

## **Doubling Farmers' Income (2016-17 to 2020-21)**

Indian economy is predominantly dependent on Agriculture and other allied activities with more than 60% population dependent on agriculture as their principal means of livelihood. During the period of last 50 years from 1965 to 2015, since the adoption of green revolution, India's food production multiplied 3.7 times while the population multiplied by 2.55 times. The net result has been a 45% increase in per person food production, which has made India not only food self-sufficient, but also an exporting country. So far, the strategy for development of agriculture sector in India has focused primarily on raising agricultural output and improving food security. During last five decades, agricultural research has focused on the development of higher productivity of crop varieties and animal breeds, better farm implements and machinery, increased fertilizer uses and other production technologies which enabled the farmers to grow more food, but at the same time it over exploited the resources and resulted in decreasing farm productivity and profitability. While the country achieved commendable position in food production, farming itself turned non-profitable overtime due to rising costs and uneconomical holdings. Farmers' income remains low in relation to income of those working in the non-farm sector. Low level of absolute income as well as deteriorating disparity between income of a farmer and non-agricultural worker constitute an important reason for the emergence of agrarian distress and farmers' unrest in the country. In this background, the goal set to double farmers' income by 2022 is central to promote farmer's welfare, reduce agrarian crisis and bring parity between income of farmers and those working in non-agricultural professions. Hence, the paradigm has been changed from food security to income security for the farmers. The Government of India (GoI) announcement of doubling farmers' income by 2022 and its implementation must have a direct impact on almost half of the population to realize a sense of income security to farmers in a time bound manner to reduce agrarian distress and promote farmers' welfare. The subject has attracted a lot of attention, generating thoughts and debates on policy, strategy and implementation to achieve the goal. However, the government's intension seems to be to double the income of the farmers from farming in real terms. In this context, many efforts have been undertaken at various levels to make strategic plans and prepare road map for doubling the farmers' income at the district level. Accordingly, 59 KVKs of Andaman and Nicobar Islands, Odisha and West Bengal under ICAR-ATARI Kolkata (Zone V) have undertaken various activities like FLD, OFT and training along with many technological interventions in the villages under this zone. A farmer's field baseline survey was conducted by 59 KVKs on total 6181 farmers in Odisha (3460 farmers), West Bengal (2664 farmers), Andaman & Nicobar Islands (57 farmers) to figure out how the farmers' income has been doubled or more between the year 2016-17 to 2020-21.

### **Odisha**

Agriculture is the backbone of the rural economy in Odisha where the small and marginal farm holdings are dominating. Of the total 48.7 lakh land holdings in Odisha, 93% are in the small and marginal category with less than 2 ha of land accounting for around 75% of the total land. The number of small and marginal farmers has increased by 5.6% between the year 2010-11 and 2015-16. Large farmers, on the other hand, are a mere 0.1% with around 2% of the total land. In Odisha, agriculture is characterized by low productivity on account of different factors. These factors include problematic soil like acidic, saline and water logged, lack of assured irrigation, low seed replacement rate, low level of fertilizer consumption and low level of farm mechanization etc. Huge gaps in yield potential and the technology transfer provide a good opportunity to increase productivity and production substantially.

With the growing demand for high value agricultural commodities like milk, meat, fruits and vegetables, there is pressure for change in the cereal centric policies of the state. The increasing value of livestock and horticultural output as compared to food grains testifies to the process of diversification in Odisha's agriculture and need for supportive action to foster the development of agricultural value chain. The major crops of the state are cereals and pulses like paddy, black gram, green gram, maize,

horticultural crops like citrus, guava, papaya, pineapple, watermelon and vegetables like brinjal, tomato, chili.

In spite of having immense potentiality in horticultural sector, Odisha suffers not only from the lack of organized marketing but also from a shortage of cold storage facilities for perishable fruits and vegetables. In dairy sector also the state suffers from low animal productivity, poor marketing and low level of milk processing. Hence, it was a formidable challenge for the 33 KVKs of the state to increase the income of the farmers up to the desired level i.e. 200% compared to their earning in the year 2016-17.

The KVKs of Odisha (33 number) put forth its efforts in advocating improved agriculture, animal husbandry and fishery practices among the farmers of the state to enable them to double their income between 2016-17 to 2020-21. In the process, they have introduced newer varieties of crops and vegetables, improved cultivation practices, appropriate irrigation practices, harvesting and processing and other associated practices.

## 1. Sector-specific interventions in Odisha

### 1.1 Field crops

- Promotion of BPH/WBPH tolerant low land rice var. *Hasanta*
- Cultivation of drought tolerant paddy var. *Swarna Shreya*
- Varietal substitution with *Sahabhagi* Dhan
- Promotion of protein rich rice variety-*CR Dhan 310*
- Promotion of aromatic rice production Var. *Nua Acharmati* and *Kalajeera*
- Cultivation of pulses, viz. black gram var. *PU-31* and *Ujjala*; pigeon pea var. *PRG-176*; green gram var. *IPM 2-3*, *IPM 02-14*, *PU 30* and *Tarm 1*; and arhar var. *Bada kandul*, *UPAS 120*, *Asha*, *LRG 52*, *PRG176* etc.
- Popularization of oilseeds, viz. mustard var. *Parvati*, *Uttra* and *PM 28*; groundnut var. *Dharani*, *Smruti*, *Devi* and *TG 38*; niger var. *Deomali* and *Utkal Niger 150*; and sunflower var. *Hybrid LSFH-171*, *KBSH41* etc.
- Introduction of improved maize var. *Pioneer 3401*
- Promotion of sweet corn var. *Sugar 75* and *Misti*
- Promotion of ragi var. *Bhairabi*, *Chillika*, *Budimandia* and *Arjun*
- Introduction of cotton var. *Tulasi*
- Promotion of integrated crop management (ICM) of various crops
- Crop diversification
- Soil test-based fertilizer application
- Management of blast and sheath blight in paddy
- Mechanical sowing/ transplanting, DSR, mechanical weeding and threshing,
- Green manuring of dhaincha for salinity management
- Promotion of paira cropping system
- Promotion of integrated nutrient management (INM)
- Promotion of integrated pest management (IPM)

