolla*@ 3% of their body weight daily basis. Table sized fish were produced in 12 months after stocking of stunt yearlings of the size 30-40 gm. 60-70 kg/100m^2 production was achieved with this technique in mid hill conditions.

Poly-lined rainwater harvesting tanks are suitable for this climate resilient practice in mid hills where scarcity and low water temperature are bottleneck in crop production. The overflow of the water was used for irrigating radish and coriander crops. Though, the growth of grass carp is comparatively higher but minor carp showed better climate resilience in terms of temperature tolerance for extremely lower and higher thermal regime. Minor carp is also helpful to keep the pond clean due to its browsing feeding habit mainly feed on periphyton.

Innovative extension methods used:

Result demonstration was applied for the dissemination of technology. A cluster approach having group discussion with adopted farmers was mainly applied for technical intervention

Linkage developed through Govt. sponsored schemes:

National Mission for Sustaining the Himalayan Eco-System (NMSHE), DST, Govt. of India sponsored scheme- 16 farmers and ICAR-VPKAS, Almora for Horticultural crops-16 farmers benefitted

Success derived:

Study was conducted with or without integration of fish farming and horticulture which resulted for increasing production of horticulture and additional income by fish production. Polythene lined fish pond is the nucleus of climate resilient horticulture practice in this drought prone area

Lessons Learned:

Polytank is a suitable structure for the polyculture of the exotic carp in mid hill, which favours the growth of the fish keeping the pond water warmer. A small farm pond in the form of polytank and practice of fish farming is a climate resilient approach in the mid altitudes.

Additional information:

Economics of Field Experimentation: with and without integration

	With integration	**Without integration**
Crop duration	**12 months**	**12 months**
Area	Pond-100m^2 Horticulture Plot-200m^2	Horticulture Plot-300m^2
Average yield	Fish-70kg, Radish-400kg Radish seed-5kg, Coriander-50kg	Radish-450kg, Radish seed-4kg Coriander-45kg
Sale price (Rs. /kg)	Fish- Rs. 150, Radish-20 Radish seed-1200, Coriander-120	Radish-20, Radish seed-1200 Coriander-120
Gross return	Rs. 30500	Rs. 19200
Production cost	Rs. 12500/-	Rs. 9500/-
Net return	Rs. 18000/300m^2	Rs. 9700/300m^2
Crop rotation	2 crops of Radish-Coriander and fish in pond	2 crops of Radish-Coriander

Netting in polytank

Netted fish from polytank

3.3 From Waste to Wealth: Pressmud as an alternative to reclaim sodic soils vis-à-vis neutralization of residual alkalinity in irrigation waters

ICAR-Central Soil Salinity Research Institute, Karnal

Background Information:

Grid based (0.5km x 0.5 km) geo-referenced digital stratified thematic maps delineating soil sodicity (soil pH) and residual alkalinity (RSC) in irrigation waters in Mundri, Kathwar, Geong, Sampli Kheri and Bhaini Majra villages of Kaithal district in Haryana indicated only 10.1% area with good quality underground water while 90% area was confirmed with residual alkalinity (RSC>2.5 meq/l, threshold value defining the critical limit for safe use of underground water for irrigation purpose) of variable nature. Continuous use of bicarbonate dominated residual alkalinity in irrigation water resulted in build-up of excessive salt concentration (Na^+) and soil sodicity (soil pH_s>8.2) in about 40.1% of the area adversely affecting plant growth, soil physico-chemical properties and strongly comprising crop productivity.

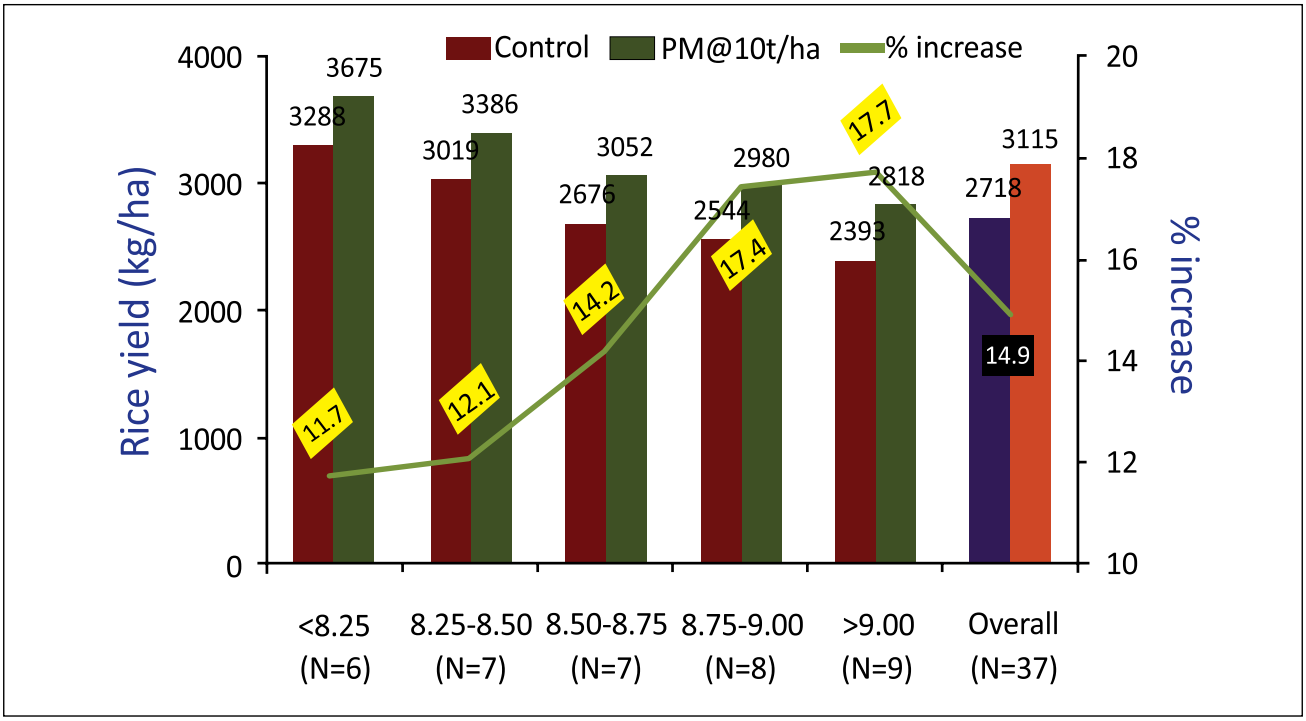
Long term field experimentation at farmers' fields indicated use of organic amendments like pressmud in neutralization of RSC in irrigation water with a concomitant reduction in sodicity buildup minimizing their adverse effects on crop growth and productivity while aiming at preventing buildup of salt load in soil-water-plant system.

