Annual Report

ARYA

Attracting and Retaining Youth in Agriculture
– An approach towards youth empowerment

2017-18

भाकृअनुप
ICAR

ICAR-Agricultural Technology Application Research Institute, Kolkata
Bhumi Vihar Complex, Block- GB, Sector-III,
Salt Lake, Kolkata, West Bengal- 700097

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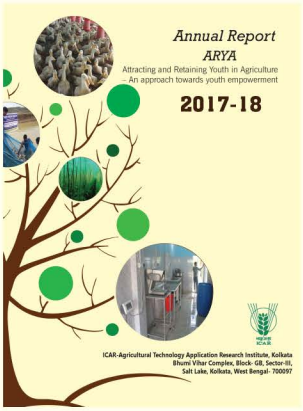

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Preface

Attracting and Retaining Youth in Agriculture (ARYA), an endeavour of Indian Council of Agricultural Research, New Delhi was launched in 2016 as a pilot project to attract and empower the rural youths to take up various agriculture, allied and service sector enterprises and to enable them to establish network groups to take up capital and resource intensive activities like processing, value addition and marketing as well as to demonstrate functional linkage with different institutions and stakeholders. The identified enterprises of ARYA offer great opportunity to work with the rural youths with the background of current nutritional insecurity and socio-economic constraints. The emphasis has been on capturing and improving the understanding on performance of interventions in different agro-ecologies and farming systems for sustainable income and gainful employment generation in village level. This also facilitates quantification of various enterprises in different bio-physical and socio-economic context. In this way ARYA-KVKs play an important role in preparing village level planning for profitable enterprises and its implementation.

Compilation of ARYA Annual Report of ICAR-ATARI Kolkata for 2017-18 depicts a close assessment of endeavour of identified ARYA-KVKs in two districts of West Bengal and Odisha under supervision and guidance of ICAR-ATARI Kolkata. Simultaneous attainment in the domain of institutional interventions, sustainable income and employment generation, capacity development of the rural youths through various skill development training programme *etc.* were regularly monitored and put on records. Annual Report of ARYA 2017-18 includes all the required and relevant information pertaining to achievements of ARYA-KVKs coping with the challenges of rural migration,employment generation as well as livelihood pattern for the empowerment of the youths.

All the staff members of ARYA-KVKs of Zone-V and Indian Council of Agricultural Research, New Delhi deserve appreciation for their contribution and guidance for compiling this report within the stipulated time. The untiring efforts of the staff of this institute monitoring ARYA project through field visit and interaction with the identified youths have contributed a lot towards giving this Annual Report a desirable shape.

Date: 12.03.2019

(S. S. Singh)
Director

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1. Introduction

In order to create interest and confidence among rural youths in agriculture, there is a need to make agriculture more profitable. Retaining youths in agriculture and making agriculture more profitable are thus big challenges. Also, there is a continuous increase in the migration of rural youths to urban areas. On the other hand, the majority of farmers are small and marginal land holders which pose challenge to food security for the growing population. Thus, realizing the importance of the rural youths in agricultural development especially from the point of view of food security of the country, Indian Council of Agricultural Research initiated a programme "Attracting and Retaining Youth in Agriculture" through 25 identified KVKs of this country. Accordingly, KVK Nayagarh from Odisha and KVK Nimpith from West Bengal carried out this programme under Zone-V.

For reinstating rural youths of Sundarbans in farming through demonstration and capacity building in attractive, remunerative and climate smart agro-based job opportunities KVK Nimpith implemented the ARYA project in South 24 Paraganas, West Bengal. The identified enterprises by KVK Nimpith are fishery unit including carp hatchery and Asian catfish hatchery, betelvine cultivation in climate resilient hi-tech shade net *boroz* and poultry farming. In KVK Nayagarh, Odisha the youths are attracted for adopting resource specific need-based alternative remunerative occupation at a sustainable level like stunted fingerlings production, mushroom production, backyard poultry farming *etc.*

2. Objective

The objectives of this project are-

I. To attract and empower the rural youths to take up various agriculture allied and service sector enterprises.

ii. To demonstrate sustainable, attractive, remunerative and climate smart agri-based job opportunities for rural youths at village level and create gainful employment.

iii. To upgrade youth-capacity in specific agri-preneurship model adoption.

iv. To establish network groups to take up resource and capital intensive activities like processing, value addition and marketing.

v. To backstop technology dissemination chain and it's up-scaling.

vi. To demonstrate functional linkage with different institutions and stakeholders.

vii. To curb rural migration.

3. Name of ARYA KVKs, villages and youths under Zone-V

3.1. Name of ARYA KVKs:

Sl. No.	KVK Name
1	Ramkrishna Ashram KVK, Nimpith, South 24 Paraganas, West Bengal
2	Nayagarh KVK, Odisha

3.2 Villages adopted by ARYA implementing KVKs of Zone-V where the various enterprises have been developed are mentioned hereunder:

Sl. No.	KVK name	Name of ARYA village	Established enterprise
1.	Ramkrishna Ashram KVK, Nimpith	Heramba Gopalpur	• Vanaraja farm • Pekin duck farm • Semi-automatic meat processing unit
		Paschim Kultali, Kantamari, Herombo Gopalpur	• Carp hatchery
		Gillar Chat, Sankargheri, Baikunthapur, Kantamari, Mosat, Tulsighata,	• Catfish hatchery
		Lakshmi Janardanpur	• Hi-tech shade net *pan boroz*
2.	Nayagarh	Khuntubandha, Damuni, Kendupalli, Nilakanthaprasad, Duadia, Kiajhara	• Stunted fingerlings production
		Bhodangapalli, Kantabania, Tipura, Puania, Gambharidihi, Rampada, Karabara	• Backyard poultry
		Malisahi, Temple sahi, Sikharpur, Podasahi, Kesharpur, Itamati, Kalyanpur, Udayapur, Anlamada, Kalyanpur, Gamei, Sikharpur, Haripur, Nagapur, Berunabari, Lakhanpur, Kesarpur, Khatia, Kalikaprasada, Narasinghprasad	• Mushroom production