### 1.2 Horticultural crops

- Promotion of wilt resistant tomato var. *Arka Rakshak* and *Arka Samrat*
- Promotion of HYV brinjal var. *Akshita 30*
- Cultivation chilli variety *Arka Haritage*, *Ragini* with INM practice
- Cultivation of papaya var. *CO2*, *Ranchi Dwarf*, *Honey Dew*, *Red Lady* etc.
- Promotion of banana var. *G9*
- Promotion of watermelon var. *Augusta*, *Kiran* etc.

- Large-scale cultivation of off-season vegetables like tomato, chilli, cauliflower, cabbage etc.
- Protected cultivation of high value vegetables like colored cauliflower, cabbage, broccoli, pochchoi, celery, parsley, lettuce, brussels sprouts etc.in low cost structure.
- Promotion of yard long bean var. *Arka Mangala*
- Cultivation of beetle vine in shade net
- Intercropping in the orchards with Turmeric var. *Roma* and *Surama* and zinger var. *Suprabha* and *Kalimpong*
- Introduction of high yielding Tuber crops like sweet potato and yam
- Micronutrient management in vegetables
- Micro-irrigation and mulching for water management in vegetables

### 1.3 Livestock sector

- Feeding of farm made feed
- Probiotic supplementation
- Rearing of backyard poultry rainbow roaster
- Rearing of poultry variety *Kadakhnath* and *Vanaraja*
- Rearing of OUAT synthetic colour broiler in semi-intensive system
- Japanese quail farming
- Feed supplement with azolla
- Feeding of OUAT Mineral mixture
- Bypass fat supplementation
- Semi-intensive goat farming
- Deworming practices

### 1.4 Fisheries

- Composite pisciculture with proper stocking density
- Introduction of '*Jayanti Rohu*' in composite carp culture
- Fish seed production in small tanks
- Improved feeding and disease management practices

### 1.5 Farm and non-farm enterprises

- Vermin compost production
- Paddy straw and oyster mushroom and spawn production
- Homestead nutritional gardening
- Apiary
- Horticultural nursery for seedlings of fruits and plantation crops, and vegetables
- Value added product from tomato
- Seed production of cereals, pulses, oilseeds and fodder crops

In Odisha, 3460 farmers were surveyed by 33 KVKs. Out of that, data of 20% of the surveyed farmers, i.e. 692 farmers' data was analysed. The detailed analysis pertaining to various avenues that contributed on enhancement in income is presented in Table 1. It was found that, 43% of them were marginal farmers (<2.5 acre), 36% small farmers (2.5-5 acre) and 12% large farmers (> 5 acre). The information indicates that the average net income of a farmer increased from Rs. 1,18,078.00 to Rs. 2,88,144.00 (144.03%) in 2016-17 to 2020-21.

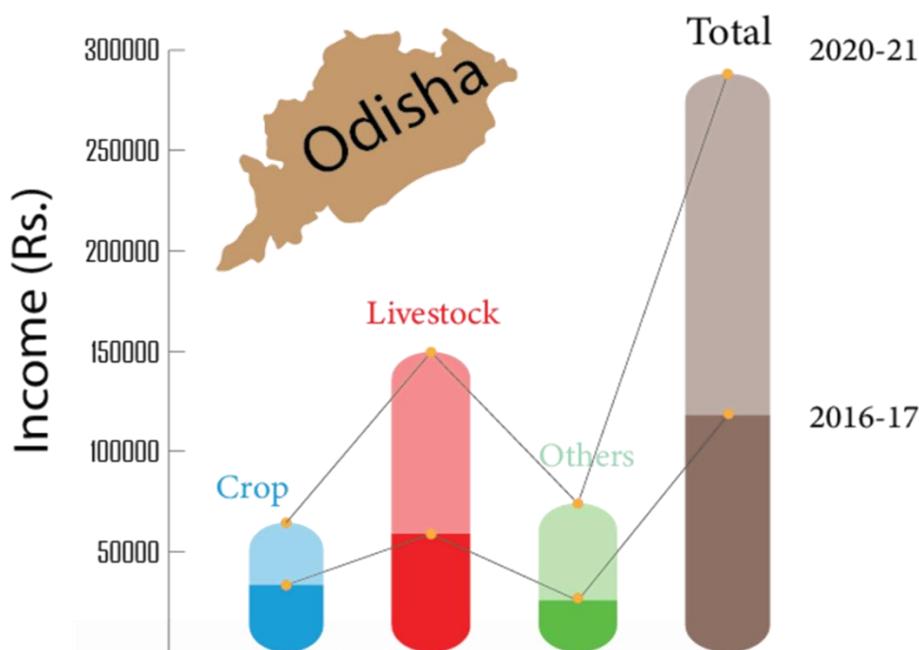
A further analysis indicates that an average income from the crops has increased from Rs. 33462/- of 2016-17 to Rs. 64521/- of 2020-21 (92%). This increase was recorded due to introduction of new crops. About 20% farmers cultivated at least one more crop other than paddy during this period.