Technological intervention:

To evaluate/demonstrate the complementary effect of applying reclamative/neutralization ameliorants (pressmud), soil application of pressmud @ 10 t ha^{-1} in rice, based on soil sodicity (soil pH_s>8.2) vis-à-vis farmer's practice (unamended) were carried out by farmers' participatory approach at 37 locations keeping 2000 m^2 area under each intervention as management strategies for neutralization and sustained use of sodic waters in concerned ecologies of rice-wheat cropping system.

Innovative extension methods used:

'Farmers participatory approach' has been applied to demonstrate the complementary effect of applying reclamative/neutralization ameliorants (pressmud).



Rice yield in pressmud (pm) and control condition

Linkage developed through Govt. sponsored schemes:

A field day was organized to visualize the field level impact of demonstrated technology where farmers from the nearby area, officials from State Agriculture Department, NGOs, Private agencies and ICAR Scientists participated and interacted on different aspects on technology adoption in convergence mode.

Success derived:

Complementary effects of applying pressmud as reclamative /neutralization ameliorant proved its effectiveness in sustainable use of poor quality waters for rice cultivated on sodic soils with a mean yield advantage of 14.9% over the farmers' practice (unamended). The cumulative yield gain with the application of reclamative/ neutralization ameliorant (pressmud) was relatively better with the increase in soil pH.

Lessons Learned:

Précised irrigation water management strategies with soil reclamation techniques are the key management issues need to be strongly addressed by holding strong farmers-scientist interface, strengthening farmers participatory research and extension network, suggesting suitable mitigation (neutralization amendments) strategies to further control degradation (soil sodicity) trends and secure sustainable land management in salt affected agro-ecosystems.

Pressmud

Effect of pressmud use in crop

3.4 Reaping benefits from adoption of pearl millet hybrid MPMH-17

Agriculture University, Jodhpur

Background Information:

Pearl millet (*Pennisetum glaucumL.)* is the most drought-tolerant millet grown in the arid and semi-arid regions of the India. It is one of the most important source of staple food and fodder in the predominantly rain fed areas of the Western Rajasthan. Under the changing climatic scenario, farmers were demanding hybrids of medium duration having high yield of seed as well as straw.

Technological interventions:

The pearl millet hybrid MPMH-17 developed at All India Coordinated Research Project on Pearl Millet (AICRP on Pearl Millet), Agricultural Research Station, Mandor, Jodhpur has shown very high adaptability even in harsh climatic situations of Western Rajasthan. MPMH-17 is a dual-purpose hybrid of pearl millet providing high grain and Stover yields. Another distinctive advantage of MPMH-17 is its high level of resistance to downy mildew and blast, two most important diseases of pearl millet.

Pearl millet hybrid MPMH-17 was demonstrated at 75 farmer's field in selected Villages (Luni) of MGMG in 30 ha area during Kharif 2020. Farmers selected for this intervention were apprised with the package of practices of pear millet and specialties of MPMH 17 through off campus training by scientists.

Innovative extension methods used:

Method and Result demonstration

Linkage developed through Govt. sponsored schemes:

KVK, Jodhpur-I -Farmer-scientist interaction, training, field days and demonstration etc.

National Food Security Mission (NFSM)-Credit loans, health and nutritious food Programme through public distribution system

NABARD-(KCC) Agriculture Loan, insurance and subsidy related issues. formation of FPO

Success derived:

Pearl millet hybrid MPMH-17 was found superior over the farmers grown varieties and gave seed yield of 22.34 q/ha which was higher over locally grown cultivar by 19.74 percent. Similarly, straw yield of MPMH-17 was also higher by 23 percent over local. Adoption of this hybrid recorded additional net return of ₹13,987/ha over locally grown cultivar. Pearl millet hybrid MPMH-17 was found safe from bird damage as it has awns on the ear head and it was also found to be completely disease & pest free during the crop cycle. The straw of MPMH-17 remains green till physiological maturity/harvest and therefore the straw appears light green in colour compared to local which remain brown to yellow in colour. The green colour straw has higher preference in market.

Lessons learned:

Continuous training and farmer scientist interaction increases adoption rate of technology.

Field visit

3.5 Land Shaping Technique for Reclamation and Management of Water Logged Sodic Soil

CSSRI, Regional Research Station, Lucknow

Background Information:

Uttar Pradesh is having good networks of canal (21 % of the net irrigated area) and contributing major role in increasing the total food grain production in U.P. In the areas, where natural drainage is inadequate, the twin problems of waterlogging and salt accumulation have taken place. Waterlogging and salt build up in the root zone are the major associated problems, hampering the direct goal of canal irrigation either by lowering the productivity or leaving land not suitable for agriculture. Sharda Sahayak Canal is a large canal command irrigating about 17.80 lakh ha in 16 districts of U.P. and also encountering the similar problems. Seepages from canals, inadequate drainage, introduction of high water demanding crops, poor water management practices, blockage of natural drainage system due to developmental activities and high rainfall are some of the natural reasons of waterlogging and associated problems.