3.3 Name of the rural youths involved in ARYA project is given in *Annexure-I.*

4. Achievements of Ramkrishna Ashram KVK, Nimpith under ARYA project

South 24 Parganas district is the largest district of the state by area and second largest by population and 6th most populous district in India (out of 640). It constitutes of 29 blocks of which 13 falls in the coastal region of Sundarbans, the largest mangrove delta in the world. Also, 36.47% of total district population is within the age group of 18-40 years (Source: Census 2011). Majority of the area is riverine and flood prone. Soil salinity of the district is one of the major drawbacks for conventional agriculture. The area is also storm and flood prone and hence inundation of saline water occurs in agricultural field. With this backdrop, the expansion of agriculture and sustainable generation of income are the main constraints of agricultural sector. Fishery, animal husbandry and climate smart horticulture play pivotal role for augmenting additional income as well as retaining the farmers within the village with sustainable and lucrative income though ARYA programmes.

4.1. Project Initiation:

- Rural youths are very important in sustaining the agriculture sector as they are mostly progressive and can introduce new ideas and technologies into practices. However, a considerable proportion of these dynamic rural youths are gradually abstaining from agriculture sector, year after year.

- In this backdrop the project was initiated on 18.02.2016 with three hub-based interventions *i.e.*

  - Livestock based intervention
  - Fishery based intervention
  - Horticulture based intervention

4.2. District Profile:

According to census 2011, 29 C.D. Blocks and 7 Statutory towns are there in the South 24 Parganas district. There are total 2,042 villages in this district. The density of population (Population per square km) of the district is 819 per square km.

- Population- 81,61,961.
- Percentage of youth: about 38% of the district population.
- Farming system followed: Rainfed farming system, cropped area is 361.55 ha.
- Employment pattern: Out of total population, 36.32% are worker and rest 63.68% are non-worker (District Statistic Handbook 2014). Out of the workers, 15.43% falls in cultivar group, 34.68% are under agricultural labour, 8.2% are house hold and industry workers and rest 41.69% are other workers. (Distribution of population over different categories of workers and non-workers by sex in the district of South 24 Paraganas -2011; source- District Statistic Handbook 2014).

4.2.1. District at a glance:

- Geographical area of South 24 Parganas district is 9960 sq km, out of which 3740 sq m is cultivated land.
- The district population is 81,61,961.
- The district comprises of total 29 blocks out of which 13 falls under the Sundarban.
- Sundarban delta has about 102 Islands, out of which 54 are inhabited.
- Average precipitation is 1760mm/year.
- Rainy days (decadal average): 80.6
- No. of dry spell (>10 days) in *Kharif* season : 3.1
- No. of intensive (>60 mm per day) rain spells : 4.7
- 26 percent rise in the frequency of high to very high intensity cyclones over 120 years.
- Average 4.6 cyclonic storms per year.
- Avg. tidal amplitude is between 3.5 to 5 m.
- Low to low medium agriculture field: 78%
- Impeded sub-surface drainage.
- Continuous submergence in *kharif.*
- Brackish ground water table at shallow depth.
- Occasional saline water flooding.
- Deposition of salt layer on the soil surface during *Rabi*-Summer.
- 74.42% of total district population lives in rural areas.
- 95% of the population depends on agriculture.
- 72% of the farmers are marginal and small.
- Per capita average land holding is only 0.29 ha.

- About 38% of the population falls below poverty line and majority of them migrate to nearby cities in search of livelihood for 5-6 months a year.
- Life risking ventures in deep forest and rivers.
- 36.47% of total district population is within the age group of 18-40 year.

[Source: Census 2011]

4.3. Identification of youth:

The youths (age group of 18-40 years) of any community are the most important work force and are supposed to be the greatest asset of the district for the development of agriculture. They are dynamic, energetic, resilient, progressive and innovative. They are the most resilient work force which is ready to accept changes according to the changing scenario of the society as well as the ecology. Especially the rural youths play an important role for the sustainable development of the agriculture sector because they are enthusiastic and can innovate and practise new strategies for its progress and upliftment. But, there is a gradual increase in the migration of rural youths to urban areas for search of work and better livelihood in recent years. Accordingly, for implementing this project the youths are identified on the basis of following aspects-

- Unemployment
- Participatory and innovativeness
- Having preliminary knowledge on fish and poultry farming for fishery and animal husbandry activities
- Age between 18-40 years
- Less or no land holding for selecting youths for animal husbandry activities
- Minimum land holding of 0.04 ha for fishery activities
- Should possess at least one pond of minimum 0.13 ha for fishery
- Women participation
- In case of horticulture based intervention, i.e. betelvine cultivation in climate resilient hi-tech *boroz*, youths were selected from a family having previous experience in betel vine farming. Either the youths have experience in betelvine farming in his family *boroz*, or in any other neighbour's *boroz*.
- The youths selected are energetic, dynamic and smart, having education level of up to class X or XII.

4.4. Name of cooperating institutions for technical support:

i. ICAR -ATARI, Kolkata
ii. Livestock Development Corporation Limited, Govt. of West Bengal
iii. Animal Resource Development Department, Govt. of West Bengal
iv. Central Institute of Fisheries Education (CIFE), Kolkata

4.5 Enterprise details:

4.5.1. Fishery activities:

The fishery units comprising carp hatchery and Asian catfish hatchery of KVK Nimpith are developed at different villages of block Mathurapur-II, Kultali, Pathar Pratima and Diamond Harbour-I.

4.5.1.1. Carp hatchery:

Objectives of this enterprise are-

- To supply of quality carp spawn at reasonable rate at door step
- To cater the need of 3 types of fish seed *viz*. spawn, fry and fingerling for the fish farmers of the locality
- To generate additional income from subsequent rearing of fish fry and fingerlings
- To prevent the intervention of middlemen in the fish seed business
- To establish a hub of quality carp fish seed in the village

Carp hatchery at Paschim Kultali

KVK experts advising the youths

Detailed Description:

The breeding season of the carps extends from pre-monsoon to the end of monsoon months *i.e.* from April to August. In order to breed the carps, natural environment for their spawning has to be simulated which is exactly what is done in a carp hatchery. Simulation of natural environment comprises of providing continuous water flow, shallow water depth and artificial rain. The hatchery is designed in such a way that all these pre-conditions are fulfilled.