Income from livestock sector has been increased from Rs. 58885/- in 2016-17 to Rs. 149528/- in 2020-21 (153%). Among the livestock, 30% of the farmers have taken up poultry rearing, diary or fish farming for the first time in the period of 2016-17 to 2020-21. Some brackish water fish cultivation has been found to be very profitable. The contribution of KVKs towards this income enhancement was observed in the respect of introducing appropriate rearing practices, feed management, disease management, and other related areas. Vaccination and health awareness camp conducted by the KVKs also helped in improving the health and production of livestock that contributed higher income on the part of the farmers. Similarly, fishery sector also recorded higher income due to proper pond management, stocking density, quality fish seed and marketing.

The paradigm shift in farmers' income was more evident in the other enterprises like bee keeping, mushroom and vermicompost production. The income from these sectors was increased from Rs. 25730/- of 2016-17 to Rs. 74095/- of 2020-21 (187%).

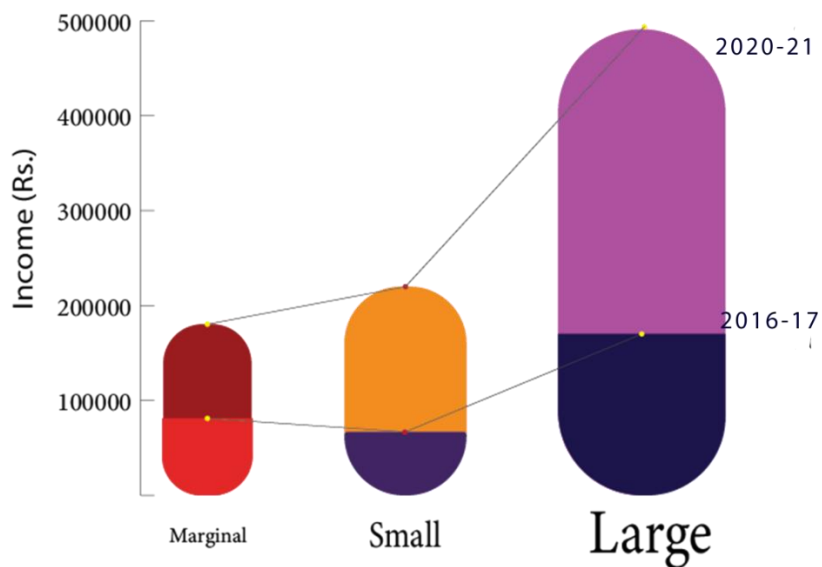
**Economics of farmers' income in Odisha during 2016-17 and 2021-22**

<i>Crops and Enterprises</i>	<i>Net income (Rs/ household at current prices)</i>		<i>% increase in income</i>	<i>% share in total income</i>		<i>% share in additional income</i>
	<i>2016-17</i>	<i>2020-21</i>		<i>2016-17</i>	<i>2020-21</i>	
Field crops	13385.00	23808.00	77.9	11.3	8.3	6.1
Horticulture	20077.00	40713.00	102.8	17.0	14.1	12.1
Livestock	23554.00	50811.00	115.7	19.9	17.6	16.0
Fisheries	35331.00	98717.00	179.4	29.9	34.3	37.3
Farm and non-farm enterprises	25730.00	74095.00	188.0	21.8	25.7	28.4
<b>Overall</b>	<b>118078.00</b>	<b>288144.00</b>	<b>144.03</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>



**Sector wise increase in income from 2016-17 to 2020-21**

The overall analysis indicates that marginal farmers were more dependent on cereal crops and small farmers were more prone to cultivate horticultural crops. Whereas, large farmers have diversified their farming pattern to fisheries and livestock. Marginal farmers showed change in income from Rs. 81081/- to Rs. 195493/- with an increase of 141%. They cultivated paddy, ragi, greengram, mustard and fodder crops with a small portion having vermicompost pit, mushroom beds etc. Small farmers showed change in income from Rs. 66867/- to Rs. 220560/- with an increase of 229%. They cultivated paddy, sunflower, maize, cabbage, brinjal, tomato, chilli, cauliflower, sunhemp etc. Supplementary enterprises like bee keeping, vermicompost, value addition etc also contributed towards enhancement of farm income. Large farmers had shown the highest increase in income from Rs. 170017/- to Rs. 494492/- (190%). Non-crop sectors like fisheries, poultry, dairy, bee keeping etc. might have contributed to a great extent towards such enhancement of income.



**Farmer category wise increase in income from 2016-17 to 2020-21**

***Representative Success Story 1 in Odisha***

Shri. Duryodhan Nayak is a 28 years old farmer of Village- Kuanrda, P.O.- Bonth of District- Bhadrak in the State Odisha. As per record of 2016-17, Shri. D. Nayak was cultivating rice in 1.0 acre of land and vegetable production in 0.15 acre of land and he had the annual net income of Rs. 56500/-. He faced problems of pest incidence in rice. Shri. D. Nayak came to know about various training programs of KVK, Bhadrak and took hands on training on mushroom cultivation and broiler poultry farming from KVK, Bhadrak and thereafter he started mushroom cultivation with 3000 beds and broiler poultry farming with 1000 birds and thus recorded annual net income of Rs.171000/- in 2020-21.



**Mushroom cultivation**



**Broiler poultry farming**



## ***Representative Success Story 2 in Odisha***

Shri. Hirnya Naik, 45 years old farmer, is hailing from Village- Kalisui, Block- Sadar of District- Keonjhar in the State Odisha. His land holding is 2.5 acre only. Before intervention by KVK, Keonjhar, Shri. Naik was cultivating only rice with an annual net income of Rs. 7,800.00 in 2016-17. He faced problems like BPH, low yield etc. With DFI interventions like improved variety rice, paira cropping, new technology like seed-cum-fertilizer drill, crop diversification with chickpea cultivation and production of brinjal, Shri. Hirnya Naik achieved to earn an annual net income of Rs. 61,705.00 in 2020-21, that was 7.9 times higher than the earlier annual net income.