About 0.18 million ha productive land suffers from shallow ground water table (0.45 m) conditions and secondary salanization and in Sharda Sahayak Canal Command. Land and water productivity of waterlogged sodic soils are extremely poor due to high soil pH ranged from 9.0 to 10.5. The soil pH generally decreases with increase in soil depth because of increasing quantum of seepage from canal. The gypsum based technology is not effective and sustainable for reclamation of waterlogged sodic soil due to shallow water table and secondary salinization. To overcome this problem, land shaping based integrated farming system model was hypothesized for sustainable reclamation and management of waterlogged sodic soil in Sharda Sahayak Canal Command area. The model essentially consisted of pond for using abundant good quality canal seepage water for aquaculture, increasing crop and livestock productivity. It also envisage the control of secondary salinization due to shallow water table.

Technological interventions:

A pond was constructed over an area of 3000 m^2 in shape of English alphabet 'U' under farmers' participation mode. The average depth of pond was 2.0 m. The excavated soil of the pond was spread around the pond in such a manner that top soil is brought on the bottom and bottom soil to the top to form the elevated field bed. The total area of the elevated field bed was about 3000 m^2 with elevation of about 1.5 m above the soil surface. The ratio of elevated field bed and pond area was 1:1. The width of elevated field bed was estimated to be 22 m. One time gypsum was applied (0.5 kg /m^2) on raised bed before cropping where the soil pH exceeded 9.5. Bunds (30 cm x 30 cm) around the elevated field bed were made in order to retain water and avoid erosion from the side. The drainage pipe of 10 cm diameter was installed at regular distance of 10 m along the bund to drain out excess water and salts safely. The construction cost of the model was 2.0 lakh.

Innovative extension methods used:

Farmers Participatory Mode

Linkage developed through Govt. sponsored schemes:

UP Council of Agricultural Reasearch, Directorate of Agriculture, National Bureau of Fish Genetic Resoucres, Lucknow

Success derived:

The maximum land and water productivity were found to be 75.9 Rs/m^2 /year and 207.1 Rs /m^3 /year, respectively with B:C ratio of 4.7 for fodder crop while minimum was found for rice–wheat-green gram system. The B:C ratio of fish was recorded to be 4.1. Cultivation of vegetables in different season played a significant role in enhancing the land and water productivity. The fodder (hybrid Napier CO-4) was available throughout the

year, due to its perennial nature which boosted animal productivity significantly. As per the farmers' version, the average milk production enhanced by 25 to 30%. The B:C ratio of whole system was worked out to be 3.2 with land and water productivity of 33.0 Rs/m^2 /year and 85.94 Rs/m^3 /year, respectively. Salt accumulation over the elevated field bed was not noticed. Apart from recurring income from the system, it provided nutritional and social security for the farmers' family. The system also generated employment opportunity to the rural youths and minimized daily commuting to the cities.

Reclamation of sodic soil

Pond construction

Brinjal cultivation

3.6. Regulation of Bearing in Litchi through Girdling of Primary Branches

ICAR - National Research Centre on Litchi, Muzaffarpur, Bihar

Background Information:

Irregular and erratic bearing of litchi particularly in cultivar China and low fruiting in cultivar Shahi due to poor orchard management.

Technological interventions:

2-3 mm circular girdling in primary branches (75% in covering the plant spread) was performed in 1-2 week of September in cultivar China and last week of august in cultivar Shahi. The orchard has to be fertilized just after the harvest of the fruit.

Innovative extension methods used:

First demonstration of the technology in large scale was done in presence of the farmers. The other farmers have given the training for selection of branches, removal of bark and cleaning of the dead material in the presence of the scientists then farmers allowed to do by themselves.

Linkage developed through Govt. sponsored schemes:

State Department of Horticulture: needful support for obtaining the implements in subsidized rate was made available to the farmers.

Success derived:

Profuse panicle initiation and flowering was recorded in girdled branches of the trees. All the trees flowered and the fruits bunches were very compact and just like grape bunches with more than 40-50 fruits each bunches. The plants had less infestation of fruit borer and reduction in the cost of spray. Synchronized maturity can provided assured fruiting help in better marketing strategies of the fruit sale.

Lessons Learned:

Timely implementation of the technologies with care and removal of bark and not the wood part enhances flowering and fruit bearing branches.

Fruit bearing stage in litchi

3.7 Horse gram Cultivation in Barren Land

ICAR- Research Complex for Eastern Region, Ranchi

Background Information:

During the survey of fellow land area for selection of Jobla Village of Ramgarh district under MGMG, the large patches around 05 hectare in Jobla village was noticed. This land belongs to the tribal farmer's community and was lying barren from several years. We approached this group of farmers through farmers meeting for coverage of crop in fallow land area. The women farmers showed keen interest and desired to cultivate horse gram. The women farmers taken initiative of technology intervention of horse gram.

Technology intervention:

Horse gram variety - Birsa Kulthi 1 + Bavistin with Rhizobium culture for seed treatment + line sowing, two foliar spray of NPK 19:19:19 at 45 and 60 days old crops @ 4.0 kg./ha and spray of neem oil (Neemarin) at the time of pod formation @ 2.5 liter/ ha.

Innovative extension methods used:

Training, during sowing time and different stages of crop growth and provided the quality seed. Diagnostic visits and monitoring was done regularly by the scientists.

Linkage developed through Govt. Sponsored schemes/spread/benefits:

Linkage with KVK, Ramgarh and support from NGO.

Success derived:

After harvesting, the data revealed that, local check yield of 4.5 quintal /ha was obtained and demonstration area yield was 8.4 q/ha. Which is 86 % higher than local check with 1.76 B:C ratio.

Lesson Learned:

The crop stage-wise training/field day was appreciated by the farmers.

Monitoring and diagnostic visit

Crop view at the 25 days old crops

3.8 Accelerated Retting Technology of Jute

ICAR- ICAR-National Institute of Research on Jute & Allied Fibre Technology, Kolkata

Background Information:

Jute (*Corchorus* spp.) as a natural fibre is an important remunerative crop for a large majority of farmers in the eastern region of the Indian subcontinent besides being durable, recyclable, reusable and environment-friendly. The commercial value of the fibre is governed by its quality and in this regard, retting is an essential post-harvest process in jute production and processing which serves as the principal determinant of fibre quality.