Spawn quantity and quality estimation

The hatchery consists of a water source, a water reservoir, a breeding or spawning pool, a hatching pool and a spawn collection chamber.

During the day of breeding fish, brood fish are collected from brood fish ponds and male and female fish are kept in separate nylon enclosures called "hapa" fixed in a nearby pond in early morning. For a successful breeding operation, two male fish are engaged for a single female fish. Accordingly, the total numbers of male and female fish are kept in the *hapas*. During the evening hours the brood fish are injected with market available fish hormones and released in the breeding pool. Water flow and sprinkling of water in the breeding pool is ensured during the entire breeding period which lasts from 6-

8 hours. During this period water is continuously inlet in the breeding pool from the reservoir and passed out through a central outlet into the hatching pool. Water in the breeding pool is kept to a depth of 1.5 to 2.5 ft. depending upon the size of the brooders.

Village level sale of fish spawn

Spawning takes place within 3-4 hours of the injection when eggs are released by the female and are instantaneously fertilized by sperm from the male fish. These fertilized eggs are passed into the hatching pool with the outlet water and hatches within 15-20 hours. Continuous water flow is also maintained in the hatching pool. The hatchlings are transformed into spawn within another 48-52 hours.

The spawn are collected in the spawn collection chamber and are sold normally by measuring in a 160 ml. steel container locally called "bati" which holds about 80,000 carp spawn. A "bati" of spawn may vary in price from Rs. 150.00 – Rs. 500.00 depending on the time and species of fish. The spawn is the first stage of fish which is used as seed to obtain fry in nursery ponds. The fry is the second stage of fish which is again used as seed to obtain fingerling in rearing ponds. The fingerling is the third stage of fish which is used as seed to grow table fish in stocking ponds.

Hence, the carp hatchery provides 3 types of fish seed for earning livelihood.

Input/support provided:

The selected rural youths were given hands on practical training in the RA KVK, Nimpith during carp breeding season. During the training programme, they were allowed to breed carps in the KVK carp hatchery and were given a detailed idea of the infrastructure of the hatchery and modification to be made in the village situation.

The modified small scale carp hatchery was set up in the village at a cost of Rs.160000/- with the financial support from ARYA project. The following infrastructures were made:

- One circular cemented breeding pool 3' height, 8' diameter with water sprinkling arrangement
- One cemented hatching pool 3' height, 4' diameter with inner circular frame
- One 3' X 3' X 2' cemented spawn collection chamber
- 12' X 22' integrated 3 platform cemented floor with platform heights 4.5', 2.5' and 0.5'
- The running cost of the small scale carp hatchery was Rs.32000/- per year which was borne by the selected ARYA youths. This running cost comprises brooder cost, electricity cost and cost of other ingredients like hormones *etc.*

Progress made:

The progress made in the enterprise on carp hatchery is presented in Table 1.

Table 1.

Name of enterprise	No. of youths involved	Unit / No.	Measurable indicators of output in suitable unit			% increase	Economic of enterprise		
			Before adopting ARYA		After adopting ARYA		Gross cost (Rs.)	Net return (Rs.)	BCR
Carp hatchery	12	3	Gross income (Rs.) per year	60000	228800	281	Establishment Cost- Rs.160000 & Running cost- Rs.32000 per year	196800	7.15
			Time spent with family (Hrs.) per day	7	19	171			
			Contribution to family expenditure (%)	25	60	140			
			Retained at village (months)	3	11	266			

- Sustainability of the youth group – The group is very enthusiastic and encouraged by the success they have met from the result of this year. They have already planned for the next year in which they are ready to invest for procuring the brood fish from distant places in order to avoid mixing of same blood group of the brooders.
- Sustainability of the enterprise – The enterprise is very lucrative as it gives huge return within a very small period of time. Moreover, the local villagers are insisting that the group produce more fish seed so that each of them can procure the same from them at reasonable price. As carp fish is a very popular cuisine to the fish loving people of Bengal, the enterprise holds immense promise to sustain over a long period of time.
- The small scale carp hatchery established under the ARYA project has come as a boon to the vast majority of fish cultivators of the locality. As availability of quality carp seed in this distant village of South 24 Parganas was so far a rare privilege, the hatchery was an immediate success to the group of rural youths. Assuming this, the group installed a water reservoir of their own. The success of this year has encouraged the group so much that they are planning to install a second hatching pool from their own fund so that more spawn may be produced from a single operation. Hence, this KVK planned and modified carp hatchery is definitely going to act as model hatchery for further replication in other villages by progressive rural youths.

4.5.1.2. Catfish hatchery:

Objectives of this enterprise are -

- Revival of paddy cum fish culture
- Fishery in derelict ponds
- Supply of quality seed at reasonable rate at door step with augmentation of income
- Conservation of endangered fish species

Detailed description:

Like the carps, the breeding season of the catfish, too, extends from April to August. To get maximum seeds, it is imperative to breed the fish in captivity. Breeding of catfish *viz*. the Asian catfish, *Clarias batrachus*, involves identification of brooders, hormone injection

Catfish breeding unit

to the female fish, castration of the male fish, stripping of eggs from the female fish and ultimately fertilization by mixing milt and the stripped eggs.

- A triggering dose of hormone injection is administered to gravid females which help in loosening of eggs in the ovary that in turn facilitates easy stripping of eggs from the female within 12-16 hrs.
- The abdomen of the male fish is cut open and the two testis lobes are taken out, cut into small pieces, collected on a piece of fine meshed net dipped in a small bowl filled with 0.9 % saline solution and then squashed by finger pressing within the piece of net and the sieved milt is collected in the bowl containing the saline solution.
- The female fish is held by the head and pressure is applied on its swollen belly to collect the eggs in a bowl.
- The milt suspension (in 0.9% saline solution) is collected with the help of a dropper and is spread uniformly over the stripped eggs and then the bowl is vigorously shaken for a few seconds for fertilization.
- Freshwater is added in the bowl and the washings are poured out.
- The clean fertilized eggs in the bowl are then transferred on the surface of the mosquito net frames kept immersed in the glass hatching pool for further development.
- Within 24 hrs. the eggs hatch out and after 3 days the small fish are fed with freshly hatched brine shrimp for 7-8 days after which the growing fry are fed with worms till they are ready to be sold after 21 days.