**Cultivation of chickpea**



**Foliar spraying of *Bacillus Thuringiensis* in Brinjal**

## **West Bengal**

West Bengal (21° 25' 24" and 27°13' 15" north latitudes and 85°48' 20" and 89°53' 04" east longitudes) is predominantly an agrarian State, comprising of only 2.7% of India's geographical area. West Bengal is located in Eastern India stretching from the Himalayas in the north to the Bay of Bengal in the south. It has an area of 88,752 sq km. West Bengal supports nearly 8% of its food production in the country. There are 71.23 lakh farm families of whom 96% are small and marginal farmers. The average size of land holding is only 0.77 ha. Total cultivable area of the state is about 56 lakh ha which 63% of its geographical area. The major crops of the state are paddy, potato, pulses, oilseeds, fishery, livestock and horticultural crops. Other enterprises are also found in good numbers which are supporting the family income to a great extent. As the state enjoys natural resources to a great extent followed by adoption of improved crop cultivation practices, achieving the objective of doubling farmers' income is perhaps the most promising aspect.

Almost two third population of the state directly or indirectly depends on agriculture and agri-allied activities. The central pillar of economic growth remains agriculture. Though the state has a surplus production of rice, vegetables and potato, a huge gap exists between the requirement and production of pulses, oilseeds and maize. Deterioration soil health due to imbalance in use of chemical fertilizers, paucity of suitable improved variety of seeds, inadequate farm mechanization, unorganized marketing structure etc. are some of the major challenges to agricultural growth of this state.

The KVKs of West Bengal (23 KVKs) operating in this state have collected data from 2664 farmers to understand the average income of the farmers from both farm and non-farm sectors i.e. contribution of various enterprises during 2016-17 to 2020-21. This was followed by identification of gaps in various sectors in terms of technology, input support, skill support, marketing, group formation like FPOs etc. The continuous efforts of the KVKs during last five years to double the income of the farmers are reflected through enhancement of productivity of crops and commodities and rise in income between the year 2016-17 to 2020-21. In the process, they have introduced newer varieties of crops and vegetables,

improved cultivation practices, appropriate irrigation practices, harvesting and processing and other associated practices.

## 2. Sector-specific interventions in West Bengal

### 2.1 Field crops

- Promotion of sub-mergence stress tolerant paddy var. *CR-1009, Swarna Sub-1, Bina 11* and *Luna Swarna*
- Cultivation of aromatic rice production var. *Gobindovog, Tulaipanji, Kalonunai, Radhunipagol* etc.
- Introduction of pulses, viz. black gram var. *WBU109, IPU 2-43, Vallab Urd1* and *PU 31*; pigeon pea var. *LRG-41* and *Laxmi*; Chickpea var. *NBeG-49, Anuradha, Jaki-9218* and *RVG 202*; green gram var. *IPM 02-14, IPM-205-7(Virat)* and *PDM 84-139* and lentil var. *Pusa Agati-4717, WBL-77, KL-320, PL-08, HUL-57* and *IPL-406* etc.
- Popularization of oilseeds, viz. mustard var. *PM-28, Parvati, Pusa Mustard 26, B-9* and *PAN-70*; groundnut var. *Dharani, Devi, TG-37A, TAG-24, AK-12-24* and *Kadri 6*; soybean var. *PS 1368* and *JS 9752*; sesame var. *Savitri, CUMS 17 (Suparva)* and *SWB-32-10-1*; linseed var. *Deepika, Shekhar, Sharada* and *Azad alsi-1*, rapeseed var. *Pusa Mahek* and *Kashinath*; sunflower var. *Hybrid LSFH-171, KBSH 53, MSFH 17, Dibakar* etc.
- Seed production of paddy, green gram, sunflower etc.
- Potato cultivation
- Improved package of practices of field crops like paddy, jute along with different pulse and oilseeds
- Popularization of improved jute var. *JRO-204* and *CRIJAF Sona* for improving fiber quality during retting
- Introduction of kharif onion var. *Agrifound Dark*
- Crop diversification
- Soil test-based fertilizer application
- Intercropping
- Integrated nutrient management
- Integrated pest management
- Popularization of drum seeder and tranplanter, DSR etc.
- Use of farm tools and implements towards farm mechanization

### 2.2 Horticultural crops

- Popularization of improved varieties of vegetables like French bean var. *Contender*; green peas var. *Arkel*; cauliflower var. *Pusa Synthetic, Pusa Snowball 1,2, Valentina* and *Carotena*; cabbage var. *Red Ball* and *Royal Ball*; broccoli var. *Centauro* and *Sultan* including chilli var. *Bullet, Panai* etc.
- Introduction of wilt resistant tomato var. *Arka Rakshak* and *Arka Samrat*
- Cultivation of improved variety of elephant foot yam var. *Bidhan Kusum, Gajendra* and *Colocasia*; ginger, turmeric var. *Suranjana, Suguna* etc.
- Cultivation of capsicum, broccoli, pointed guard, strawberry etc.
- Promotion of off-season vegetable cultivation including use of UV sterilized polythene paper
- Protected cultivation of high value vegetables like coloured cauliflower, cabbage, broccoli, celery, lettuce etc. in low-cost structure
- Introduction of kharif onion var. *Sukhsagar* and *Agri Found Red*
- Promotion of multitier horticulture
- High value flower cultivation of marigold, tuberose, gladiolus, gerbera etc.
- Orchard development with ber var. *Apple* and *BAU*; Guava var. *Khaja*, dragon fruits var. *Red Fleshed* etc. proper management