Technological Information:

ICAR-National Institute of Research on Jute & Allied Fibre Technology (ICAR-NIRJAFT) has developed a better and user friendly technology for improved retting of jute. The powder formulation (Names as NIRJAFT-SONALI SATHI) contains microbial growth supplement which enhances the initial microbial population of retting water, which in turn accelerates the rate of retting. The National Food Security Mission (Commercial Crops) under Ministry of Agriculture and Farmers Welfare has extended the financial support for popularizing the technology through front line demonstrations (FLDs).

Innovative extension methods used:

Frontline demonstration has been used as the basic approach adopted to outreach the technology. Moreover, the local techniques amalgamated with the developed methodology have shown promising result in reaching the technology to the different corners of jute growing areas.

Linkage developed through Govt. sponsored schemes:

Different organizations KVKs, NGOs, State Departments and Company like IFFCO has collaborated in organizing the FLD programmes which were conducted as per the specified guidelines of National Food Security Mission (Commercial Crops) and carried out under the direct supervision of scientist from ICAR-NIRJAFT.

Success derived:

During the year 2015 to present crop year around 100 Nos. of FLDs were conducted and 6500 number of farmers were benefitted directly covering an area of 3500 ha. The basic advantages of the technologies are:

- Accelerated retting is an effective and remunerative process of jute retting to enhance the farmers' income.
- The Jute grades improves through increasing the strength, fineness, colour and reducing the defects
- Fibre quality has been improved by 1-2 grades and thus per quintal effective income increases to the jute growers
- As compare to conventional retting, there is no additional impact on environment through accelerated retting
- There is no impact on water and soil and the retting residues enriches the soil

Table 1. Comparison between traditional and accelerated retting method of jute

Trial No.	Method	Duration (days)	Root (%)	Strength (g/tex)	Fineness (tex)	Defects (%)	Colour	Grade
1.	Traditional	19	9	17.6	2.6	1.0	Average	TDN-3 +65%↑
	Accelerated	9	7	19.3	2.3	1.0	Good	TDN-2+10%↑
2.	Traditional	18	10	19.6	2.8	1.0	Average	TDN-3 +65%↑
	Accelerated	8	6	20.8	2.4	0.5	Good	TDN-2+65%↑

Trial No.	Method	Duration (days)	Root (%)	Strength (g/tex)	Fineness (tex)	Defects (%)	Colour	Grade
3.	Traditional	21	8	18.1	2.5	1.5	Average	TDN-3+60%↑
	Accelerated	10	< 5	21.2	2.2	1.0	Good	TDN-1
4.	Traditional	19	10	14.8	2.6	1.5	Good	TDN-3
	Accelerated	10	8	17.1	2.4	1.0	Good	TDN-2+25%↑
5.	Traditional	18	10	23.9	2.6	1.0	Average	TDN-2+15%↑
	Accelerated	8	6	22.4	2.2	1.0	Good	TDN-2+75%↑
6.	Traditional	20	> 10	14.1	2.7	1.5	Average	TDN-4+55%↑
	Accelerated	9	9	18.3	2.3	1.0	Good	TDN-3+90%↑
7.	Traditional	17	6	18.5	2.2	1.0	Good	TDN-2+25%↑
	Accelerated	8	< 5	21.8	2.1	1.0	Good	TDN-1
8.	Traditional	20	9	24.1	2.6	1.0	Good	TDN-2+40%↑
	Accelerated	11	6	25.3	2.4	0.5	Good	TDN-1
9.	Traditional	22	6	16.6	2.1	1.0	Average	TDN-2
	Accelerated	9	< 5	18.7	1.9	0.5	Good	TDN-1
10.	Traditional	18	7	14.6	2.5	1.0	Average	TDN-3+55%↑
	Accelerated	8	< 5	18.4	2.2	0.5	Average	TDN-2+40%↑

Lessons learned :

The accelerated retting technology can reduce the drudgeries of handling the jute after the harvest of the crop for achieving the remunerative return.

3.9 Off-season Cultivation of Horticultural Crops in Polyhouse- A Agriventure

College of P.G. Studies, CAU, Umiam, Ri-Bhoi, Meghalaya

Background Information:

Cultivating paddy during *kharif* season and local vegetables during *Rabi* season was the main livelihood for Mr. Ninestar Shadap and his family. He is living in Palwi Village, Unsning Block of District Ri-Bhoi of Meghalaya state. Biotic (occurrence of diseases and pests etc.) and abiotic (heavy rainfall during rainy season, water scarcity and very cold temperature during winter season etc.) factors are the main stumbling blocks for him to earn a steady income (by selling a meagre surplus production) of around ₹ 1500–2000/- per month.

Technological intervention:

Inspired by the idea on becoming agripreneur by cultivating vegetables and fruits after attending training programme on 'Protected Cultivation of High Value Horticultural Crops in Polyhouse' under MGMG of CPGS(A) [CAU, Imphal], Umiam, Meghalaya in February, 2017, Mr. Ninestar Shadap had developed a Polyhouse within a month in his farmland in the area of 60' (L) x 40' ft (B) x 15' ft (H) with strict technical guidance from TSP team and construction materials under TSP scheme.