Catfish spawn in glass tray

Input/support provided:

The selected rural youths were given hands on practical training in the RAKVK, Nimpith during the monsoon months, breeding season of catfish. During the training programme they were allowed to breed the catfish following all the procedures in the KVK and were given a detailed idea of the infrastructure of the hatchery and modification to be made in the village situation.

The small scale catfish hatchery was set up in the village at a cost of Rs.100000/- with the financial support of ARYA project. Also the

following supports are given to the selected youths-

- 20 pieces glass aquaria (3' X 3' X 9'') 6 mm glass
- Water supply lines
- Electric pump ½ HP
- Overhead tank 1000 L.
- 1lb brine shrimp nauplii
- Air pump, air pipes, air stones
- 10 ml hormone, disposable syringe, forceps, scissors, 0.9% saline solution, etc.

Asian catfish fry

Catfish fry ready for sale

Marketing facility/linkage support provided:

In the first year of hatchery establishment, 100 local farmers and 25 farmers from other villages benefited by procuring spawn, fry and fingerlings from the ARYA group. Due to the popularity of three types of fish seed, it was readily sold from the site of the project for which there is no problem for marketing of the seeds.

Progress made:

The progress made in the enterprise on catfish hatchery is presented in the following Table 2.

Table 2.

Name of enterprise	No. of youths involved	Unit / No.	Measurable indicators of output in suitable unit			% increase	Economic of enterprise		
			Before adopting ARYA		After adopting ARYA		Gross cost (Rs.)	Net return (Rs.)	BCR
Catfish hatchery	18	6	Gross income (Rs.)per year	54000	167200	210	Establish-ment cost-Rs.100000 & Running cost-Rs.22000	145200	7.6
			Time spent with family (Hrs) per day	6	17	183			
			Contribution to family expenditure (%)	20	50	150			
			Retained at village(months)	4	9	125			

4.5.2. Animal husbandry activities:

The identified livestock activities of KVK Nimpith are operational at the ARYA adopting village Heramba Gopalpur of Pathar Pratima block.

Objectives:

- Sustainable income generation
- Gainful stay at village
- Employment generation
- Use of household resources
- Use of unemployed family labour

4.5.2.1. Vanaraja farming:

Rationale:

- Climate adoptability is high
- Feed Conversion Ratio is comparatively more than native breed
- High market value
- 2 month period of farming/cycle
- Disease incidence is less
- Average body weight is 2.3 kg/bird within 2 months period

- Cost of meat is Rs. 150/kg live weight
- It is a dual type bird and having an attractive multi-coloured feather for family farming, high immune competence, perform on low plane nutrition, grow faster and characteristically very low operational cost

Brooding of vanaraja chicks

Doorstep Counseling of farmers & providing advisory

4.5.2.2. Broiler duck (Pekin) farming:

Rationale:

- Disease incidence is less
- High profit margin
- 2 month cycle.
- Average body weight gain is more than 2.2 kg.
- Initial 15 days may be free range and last 15 days in intensive system.
- Eye level depth of water is required.

Village level duck house

Semi-mechanized duck house

4.5.2.3. Meat processing center:

The project village holds 13% of meat produced by the block. But the youths of the project village were not getting the facility of scientific and hygienic meat production. Besides, longer transport to other meat processing plant, birds usually lose at least 4-5% of their body weight which is a loss on the

Meat processing unit in collaboration with LDC, Govt. of West Bengal

part to the farmers. Hence, establishment of meat processing unit in the village provides an opportunity to catch the high value market as

Evisceration of the bird

well as helps to minimize the transport loss. To meet the above said purposes, a semi-automatic meat processing centre is

Portioning

established at Heramba Gopalpur village. Capacity of the processing unit is 200 birds/hour and preservation of the processed meat is done at village level with refrigeration. This unit is established in convergence with Livestock Development Corporation Limited, a Government of West Bengal undertaking organization.

Input/support provided:

Vanaraja farming: The youths are provided with some inputs essential for the rearing of the poultry birds which costs Rs.0.21 lakh/unit.

Distribution of Vanaraja chicks

The inputs are as follows-

- 200 chicks/unit
- 10 bag (1 –pre-starter, 2 bag starter and 7 bag finisher)
- Feed and medicines (enrofloxacin, multivitamin, liver tonic, dewormer, antibiotic, farm disinfectant)

Broiler Pekin duck: For duck farming Rs. 0.60 lakh/unit is supported from the ARYA project to provide the following inputs to the youths-

- 300 ducklings/unit
- 16 bag (6 bag starter and 10 bag finisher)
- Feed and medicines (enrofloxacin, multivitamin, liver tonic, dewormer, antibiotic, farm disinfectant)

Distribution of pekin duckling

Meat processing unit: For scientific and hygienic meat production at village level a meat processing unit is developed in the Heramba Gopalpur village. For establishing this unit the following equipment are provided from this project which are outsourced from LDC, Govt. of West Bengal, costing Rs. 2.00 lakh/unit.

- Bleeding cone
- Blood collection vat, scalding vat
- De-feathering machine
- Portioning table, portioning machine
- Deep freeze

Preventive Vaccination:

Various vaccination camps were organized against Ranikhet and duck cholera at the ARYA adopted village under KVK Nimpith. Mortality rate reduce up to the extent of 97% have been recorded after the vaccination camps organized. The details of vaccination camp are given in Table 3.

Marketing facility/linkage support provided:

Before taking this intervention, detailed discussion with Livestock Development Corporation Limited, Government of West Bengal was done to buyback the produce from ARYA Programme with a branding. The same has been implemented and the farmers are now selling out their produce to the Organization obliterating middlemen.