- Improved production technology of tissue cultured banana
- Micro irrigation and use of mulching technology
- Micronutrient management
- Development of horticulture nursery for seedlings of fruits and plantation crops, and vegetables

### 2.3 Animal Husbandry

- Animal feed preparation using locally available ingredients and marketing
- Improved management, feeding and health care of dairy cattle
- Goat farming of *Black Bengal* goat with proper care and management
- Popularization of improved poultry variety like *Kadakhnath*, *Vanaraja*, *Kaveri* etc.
- Duck farming with *Khaki Campbell*
- Introduction of turkey breed *White Broad Breasted*
- Pig farming with improved variety like *T x D*, *Ghungroo* etc.
- Feeding location specific mineral mixture
- Feed supplement with azolla
- Popularization of deworming practices

### 2.4 Fisheries

- Composite fish culture with proper stocking density
- Diversified fish culture
- Air breathing fish culture with magur, singhi etc.
- Shrimp (*Litopenaeus vannamei*) production
- Biophyton culture for *GIFT Nile Tilapia* culture in periphyton and
- Fish seed production of IMC, Asian catfish, scampi etc.
- Ornamental fish culture with gold fish, angel, guppy etc.
- Fish feed preparation and marketing
- Pond based integrated farming system

### 2.5 Farm and non-farm enterprises

- Vermicompost production
- Organic manure production through Waste decomposer
- Paddy straw and oyster mushroom and spawn production
- Homestead nutritional gardening
- Beekeeping
- Lac cultivation
- Drudgery reduction through effective use of farm tools and Implements
- Seed production of cereals, pulses and oilseeds

In West Bengal, 2664 farmers were surveyed by 23 KVKs. Out of that, data of 22% of the surveyed farmers, i.e. 586 farmers' data was analysed. The detailed analysis pertaining to various avenues that contributed on enhancement in income is presented in Table 2. It was found that the population consisted of 56% marginal farmers (<2.5 acre), 25% small farmers (2.5-5 acre) and 19% of large farmers (> 5 acre). The enhancement and productivity are presented graphically. On the whole the net income of a farmer increased from Rs. 126033/- to Rs. 324052/- (157.10%) during this period.



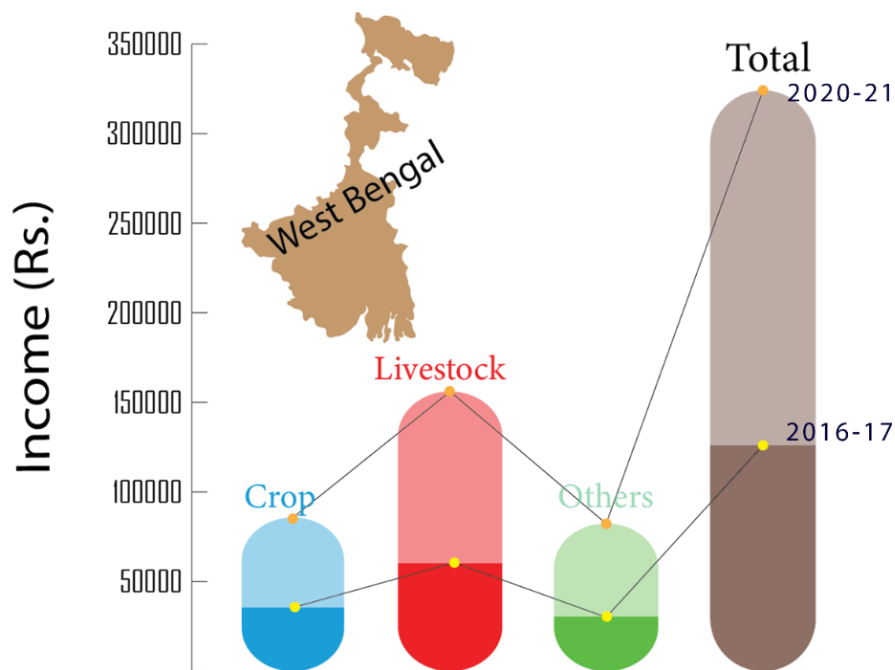
It is observed that average income per farmer from the crops has increased from Rs. 35436/- to Rs. 85708/- in five years (142%) by cultivating improved variety of paddy, vegetables like cauliflower, brinjal, tomato, chilli, gourds, potato, cabbage, oilseeds like mustard, sesame, ground nut etc.; pulses like lentil, blackgram, chick pea, green gram etc. and fruits like mango, guava, litchi, banana, sapota, jackfruit etc. The vegetable crops produced higher income compared to cereals and other crops. However, potato, jute and tea are predominately cultivated as the cash crops which ensure enhanced as well as steady income from agricultural sector. In addition, nearly 23% farmers opted for vegetable cultivation alongside crop cultivation/enterprises.

Income from livestock sector was also increased from Rs. 60134/- to Rs. 156044/- (159.50%). The contribution of KVKs in assuring scientific livestock rearing practices, following vaccination schedule by the farmers, conducting large scale awareness camp, introduction of AI, nutritious feed preparation etc. was well documented in achieving such success. Poultry and fisheries are another two dominating sectors that contributed towards doubling of farmer's income in association with overall livestock rearing. Processing and value addition of fishes, particularly of marine fishes is another lucrative livelihood for the fish farmers in enhancing their income.

Apart from that, it was also found that adopting subsidiary enterprises like bee keeping, vermiculture production, mushroom production, lac cultivation, vegetable seedling rearing, planting material production, embroidery did help in enhancing income of the farm families. The income from these sectors was increased from Rs. 30463/- to Rs. 82300/- (170%) with an additional involvement of nearly 80% farmers/farm women seeking employment in these enterprises.