Innovative extension methods used:

Personalized Mixed Media Agro-Advisory Services and Feedback

Linkage developed through Govt. sponsored schemes /Spread / benefits:

The Tribal Sub Plan (TSP) of CAU(Imphal)

Success derived:

Meticulously, from the Polyhouse he started producing nursery seedlings of Capsicum, Lettuce, Cauliflower, Cabbage and Onion from 15 nursery beds of size 6' x 2' each allocating two nursery beds to each crop. He could mark an earning of about ₹ 30,000/- by selling @ ₹ 10/50 healthy seedlings of vegetables in one season. Subsequently, the demand of seedlings not only from his village but also from adjacent villages such as Umket, Umraling, Nongrimladew etc. was increased. Now, the farmer has expanded his venture on raising nurseries for Mango, Orange, Guava and Assam Lemon under the Polyhouse. He has constructed a permanent water harvesting structure out of PVC Polycon water tanks for the Polyhouse. The farmer is getting a net profit of around ₹ 55,000–60,000/- per annum. Mr. Ninestar Shadap narrated that protected cultivation of vegetables and fruits through Polyhouse has not only overcome the stresses but also open the gates for off-season and year round supply of vegetables with remunerative prices to the fellow farmers. The protected cultivation under Polyhouse is organic and very economic as there is hardly any need of chemicals for controlling pest and diseases.

Lessons Learned:

The MGMG of CPGS (A), [CAU, Imphal], Umiam, Meghalaya has made the aspiration of Mr. Ninestar Shadap to become an agripreneur has made a true one.

The Polyhouse of Mr. N. Shadap

MGMG team inspecting nurseries inside the polyhouse

3.10 Eco-Friendly Plant Protection measure in Bt cotton

Navsari Agricultural University, Navsari

Background Information:

Cotton is a key cash crop having direct bearing on socio-economic structure of farmers of block Dediapada region of Narmada. It continues to suffer heavily from a complex of insect-pests and diseases, which affect the crop from seedling to harvest stage. The losses due to pests amount to 50-60% resulting in substantial yield reduction. The altered cropping systems, multiplicity of non-descript cultivars, imbalanced fertilizer use, and intensive cultivation has aggravated the problems of pests and environmental hazards. The cotton cultivars of Patadi village of Dediapada block were growing 8-10 varieties/hybrids of cotton having staggered sowing and applied imbalanced doze of fertilizers. Due to pigeon-pea and chickpea grown in the cotton- based cropping system, *Helicoverpa* pest sustained it's life cycle and lack of sanitation of cotton stalk immediately provided niche for continuation of the pink bollworm population increases infestation of these pest.

IPM strategies had become imperative to sustain productivity of cotton in an ecofriendly manner. A bio-intensive IPM module with much reliance on conservation and promotion of naturally occurring bio agents, bio pesticides and botanicals as tools for sustainable production of cotton was validated over 20 hectares under farmers' field conditions at block Dediapada and Sagabara regions of Narmada a predominantly rainfed cotton belt.

Technology Intervention:

Krishi Vigyan Kendra adopted Patadi village under Mera Gaon Mera Gaurav since last two year located in the tribal belt of Dediapada block of Narmada. Different demonstrations were given to the farmer of Patadi. KVK scientists guided to adopt the integrated insect pests management method of BT cotton cultivation. Drip system and all practices of IPM like, deep summer ploughing, sanitation of field, weeds removal /alternative hosts/previous crops stubbles, cultivation of inter crop/ trap crop, use of yellow sticky trap, neem oil and used proper dose of recommended insecticides as per guidance of KVK scientists were followed. Regular field scouting formed a vital component of the pest management as it provided reliable information on the time when pest reached the economic threshold level. Management measures were applied when pest population reached ETL.

Innovative extension methods used:

Result and method demonstration on integrated insect pests management method of BT cotton cultivation and regular field visit by KVK scientist

Linkage developed through Govt. sponsored schemes:

A bio-intensive IPM module was validated over 20 hectares under farmers' field conditions at block Dediapada and Sagabara regions of Narmada a predominantly rainfed cotton belt by KVK.

Success derived:

High yield range of 22 qt/ha and at that time cotton price was good in the market so about Rs. 79530/-ha net income fetched which is 19.5% more as compared to other farmers in the villages. The result of cotton IPM was highly praise worthy by the KVK Scientists, as well as villagers too.

Specific Technology	Yield (q/ ha)	Gross cost (Rs/ha)	Gross income (Rs/ha)	Net income (Rs/ha)	B:C ratio
Previous yield without IPM local Local farming practices	18.5	13500	79550	65750	4.76
Yield after adoption of IPM practices	22.1	11500	95030	79530	5.13
% Increase in Demonstration plot	19.5				

FLD on Cotton IPM

Field day celebration programme

3.11 Improved production technologies to enhance onion production

ICAR-Directorate of Onion and Garlic Research, Rajgurunagar, Pune

Background Information:

Under MGMG, ICAR-DOGR has identified fifteen villages *viz.*, Gadakwadi, Varude, Gulani, Wafgaon, Jawulke, Khairenagar, Gosasi, Mitgudwadi, KanhurMesai, Khairewadi, Khadakwadi, Loni, Pondewadi, Dhamni and Ranmala. In these villages, onion crop is grown in all three seasons and garlic is also grown on small scale. The villages were surveyed as per guidelines of the scheme. The major problems in these villages were shortage of irrigation water, lack of guidance about organic farming, etc.

The scientists of ICAR-DOGR provided scientific information to the farmers about improved technology of onion and garlic time to time. The activities to be undertaken in *Mera Gaon Mera Gaurav* programme have been discussed with village officials and Sarpanch of the respective villages.

Bhima Super-Best rabi onion variety

Technological intervention:

- ICAR-DOGR varieties *viz.*, Bhima Super, Bhima Red, Bhima Raj, Bhima Dark Red, Bhima Shakti, Bhima Kiran, Bhima Light Red, Bhima Shweta, BhimaShubhra and Bhima Safed
- Modified bottom and side ventilated storage structure
- Broad Bed Furrow planting with drip irrigation

Bhima Shakti- Best kharif onion variety

Innovative extension methods used:

Baseline survey, trainings, field demonstrations, mobile advisories

Linkage developed through Govt. sponsored schemes /Spread / benefits:

Linkages developed with 3 agencies *viz.*, NGO "Harita" Srinivasan Service Trust, State Department of Agriculture and KVK, Narayangaon. These organizations helps ICAR-DOGR in organizing training programmes, conducting demonstrations, etc.