Marketing through Haringhata Meat- LDC, Govt. of West Bengal

"Chaser Asar"- sharing problems and finding solutions

Table 3. Details of vaccination camp:

Name of enterprise	Name of the vaccine	Stage at which vaccine is given	Mortality rate checked
Poultry farming	Ranikhet (F1) vaccine	5th day	Done as routine vaccination and mortality checked upto 97% due to RD
	Ranikhet (F1) vaccine	21st day	
	Duck cholera vaccination	21st day	Done as routine vaccination & mortality checked upto 98% by Duck cholera
	Duck cholera vaccination	42nd day	

Progress made:

The progress made in the enterprise on poultry farming is presented in Table 4.

Table 4.

Name of enterprise	No. of youths involved	Unit / No.	Measurable indicators of output in suitable unit			% increase	Economic of enterprise		
			Before adopting ARYA		After adopting ARYA		Gross cost (Rs.)	Net return (Rs.)	BCR
Vanaraja Farming (200birds/ unit)	42	42	Gross income per year (Rs.)	36000-48000	96000-144000	166 - 200	84000 (21000 per cycle of 2 months duration, 4 cycle per year)	56000 (14000 per cycle of 2 months duration, 4 cycle per year)	1.67
			Time spent with family (Hrs) per day	8	20	150			
			Contribution to family expenditure (%)	30	80	166			
			Retained at village (months)	4	12	200			
Broiler Duck farming (300 birds/ unit)	25	25	Gross income per year (Rs.)	72000	324000	350	240000 (60000/ cycle of 2 months duration, 4 cycle a year)	84000 (21000/ cycle of 2 months duration, 4 cycle a year)	1.35
			Time spent with family (Hrs) per day	8	20	150			
			Contribution to family expenditure (%)	30	80	166			
			Retained at village (months)	4	12	200			

4.5.3. Horticultural Activity: Climate smart hi-tech betelvine cultivation:

Betelvine is a shade loving crop usually grown in artificial shade structure, called *Boroz*, made up of bamboo, paddy straw and other related bio-degradable items. This *boroz* is prone to incidence of various diseases and insect pest. Also, in the coastal area these structures are frequently affected by storms and cyclones.

In ARYA project a durable *boroz* structure was established at Lakshmi Janardanpur village of Pathar Pratima block under ARYA project. This durable *boroz* structure was conceptualized using GI pipes where the iron frame was erected on concrete basement fitted with green shade net, 75% shade on the top and 50% shade on the side walls. Unlike traditional *boroz*, this new *boroz* is made up of non-degradable items and thereby chances of pest and disease attack is very less. Also, this modern *boroz* is fitted with micro-sprinkler irrigation facility, which not only reduces irrigation cost, but also maintains proper temperature and humidity

within the *boroz* during the hot summer and dry winter. Another advantage of this hi-tech *boroz* is the uniformity in shading; thereby uniform coloration of leaf is achieved.

Adopting this modern *boroz*, youths are experiencing better profitability in betelvine cultivation than their traditional betel leaf cultivation system, due to lower cost of cultivation, minimum or no recurring cost for maintenance of *boroz* structure, lower incidence of pests and diseases, higher production and higher market value of the produce (leaf) due to good colour, shape (roundish) and luster of the leaf. For better realization of the quality parameters of leaf, a study was made, which is reflected in Table 5.

Input/support provided:

- Capacity development: At first, the youths were taken to an exposure visit in a shade net vegetable farming structure implemented by RAKVK through SASMIRA project.
- Then they were provided with training, once at KVK, with hands-on training at KVK Instructional farm and then at their village as follow-up training.
- Lastly, they were provided with the demonstration structure at their own plots along with continuous follow-up training and monitoring.
- Cost of establishment of each demonstration structure was of Rs. 2.35 lakh, provided from ARYA project.

Table 5.

Parameters	Hi-tech *Boroz*	Traditional *Boroz*
Leaf colour	Uniformly green	Scorching discolouration in some leaves
Leaf Chlorophyll content (by SPAD)		
3rd leaf from top	41.5	37.8
mature leaf	55.7	48.1
Leaf shape (length/width)	1.12	1.18
Avg. leaf weight (g)	4.29	3.52
Leaf thickness (mm)	0.25	0.22
Plant internodal length (cm)	9.45	7.86
Disease severity (10 point scale)	3.5	8.0
Annual yield	300 no./sqm	220 no./sqm

Progress made:

The progress made in the enterprise on betelvine cultivation is presented in Table 6.

Table 6.

Name of enterprise	No. of youths involved	Unit / No.	Measurable indicators of output in suitable unit			% increase	Economic of enterprise		
			Before adopting ARYA		After adopting ARYA		Gross cost (Rs.)	Net return (Rs.)	BCR
Hi-tech shade net *pan boroz*	5	5	Gross income (Rs.) per year	102000	180000	76%	Establishment cost- Rs.235000 & Running cost- Rs.48000 per year	132000 per year	3.75
			Time spent with family (Hrs) per day	5	14	180%			
			Contribution to family expenditure (%)	24	69	188%			
			Retained at village (months)	3	12	300%			

- Youths are very much interested in this type of hi-tech system. Already more than 50 numbers of farmers have expressed their interest over this type of betelvine farming of their own.
- This climate smart system of cultivation is very much environment friendly and produces better quality leaf with very less use of pesticides.
- In each *boroz* structure more or less 2 to 4 village labors are getting employment round the year in the village in different stages of farming, starting from planting to marketing of the produce. So, this system provides a village level employment also.

4.6. Capital Generation:

Table 7.