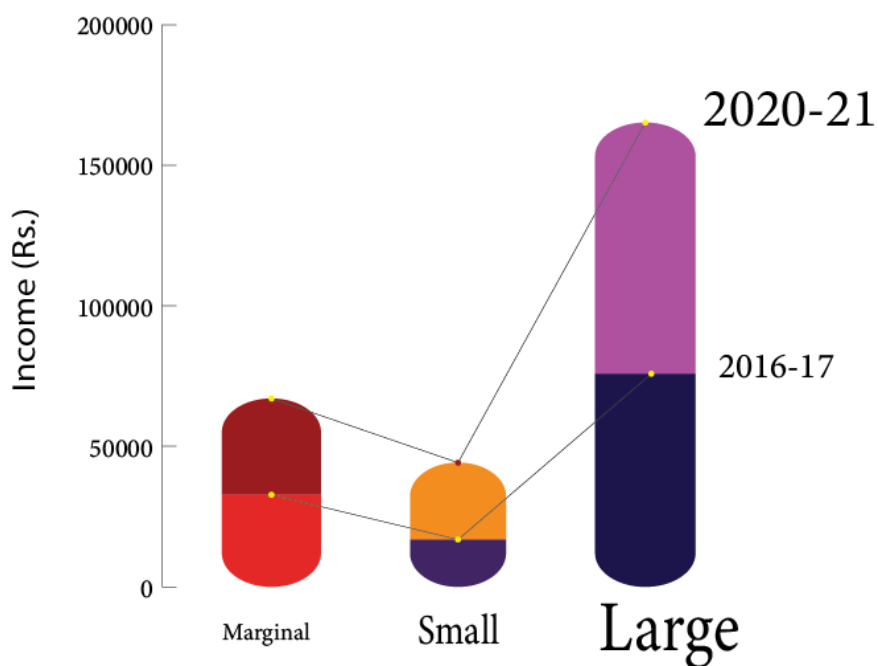
#### **Economics of farmers' income in West Bengal during 2016-17 and 2020-21**

<i>Crops and Enterprises</i>	<i>Net income (Rs/household at current prices)</i>		<i>% increase in income</i>	<i>% share in total income</i>		<i>% share in additional income</i>
	<i>2016-17</i>	<i>2020-21</i>		<i>2016-17</i>	<i>2020-21</i>	
Field crops	14170.00	28880.00	103.8	11.2	8.9	7.4
Horticulture	21266.00	56828.00	167.2	16.9	17.5	18.0
Livestock	20053.00	50418.00	151.4	15.9	15.6	15.3
Fisheries	40081.00	105626.00	163.5	31.8	32.6	33.1
Farm and non-farm enterprises	30463.00	82300.00	170.2	24.2	25.4	26.2
<b>Overall</b>	<b>126033.00</b>	<b>324052.00</b>	<b>157.1</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>



**Sector wise increase in income from 2016-17 to 2020-21**

The trend in change of income to achieve the objective of doubling farmers' income indicates that the marginal farmers enhanced their income from Rs. 32769/- to Rs. 66987/- (104%). In respect of small farmers, the increase in income was from Rs. 16794/- to Rs. 44173/- (163%). Large farmers, however, could increase their income through agriculture and allied means from Rs. 75800/- to Rs. 165196/- (117%). It can be inferred that commercial cultivation of crops and vegetables, scientific livestock rearing, crop diversification towards high value crops and vegetables and creation of large number of enterprises in the rural areas have contributed greatly towards the success to double the income of the farmers of West Bengal.



**Farmer category wise increase in income from 2016-17 to 2020-21**

### ***Representative Success Story 1 in West Bengal***

Mosarab Ali Molla, aged 41, having a land of 2.66 acre at Village- Kantul, P.O.- Puinan, Block- Polba- Dadpur of District- Hooghly in the State West Bengal was engaged in kharif paddy production along with potato and mustard cultivation. He had the annual net income of Rs. 82161/- in 2016-17. Once he attended training at KVK, Hooghly and came to know the improved variety of paddy, potato, mustard etc., good management practices and the scope of capsicum cultivation, he started cultivation of improved variety of paddy, potato, mustard etc and introduced the production of capsicum at his farm and initiated vegetable nursery after taking training under ARYA project and thus, Mosarab Ali Molla achieved to earn annual net income of Rs. 185290/- in 2020-21.



**Mustard field of Mosarab Ali Molla**



**Vegetable nursery of Mosarab Ali Molla**

### ***Representative Success Story 2 in West Bengal***

Smt. Priya Das, 23 years old, is living at Village- South Akhanagar, P.O.- Pirpukur, Block- Kaliaganj, District- Uttar Dinajpur in the State West Bengal. She has only 0.2 acre of land where she used to cultivate local variety of papaya and earn net income of Rs. 30000/- annually in 2016-17. She did not know about the improved variety of papaya. Once she contacted KVK scientists, she came to know about red leady papaya variety and replaced the local papaya variety with red leady papaya variety. Smt. Priya Das also attended training on scientific bee keeping at KVK, Uttar Dinajpur and thereafter started bee keeping which became an extra source of income. Smt. Priya Das reported to fetch annual net income of Rs 108000/- from Papaya and honeybee rearing in 2020-21.