Bottom and side ventilated storage structure

Success derived:

Many farmers got double income after adopting ICAR-DOGR technology in MGMG villages. There is tremendous increase in their socio-economic status after adoption of ICAR-DOGR technologies.

Lessons Learned:

At the starting of MGMG scheme, the farmers of villages under MGMG were reluctant to adopt new technologies. After convincing them and providing trainings, they agreed to carry out demonstrations. Time to time guidance was given to them. Now they have become spokespersons for our technologies. The scientists of our Directorate also learnt the benefits of team spirit.

Onion on BBF with drip irrigation

3.12 Demonstration on laser guided land leveller for paddy cultivation

ICAR- Central Institute of Agricultural Engineering, Bhopal

Background Information:

There was no paddy crop taken up by farmers besides the availability of water for cultivation of paddy. The farmers of the adopted MGMG villages were not using the laser guided land leveller. Training on improved crop production machinery was conducted for the farmers.

Technological intervention:

The laser guided land leveller was demonstrated to the farmers for paddy crop cultivation.

Innovative extension methods used:

Demonstration of laser guided land leveller in an area of 2.5 ha.

Linkage developed through Govt. sponsored schemes:

State Agricultural Department, Madhya Pradesh

Success derived:

The water use efficiency was improved by proper levelling of soil. The subsequent years, the paddy crop cultivated by more number of the farmers in the MGMG villages

Lessons Learnt:

The laser guided land leveller must be adopted and popularize in the paddy crop area for higher yield and optimum water use.

Demonstration of laser guided land leveller

Visits of foreign delegates in the MGMG villages

3.13 Weed Management Practices for sustainable production

ICAR – Directorate of Weed Research, Jabalpur

Background Information:

Weeds are serious problems for agriculture, environment and major yield limiting factor for crops, weed contributes 37% loss of crops. Considering the problem of weed it was decided to set up a nodal centre for basic and applied research in weed. Thus the National Research Centre for Weed Science (NRCWS) was established in April, 1989 and presently known as ICAR-Directorate of Weed Research (since 2014) with the vision of developing innovative, economic and eco-friendly, weed management technologies to contain challenges for sustainable agriculture and other social benefits and with mission to provided scientific research and technology in weed management for maximizing the economic, environmental and social benefit for the people of India.

Directorate has developed effective weed management technologies for cropped & non-cropped aquatic situation to increase productivity, profitability and livelihood security of the farmers. The developed technologies are demonstrated and promoted under the *Mera Gaon Mera Gourav* programme in various villages of Jabalpur and surrounding districts. Apart from this ICAR-DWR has AICRP-WM centre where location specific and crop specific technologies are being developed and demonstrated to stakeholders.

Technological intervention:

- Weed management under Conservation Agriculture
- Weed management in cropping system
- Spraying techniques of herbicide
- Safety use of herbicides

Greengram under conservation agriculture

Innovative extension methods used:

On-Farm Research/Demonstration methods are followed based on principles of learning by doing and seeing is believing in a participatory mode.

Linkage developed through Govt. sponsored schemes:

Linkage developed with State Agriculture University, Krishi Vigyan Kendra, State Agriculture Department and Village Participations.

Success derived:

Farmer's participatory approach adopted under OFR-cum-demonstration proved to be an accurate guide to its subsequent adoption by farmers. Successful demonstration of this technology was realized by following the principles of learning by doing and seeing is believing in a participatory mode. Farmers were highly enthusiastic about wheat and greengram sown under conservation agriculture. Farmers were fully satisfied and impressed with the performance of wheat and greengram they realized that CA is a useful option in saving the field preparation, cost, labour, time and conserve the moisture in soil. After successful demonstration of CA technology in farmers field, Farmer's from different localities are contacting the Directorate and showing keen interest about the technology.

Lessons Learned:

Though conservation agriculture technology has been widely accepted by farmers despite several benefits, adoption of CA systems by farmers the limiting factor is high cost of happy seeder and high power tractor (more then 50 HP) thus the adoption of this technology still in its infancy as they required a total paradigm shift from conventional with regard to crop management.

3.14 Three-Tier System of Cage Aquaculture in Open Brackishwaters for Livelihood Security and Doubling the Income of Coastal Fishers

ICAR-Central Institute of Brackishwater Aquaculture, Chennai

Background Information:

A large area of open brackishwater comprises estuaries, creeks, backwaters, and lagoons, which are hitherto left unutilized for fish production. The water spread area of significant open brackishwater resources can be made highly productive for fish farming by developing appropriate rearing systems. Cage aquaculture is an ideal system for utilizing open brackishwaters that have suitable depth and optimum water quality by crafting location-specific cage systems. The cage confines the fish to a mesh enclosure where the initial investments and inputs in terms of land, water, electricity, and manpower requirement are very low vis-à-vis land-based aquaculture.

Technological interventions:

The three-tier system of cage farming (nursery-pre-grow-out & grow-out) is suitable for a coastal brackishwater body and is possible with the participation of local fishermen who depend on the water resource for their livelihood. Hatchery produced Seabass (*Latescal carifer*) fish fry of 2 cm size were stocked in small net cages grown to an average size of 7.3 cm with a mean survival of 40% in 50-60 days. Subsequently, the fingerlings were reared in pre-grow out cages for 90-100 days, and later the juvenile fishes of 100-125 g size were transferred to grow out cages. The survival in pre-grow out phases were 80-90%. The fishes were fed with CIBA Seebass^{Plus} feed at the rate of 8-10%, 4-6% and 2-4% of body weight in the nursery, pre-grow out, and grow out phases, respectively. In 270 days of grow-out culture, the fishes attained a marketable size of 900 g to 1.2 kg.

Innovative extension methods used:

Youths were mobilized to form a group; ground skill development on cage designing, installation, and management was given; training in farming technology methods were given by adopting the learning-by-doing method; the involvement of women in nursery rearing was also welcomed, with handholding for one crop and facilitating subsequently rearing.