Particulars/ Equipment	Quantity (No.)
Hatching machine (2000 capacity)	1
Carp hatchery	3
Catfish hatchery	6
Shade net *pan boroz* GI structure of 500 sqm made up of GI pipes at 4 m & 5 m interval	• Foundation bush: 25 nos., each of 1 m (dia. 48 mm) • Poles 25 nos., each of 3 m (dia. 62 mm) • Width wise cross bars 30 nos., each of 4 m (dia. 42 mm) • Lengthwise cross bars 30 nos., each of 5 m (dia. 42 mm)
Green shade net	• 75% shading net for ceiling, 500 sqm (3.3 rolls) • 50% shading net for side walls, 270 sqm (2 rolls)

4.7. Capacity development :

RAKVK conducted various extension activities on fishery, animal husbandry and horticulture during 2017-18. The extension activities were conducted on exposure visit, On-campus training, Off-campus refresher training, On-spot advisory, Kisan mobile advisory services, On-farm trial *etc*.

Table 8.

Activities	Fishery (Numbers)	Animal Husbandry (Numbers)	Horticulture (Numbers)
On campus 4 days	2	2	2
Off campus refresher training	2	4	3
On spot advisory	4	11	8
Kisan mobile advisory services	8	52	12
On Farm Trial	-	1	-
Exposure visit	2	1	3

A total of 14 courses were conducted by RAKVK, Nimpith under Capacity Building Programme on various thematic areas benefitting 388 practicing rural youths (240 males and 148 females) during 2017-18. Thematic areas covered on poultry farming, carp seed production, breeding of endangered fish species, protected cultivation *etc*.

Table 9.

Thematic Area	Topic of training	No. of courses	No. of beneficiaries		
			Male	Female	Total
Poultry farming	Scientific farming of vanaraja poultry	3	5	97	102
	Profitable farming of broiler pekin duck	3	24	31	55
Carp seed production	Carp fry and fingerling production	3	81	-	81
Breeding of endangered fish species	Small scale seed production and larval rearing of Asian catfish and *singhi*	3	73	1	74
Protected cultivation	Betelvine cultivation in climate smart hi-tech *boroz* for quality leaf production	2	57	19	76
Total		**14**	**240**	**148**	**388**

4.8. Economic profitability:

For vanaraja poultry farming the cost of production is Rs.21000/- and the gross return is Rs.35000/- with the net income of Rs.14000/- per cycle of 2 months duration for each unit having 200 birds. For broiler duck farming the cost of production is Rs.60000/- and the gross return is Rs.81000/- with the net income is Rs. 21000/- per cycle of 2 months duration for each unit having 300 birds. It is possible to complete 4 such cycles in a year in each unit for poultry farming. Thus, the net income is Rs.56000/- per unit per year in vanaraja farming and Rs. 84000/- per unit per year in broiler duck farming. The establishment cost of carp and catfish hatchery is Rs.160000/- and Rs.100000/- which was provided from the ARYA project and the running cost is Rs.32000/- and Rs.22000/-, respectively. Accordingly, for carp and catfish

hatchery the net income is Rs.196800/- and Rs.145000/- per year, respectively. The running cost for fish hatchery includes brooding cost, electricity cost *etc*. For establishing the climate smart hi-tech betelvine plantation the cost is Rs.235000/- and for running this enterprise the cost is Rs.48000/- per year. This running cost is for purchasing manures, fertilizers, pesticides and for hired labours. The net income is approximately Rs.132000/- per year from this enterprise.

Net income per unit per year for each enterprise is presented graphically in Fig. 1. From this graph it is shown that the net income per unit is highest for carp hatchery followed by catfish hatchery, betelvine plantation, pekin duck farming and vanaraja farming.

Table 10. Enterprise wise Income level:

Name of enterprise	Area (Acre)/ No.	Cost of production (Rs. per unit per year)	Gross Return (Rs. per unit per year)	Net Income (Rs. per unit per year)
Vanaraja farming	200 birds/unit	84000	140000	56000
Broiler duck farming	300 birds/unit	240000	324000	84000
Carp hatchery	1 (264 sq. ft. integrated area of 3 platforms)	Establishment cost: Rs. 160000 (through Project support) & Running Cost: Rs. 32000 per year	228800	196800
Catfish hatchery	1 (180 sq. ft. of 20 glass aquaria)	Establishment cost: Rs. 100000 (through Project support) & Running Cost: Rs. 22000 per year	167000	145000
Hi-tech shade net *pan boroz*	5 No. (500 sqm each)	Establishment cost: Rs. 235000 (through Project support) & Running Cost: Rs. 48000 per year	180000 per unit per year for a period of about 5 years	132000

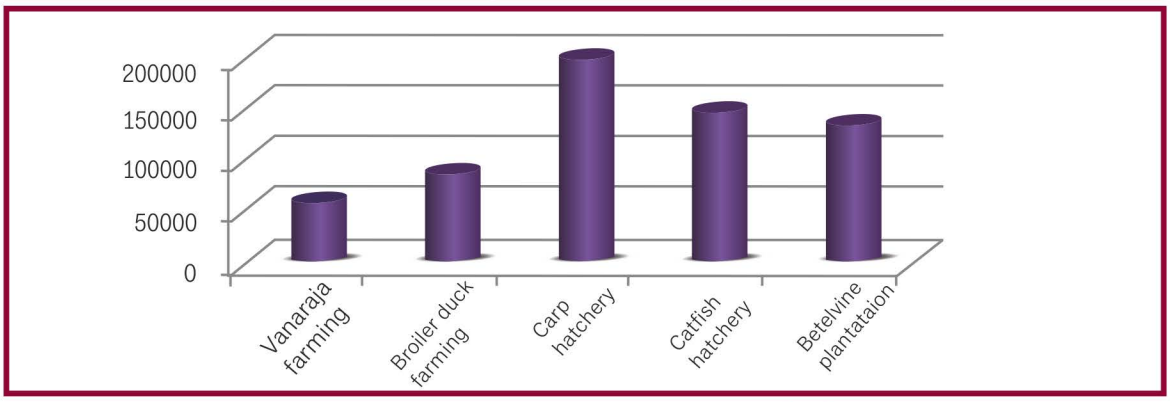


Fig. 1. Net Income per unit per year (Rs.)