**Cultivation of red leady papaya variety**



**Honeybee rearing**

## Andaman and Nicobar Islands

During the settlement period at Andaman & Nicobar Islands, the land distribution system was 2 ha each of paddy and hilly land and 0.4 ha of homestead land to each settler. However, with the time, this holding has been fragmented. Island agriculture is rainfed, carried out on small holdings putting limitations on large scale investments. Agriculture farm families in the Islands is approximately 12,000 wherein small and marginal farmers have 59.65% of the land holdings and own only 25 % of the total area, while 45.34 % of the land holdings owned by medium and big farmers have 75% of the area. The average size of the agriculture land holding in the Islands is only 1.85 ha which is declining rapidly. The livelihood opportunities in the Islands are limited to tourism and agricultural sectors. With tourism being Port Blair centric, agriculture and allied sectors are only options for livelihood for people located in far flung areas/Islands. With the limited land availability, only vertical expansion is possible to facilitate increase in yield per unit area to meet the food demand of the increasing population. Though the total rainfall received in the Islands is considered to be normal but variations cause water shortage particularly during dry season.

Andaman & Nicobar Islands are one of the 7 Union Territories of India situated in Indian Ocean and spread overall area of 8249 KM. Altogether, it has 572 Islands of which 38 (26 and 12 in Andaman and Nicobar group of Islands) are inhabited. Farming provides support to farmers; while the subsidiary activities of animal husbandry and marine fishing do form important livelihood activities of the Islanders. Farmers of this Union Territory generally grow cereal, vegetables, pulses, fruits, tuber, fish, meat, livestock and plantation crops for earning livelihood from farming related activities.

In achieving the ambitious programme of doubling farmers' income in this territory, 3 KVKs of this union territory of India identified the gaps during the baseline survey before initiation of DFI activities in their respective areas. In addition to enhancement in productivity of horticultural crops, spices and plantation crops, livestock and fishery, 3 KVKs also strategized to enhance farmers' income through adoption of other enterprises providing intensive skill development activities. In the process, they have introduced newer varieties of crops and vegetables, improved cultivation practices, appropriate irrigation practices, harvesting and processing and other associated practices.

### 3. Sector-specific interventions in Andaman and Nicobar Islands

#### 3.1 Field crops

- Introduction of medium duration (110- 120 days) low land paddy var. *CARI Dhan-1*, *CARI Dhan-2* and *CARI Dhan-3*
- Promotion of *CARI 7* seed production
- Popularization of pulses viz. black gram var. *VBN-(Bg)-8*, and green gram var. *CO 08*
- Improved package of practices of field crops
- Integrated nutrient management
- Integrated pest and disease management
- Application of different organic amendments like poultry manure, coconut husk etc.
- Use of farm tools and implements towards farm mechanization

#### 3.2 Horticultural crops

- Popularization of improved varieties of vegetables like cabbage, cauliflower, tomato, chilli, cucurbits etc.
- Intercropping in the orchards with turmeric, yams and ginger
- Improved package of practices for seed spices and trees spices
- Improved cultivation practices of plantation crops like coconut and arecanut

- Improved cultivation practices of medicinal plants
- Promotion of off season vegetable cultivation
- Protected cultivation of high value vegetables
- Micronutrient management
- Development of horticulture nursery for seedlings of fruits, plantation crops, vegetables and ornamental plants.

### **3.3 Animal husbandry**

- Promotion of balanced nutrition in livestock
- Improved management and health care of livestock
- Popularization of improved poultry variety like *Nicobari*, *Vanaraja* etc.
- Duck farming with Andaman local duck
- Goat farming with Andaman local goat
- Pig farming with Andaman and Nicobari pigs

### **3.4 Fisheries**

- Improved management of capture fisheries
- Promotion of cage culture under aquaculture
- Air breathing fish culture with magur, singhi etc
- Development of backyard hatchery for freshwater prawn production
- Promotion of brackish water aquaculture
- Ornamental fish culture with gold fish, angel, guppy etc.
- Promotion of integrated mangrove-based aqua farming system

### **3.5 Farm and non-farm enterprises**

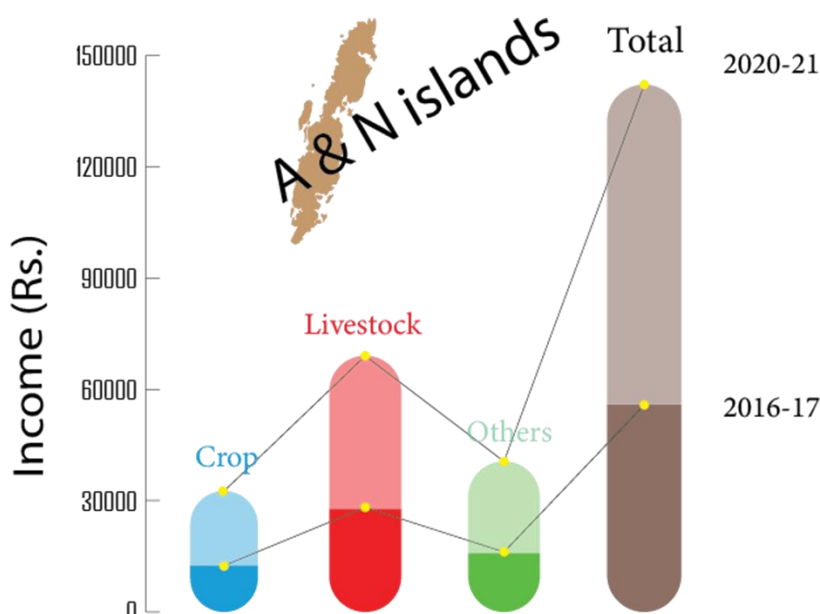
- Vermicompost production
- Homestead nutritional gardening
- Beekeeping

In the course of implementing DFI during the year 2016-17 to 2020-21, 3 KVKs of this Islands could document 57 success stories where 57 practicing farmers actually doubled their income within this period. The detailed analysis pertaining to various avenues that contributed this enhancement in income is presented below. The major crops cultivated in the Islands were paddy, pulses like chickpea, green gram, vegetables like turnip, okra, cucumber, chilli, bitter gourd etc. Farmers also cultivated fruits like mango, pineapple, guava, jackfruit. The efforts of 3 KVKs in introducing improved varieties, scientific package of practices, diversification of high value crops/vegetables and appropriate skill resulted into enhancement of average income per farmer from crops from Rs. 12344/- to Rs. 32553/- (164%).