Linkage developed through Govt. sponsored schemes:

The fishers were linked with the Tamil Nadu Fisheries Development Corporation, a government-owned agency for procurement and marketing of quality fishes to consumers. The group was also linked with suppliers of stockable fish seed.

Success derived:

Cage farming provided them livelihood security and an additional monthly income of Rs.8000, Rs. 4900 and Rs. 8500 per head respectively in nursery rearing, pre-grow out and grow out farming for spending just two hours per day. Two more groups started cage farming in the water body and the culture is in progress.

Lessons Learned:

Appropriate policy guidelines for optimal utilization of open brackishwaters involving coastal fishers and a promotional scheme with an inbuilt subsidy for crafting cage infrastructure and critical inputs are the need of the hour to scale-up this win-win approach.

There tier cage Farming system of Seabass in brackish waters

3.15 Castor (late *kharif*) production vis-a-vis groundut (*rabi*) for enhanced income and profitability

ICAR- Indian Institute Of Oilseeds Research, Hyderabad

Background Information:

Rampur thanda is a tribal hamlet perpetualised with marginal and small holdings. Majority of the area is under rainfed eco system. The baseline revealed that the farmers have no access to know- how of technology in paddy, groundnut, greengram and redgram which are the principal crops grown in the hamlet.

Mr. Seetharam Naik, a tribal farmer was accustomed to cultivation of groundnut during *rabi* season for the last ten years. The risk evidenced in groundnut cultivation was the menace of wild boar problem, limited availability of irrigation due to depleting water table, electricity problem, high labour requirement. He was not aware of any other alternate crop that could be profitable over groundnut.

After the IIOR adopting the village, Mr. Naik and the fellow farmers were empowered with technical knowledge on the production of agricultural crops including oilseed crops through various capacity building programmes in the village besides exposure visits to the oilseed demonstration plots. This led to the farmers winning the confidence of the interventions suggested by IIOR on the cropping systems, NRM and IFS modules.

This triggered interest for Mr. Naik to think of diversification. He resorted to green gram under *kharif* season during 2017 and after harvest of the greengram crop, he initiated castor crop (DCH-519 Hybrid) in one and half acre. This may be perhaps the maiden effort by a Telangana farmer to take up castor under late *kharif* (Sowuing on 27th August,2017)) as against the prevailing practice of cultivating under *kharif* or under *rabi* seasons and grown groundnut in *rabi* season.

Technological interventions:

- Technology assemblage of green gram during *kharif*
- Technology support in the production of Castor hybrid DCH-519
- NRM initiatives inclusive of INM and soil test based fertilizer application (Replacement of DAP with SSP based on high P levels of the soil)
- Market information advisories to the farmer on a regular basis to ensure that he gets the best price for this output

Innovative extension methods used:

- Participatory extension functionaries approach
- Farmer Field Schools
- Scouting

Linkage developed through Govt. sponsored schemes:

- Established linkage with Department of Agriculture for provision of green manuring, bio controls etc.
- Agricultural Regional Station (ARS) PJTSAU, Tandur on awareness of Good Agricultural Practicel (GAP) in pulses
- Private industry for providing SSP at the village (Two 16 tonne trucks of SSP was obtained by the village as a whole during kharif and rabi, 2017-18 as replacement against DAP)

Success derived:

- Castor area in the hamlet increased to 48 ha (120 acres) in a non- traditional castor area during the year 2018-19 (*kharif*/ late *kharif*).

- Reduced the drudgery of spending sleepless nights in the farm against the wild boar problem (90 days in the farm with imputed family labour costs valued at Rs.22500/- as per the prevailing labour price of Rs.250/ man day).
- Accrual of incremental farm level income of Rs. 19650/ one and half acre (Returns calculated are over operational costs of castor and groundnut).

Particulars	Groundnut (K-6)	Castor (DCH-519)
Yield (q./1.5 acre)	18	15
Cost of cultivation (Rs./1.5 acre)	56350	16900
Gross Return (Rs./1.5 acre)	76050	54000
Additional Returns (Rs ./1.5 acre)	19700	37100
Incremental farm level benefits of the intervention= Rs. 19650		

Lessons Learned:

There lies ample scope to improve the income and welfare of the farming community through understanding the local resources of the farmers and the farm in the village.

Castor field

Field monitoring of the technology at various stages of the crop growth

3.16 Decentralized coconut seedling production mission entitled "*Amma Thengu* (Mother palm)"

ICAR-Central Plantation Crops Research Institute, Regional Station, Kayamkulam

Background Information:

Good quality coconut seedlings are always in great demand with the State's requirement exceeding more than two lakhs per annum. Bharanikavu village adopted by the MGMG team is a root (wilt) disease endemic area wherein the demand of disease-free good quality coconut seedlings is felt very high in our preliminary assessment. Understanding the need of the farmers, MGMG team intervened with the successful programme of Decentralized coconut seedling production mission entitled "*Amma Thengu* (Mother palm)" executed by the members of the *Bharanikavu Panchayat Coconut Producer's Federation*.

Technological interventions:

ICAR-CPCRI facilitated the farmers group to identify root (wilt) disease-free mother palms in the Bharanikavu panchayat, collect seed nuts from such mother palms and scientifically raise them for producing quality seedlings through participatory mode. Farmers have successfully raised about 600 coconut seedlings in this mission and distribution of these best coconut seedlings was launched in a meeting held at Bharanikavu Panchayat Community hall on 31-05-2018.

Innovative extension methods used:

Farmer-participatory community level decentralized coconut seedling production mission with the sole aim of producing disease-free, goody quality seedlings identified and produced *en mass* in the village with the holistic support of the member farmers. Farmer group and nursery farm women were felicitated by the MGMG group in the seedling launch programme.

Linkage developed through Govt. sponsored schemes:

Witnessing great success of the programme, Bharanikavu Block panchayat has sanctioned a plan project with 9.00 lakh rupees for sustaining seedling production campaign in three more villages *viz.,* Bharanikavi, Vallikunnam and Chunnakara. The programme is implemented through the respective Krishi Bhavan with the patronage of panchayat members. About 28 coconut producer societies will be involved including 1200 farmers in an area of 450 ha.