Table 11. Income level per rural youth

State	Name of KVK	Name of Enterprise	No. of youths, running the entrepreneurial units in a sustainable manner	Annual income per youth before ARYA project (in Rs.)	Annual income per youth after adopting ARYA project (in Rs.)	Difference in average annual income per youth (in Rs.)
West Bengal	RA KVK, Nimpith, South 24 Paraganas	Vanraja farming	42	48000	144000	96000
		Pekin duck farming	25	72000	324000	252000
		Carp hatchery	12	60000	228800	168800
		Asian catfish hatchery	16	54000	167200	113200
		Betelvine cultivation	10	102000	180000	78000

Fig. 2 shows the difference between annual income per youth before adopting ARYA project and after adopting ARYA project. The difference in average annual income per youth is maximum for pekin duck farming which is Rs.252000/- and the difference of the same is Rs.168800/- and Rs.113200/- for carp and catfish hatchery, respectively whereas the difference is Rs.96000/- and Rs.78000/- for vanaraja farming and betelvine plantation, respectively.

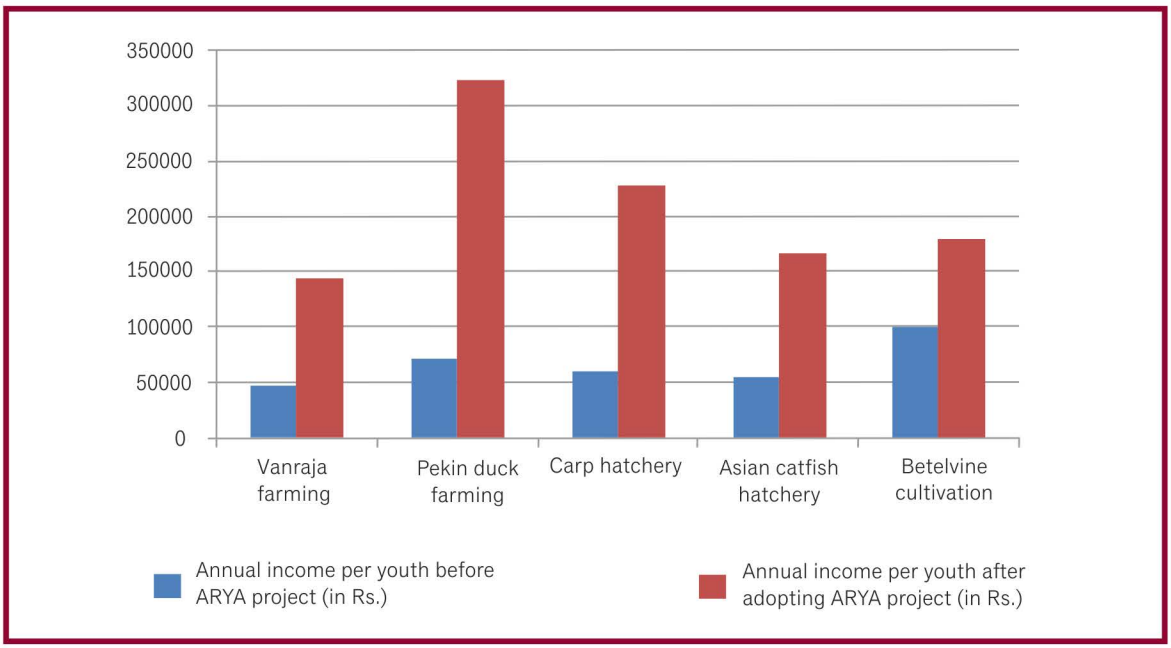


Fig. 2. Annual income per youth before & after adopting ARYA project (in Rs.)

4.9. Impact :

After adopting ARYA programme, most of the engaged rural youths achieved gainful and sustainable employment throughout the year. Accordingly, they remain within the village with more psychological & economical empowerment and social respect. They are now capable of leading a better livelihood in sustainable manner.

The up gradation of livelihood and substantial increase in annual income encourages 98 other youths of the district to adopt the enterprises. Among them 21 rural youths adopted vanraja farming and 15 youths adopted pekin duck farming, 1 youth adopted carp and 2 youths Asian catfish hatchery and 59 other youths adopted betelvine plantation in climate-smart hi-tech system.

Fig. 3 shows the number of other youths of the district adopted ARYA enterprises. It is clearly observed that around 60% of the other youths adopted betelvine plantation whereas 3% youths adopted fishery unit. Altogether 37% youths adopted poultry farming among which 22% youths adopted vanaraja farming and 15% youths adopted pekin duck farming.