In livestock poultry, sheep, goat and fishery sector also, the average income per farmer was increased from Rs. 27667/- to Rs. 69043/- (150%) during the year 2016-17 to 2020-21 due to interventions of KVKs in scientific livestock rearing, vaccination schedule, maintenance of appropriate stocking density, improved pond eco system and other related endeavors. Average income of the farmers was also doubled from other sectors like areca nut, coconut plantation, food processing that increased from Rs. 15789/- to Rs. 40556/- (157 %) during the year 2016-17 to 2020-21.

## Economics of farmers' income in Andaman and Nicobar Islands during 2016-17 and 2020-21

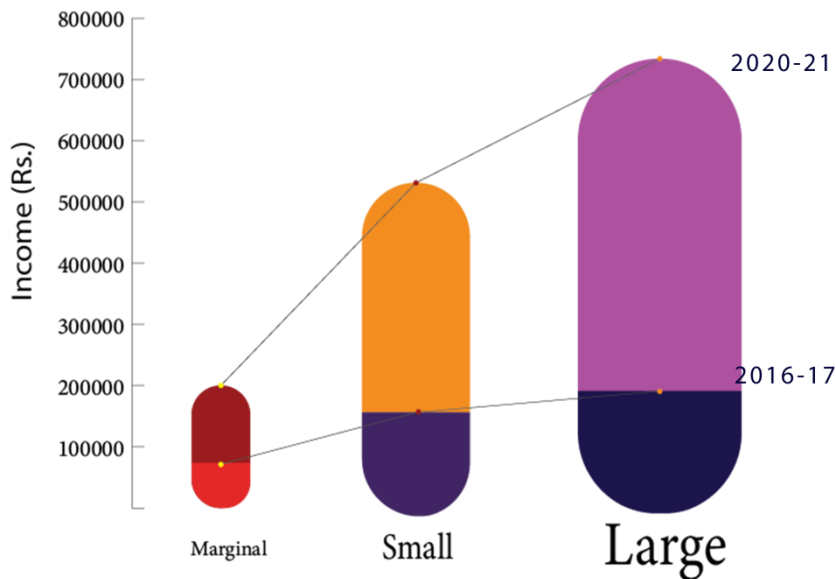
<i>Crops and Enterprises</i>	<i>Net income (Rs/household at current prices)</i>		<i>% increase in income</i>	<i>% share in total income</i>		<i>% share in additional income</i>
	<i>2016-17</i>	<i>2020-21</i>		<i>2016-17</i>	<i>2020-21</i>	
Field crops	4937.00	12532.00	153.8	40.0	38.5	37.6
Horticulture	7407.00	20021.00	170.3	60.0	61.5	62.4
Livestock	16668.00	34336.00	106.0	135.0	105.5	87.4
Fisheries	10999.00	34707.00	215.5	89.1	106.6	117.3
Farm and non-farm enterprises	15789.00	40556.00	156.9	127.9	124.6	122.6
<b>Overall</b>	<b>12344.00</b>	<b>32553.00</b>	<b>163.7</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>



**Fig. 5: Sector wise increase in income from 2016-17 to 2020-21**

The overall assessment of enhancement of farmer's income indicates that the marginal farmers (<2.5 acre) increased income from Rs. 73505/- to Rs. 200150/- (172%) by cultivating cereals of high yielding variety followed by vegetables like okra, potato, chili, cow pea etc. The small farmers (2.5-5 acre) recorded an increase in income from Rs. 169337 to Rs. 545899 (222%) by cultivating spices and plantation crops in particular like areca nut and banana followed by cereal like paddy etc. Processed food like copra also contributed towards income enhancement. The large farmers (> 5 acre) increased their income from Rs. 199820/- to Rs. 744507/- (272%). Though they were mostly coconut cultivars, fish farming, poultry and piggery were also carried out by the large-scale farmers to ensure doubling of income within the given period.





**Farmer category wise increase in income from 2016-17 to 2020-21**

***Representative Success Story in Andaman and Nicobar Islands***

Shri D. N. Madhu, aged 63 years old, is a farmer of Port Blair in Andaman & Nicobar Islands. He lives at Village- Creekabad under Chouldhari Panchayat, Port Blair. He owns 4.3 acres of land. Shri D. N. Madhu has coconut plants in 0.37 acre of land and a pond in an area of 0.45 acre where he used to rear Indian Major Craps (IMC) along with a few numbers of poultry birds and ducks and also cultivated bhendi. However, he had no idea about integrated farming system (IFS). He faced problems like irrigation, quality planting seeds/seedlings, ducklings, poor knowledge on farming etc. Once Shri Madhu visited KVK, Port Blair, he came to know about IFS and then he gradually adopted pond-based IFS along with scientific fish farming, intensive poultry farming and diversification in vegetable cultivation with brinjal. Earlier, Shri Madhu had annual net income of Rs. 175410/- in the year 2016-17 and after adoption of IFS, his annual net income has gone just doubled to Rs 352890/- in the year 2020-21.



**Pond-based IFS**



**Scientific fish culture**