Success derived:

Smt. Rajini Jayadev, President Bharanikavu Block Panchayat complimented the efforts of the MGMG group and launched the seedling distribution and felicitated the Federation team for the success of the programme. With the technical support of ICAR-CPCRI, coconut seedlings were found to be of superior quality of high scientific standard and greater demand from farmers group.

Lessons Learned:

With the doorstep delivery of technology through MGMG, good quality coconut seedlings could be produced by the farmers, for the benefit of farmers to the technical superiority proposed by scientists.

Additional information:

Most successful decentralized coconut seedling production programme by the farmers, for the farmers and to the farmers.

Inauguration of seedling launch

Release of technical pamphlet

Seedling inspection and suggestions

Mother palm selection

3.17 Organic agriculture and aquaculture in hilly area: A success story

ICAR – Central Marine Fisheries Research Institute, Kochi

Background Information:

A team of scientists from ICAR-Central Marine Fisheries Research Institute, Kochi, reached out to an upstart agrarian couple Smt Hema Vijayakumar and Shri Vijayakumar of Pazhoor, Piravom, Kerala. In an area of around 2347.26 sq. m with laterite soil they started integrated organic farming of vegetables along with ornamental plants, variety of trees, medicinal plants, cash crops, poultry, cattle rearing and aquaculture. The challenge was to convert the hilly area with laterite soil, which is more apt for rubber plantation, to a fertile productive land suitable for integrated farming with horticultural plants. It became more challenging when the couple decided to be make it fully organic cultivation.

Technological interventions:

The ICAR-CMFRI extended technical knowhow to the agrarian couple on integrated farming of fish, vegetable and horticultural crop by a re-circulatory method. The couple was advised to rear Genetically Improved Farmed Tilapia (GIFT). They constructed a natural pond with red stone at the bottom. They started fish farming by purchasing 2,570 nursery-reared GIFT seed from MPEDA.

The water quality in fish tank, inlet and outlet was regularly monitored, which is also fitted with automatic timer control system round the clock. Necessary advisories were given by ICAR-CMFRI to maintain ammonia under safe level by using recirculation of water through Azolla plant and calcium carbonate and to improve the plankton bloom by slow leaching of dried cow dung manure. It was also suggested to the farmer for providing *in-situ* recirculation. For maintaining pond pH, 6 kg common salt and 2 nos banana plant cut into pieces, were added into the water and average 7.5 pH was maintained. There were no instances of diseases.

Having less fertility of the soil, the farmer included a 'Vechur' breed cow and poultry along with fisheries and horticulture. Urine and dung from the cow were used in the plants to improve productivity. They were also used for vermi-composting along with the dried leaves and the vegetable waste from the house. Local varieties of chicken are being reared which provide nearly 7-10 eggs/day. Kitchen and farm vegetable waste were also utilized as bio -fertilizer. Regular harvest of vegetable crops is being done.

Innovative extension methods used:

Regular visit and timely advisories were provided

Linkage developed through Govt. sponsored schemes:

Technical inputs from State Department of Fisheries, Government of Kerala and Aquaculture Development Agency Kerala (ADAK) were received at various points in time.

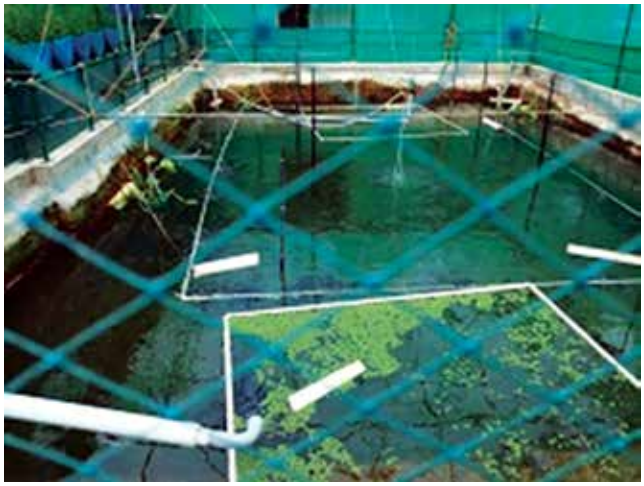
Success derived:

Several farmers in the locality (about 15) started replicating the model of Smt. Hema Vijaya kumar and Shri Vijayakumar and initiated their own culture systems over the past year.

Lessons Learned:

In spite of facing several challenges of marketing of their produces, their experiment and achievements is proving a success. The expected annual income from the pond, if two crops each of 6 months period is taken is around Rs 6 lakh (live tilapia can be sold at Rs. 250-300/ kg) and the income from vegetables, fruits and cash crops is around Rs 3 lakh. Thus, the total turnover from this venture could be around Rs 9 lakh/year.

Protected vegetable farm



Aquaculture farm

Animal farm

Vegetable cultivation

4. CONCLUSION

Mera Gaon Mera Gaurav an innovative flagship programme initiated by Indian Council of Agricultural Research, New Delhi for intensifying the interaction between the scientist and practising farmers in their operational areas. The main aim was to reduce the communication gap between researchers and farmers so that the adoption of bets technology/practice/techniques/modules could be enhanced. In turn, this would give momentum to innovation decision process among the farming community which will trigger the lab to land process of technology flow. The higher adoption of best bet technologies will not only improve the yield, reducing the cost but also will enhance the income of the farmers from their farming system. In this booklet case studies documented by the concerned Institutes/AUs are testimony for speeding up the adoption process by lab to land process which enhanced not only enhanced farmers' income but also environment friendly for sustainable production.

In fact, it has been observed by the scientist involved under MGMG that they are getting new perspective of agriculture and allied activities by regular interaction with the farmer at their field condition. Further, it has resulted in confidence building among the farming community by providing the latest knowledge, skills and motivations for continuance of farming operations. In future such initiatives may be given direct financial support so that it could be practiced with full pace and more intensive way.

NOTES

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