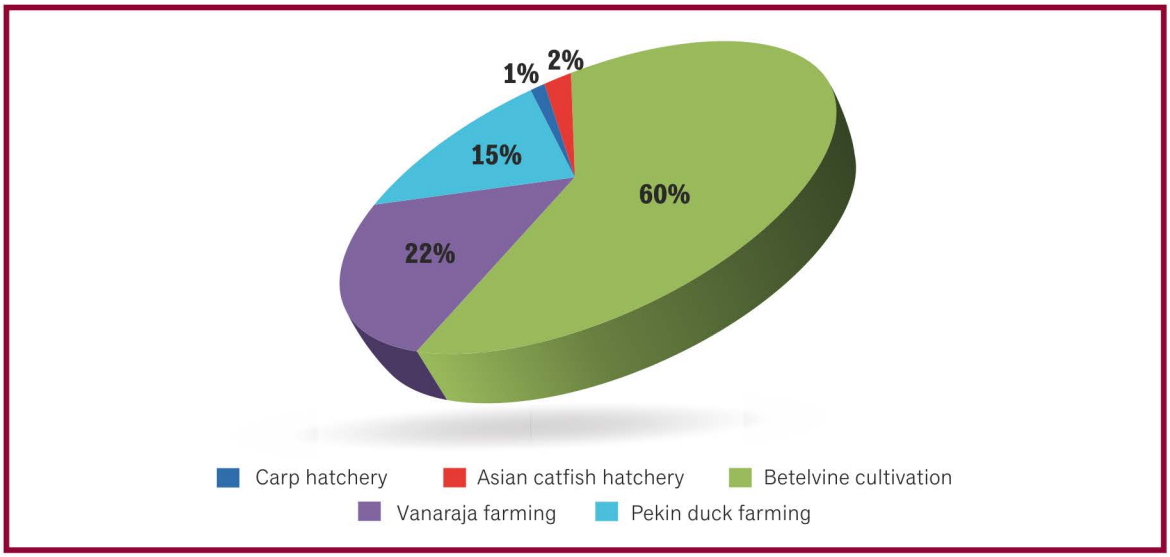


Fig. 3. Adoption of the enterprises by other youths of the district

5. Achievements of KVK Nayagarh under ARYA project

Nayagarh district comes under east and south eastern coastal plain agro-climatic zone. It covers an area of 3,89,000 ha and has 9.63 lakh population as per 2011 census. It accounts 2.5% of states territory and shares 2.29% of the state population. It consists of 1531 inhabited villages. It has 8,83,051 rural population and 79,738 urban population representing 91.7% and 8.3% of the district population as per 2011 census. The youths constitute 33% *i.e.*

2,91,406 nos. of the rural population. They have important roles in agriculture development of the district. Even with a promising scope to have better earning from agriculture, during the recent past a trend has been observed wherein the rural youths particularly in resource poor category are moving away from agriculture. The youths migrating (1,16,562) to the places like Bhubaneswar, Khurda, Berhampur, Surat (Gujarat), Tamil Nadu, Kerala *etc.* are increasing in recent years to work in service sector as they lose interest in agricultural activities. This is due to the poor income potentiality of the existing enterprises which is not been able to attract the interest of this specific group to retain their vocation.

5.1. Project Initiation :

The project was initiated in Nayagarh district of Odisha during the year 2015-16.

5.2. District Profile :

	Particulars	Unit/No.
1.	Geographical area of the district	3,94,110 ha (4242 sq.km)
2.	Height from mean sea level	90 m
3.	No. of subdivisions	1
4.	No. of Tahasils	8
5.	No. of NAC	2
6.	No. of CD blocks	8
7.	No. of GPs	180
8.	No. of revenue villages	1531
9.	Population in the district 2011 census	9,62,000
	• Male	5,02,000
	• Female	4,60,000
10.	ST population	50,836 (5.28%)
11.	SC population	1,21,409 (12.62%)
12.	Literacy	79.12%
	• Male	82.66%
	• Female	57.64%
13.	Population density	247/sq. km.

5.3. Identification of youth :

In the above back drop youths are identified for this project through-

- ❖ Benchmark survey of the prevailing enterprises of the district.
- ❖ Study of market assessment of the existing market supply chain.
- ❖ Seeking expression of interest from youths for entrepreneurship development
- ❖ Preliminary screening of youths on the basis of personal information, qualification, age and resources *etc.*
- ❖ Organization of consultative workshop for stakeholder interest analysis.
- ❖ Invitation of successful entrepreneurs to share their experiences in the consultative workshop.
- ❖ Discussion on scope, opportunity and challenges of each enterprise in the consultative workshop.
- ❖ Identification of potential rural youths interested for different enterprises.
- ❖ Exposure visit to successful entrepreneur units about the opportunities in primary and secondary agriculture for making a satisfactory living in rural areas.

5.4. Name of cooperating institutions for technical support :

- Department of Animal Husbandry, Odisha
- Department of Horticulture, Nayagarh
- Department of Fishery Science, Odisha
- NABARD, Nayagarh
- SBI, Nayagarh
- CIFA, Bhubaneswar
- OPOLFED, Bhubaneswar
- IPDP, Bhubaneswar
- CTMRT, Bhubaneswar

5.5. Enterprise details:

5.5.1. Stunted fingerling production:

In the district, the total fish production is around 8090 MT with a pond area of 2171 ha with avg. productivity of 2.3 t/ha. For production of fish in a short period, there is a requirement of

Harvesting of stunted fingerlings

stocking large sized fingerlings called stunted fingerlings/ yearlings. In Nayagarh, most of the ponds are community ponds and seasonal ponds. There is a greater scope for increasing the fish production and per capita income by promoting young entrepreneurs for production of fish seed and fingerling. The production of stunted fingerlings/ yearlings is best suited for the unemployed youths for sustainable income and gainful employment in their own area.

As per the guidance of KVK experts, the involved youths prepared pond with strengthened bundh, eradication of weed fish and aquatic insects followed by application of lime @ 60 kg/acre. After 7 days of lime

Skill development training on stunted fingerlings production

application, pond was manured with raw cow dung @ 4q and single super phosphate @ 120 kg per acre. Then the pond was stocked with IMC fry (Indian Major Carp). Feeding rice bran

Exposure visit on stunted fingerlings production to CIFA, Bhubaneswar

and ground nut oil cake at the ratio of 1:1 was followed. Regular water quality management, manuring and disease management were the key points maintained for stunted fingerling/ yearling practice. Sampling at every 45 days was done for checking the health status and alternative bath treatment with KMnO4 and salt as preventive measure followed for disease management. The fry/fingerlings were protected from fish eating birds by fixing nylon net and plastic rope over the top of the pond.

The season for stunted fingerling production extends from July to September every year and the average land holding of the identified youth are 1 ha per youth.

From Table 12. it is clearly observed that the operational cost for production of yearlings in 1 acre pond is Rs.32000/-. Accordingly, for 1 ha pond the cost of production of yearlings is Rs.80000/-. This operational cost includes cost of pond preparation, organic andinorganic manures, lime as well as for fry, feed,medicines *etc*.

Table 12. Operational cost for production of yearlings in 1 acre pond

Sl. No.	Parameters	Price (Rs.)
1	Pond preparation	4000
2	Cost of organic manure @4q/acre/year @Rs. 1.00 per kg	4000
3	Inorgainc manure @120 kg/acre/year @Rs. 10.00 per kg	1200
4	Cost of lime 60kg @12.00 per kg	720
5	Cost of Fry 55 pkts @ 150/pkt ,800 fry per pkt)	8250
6	Feed(100kg GNOC @ 70.80/kg + Rice Bran 50 kg @ 15 per kg)	7830
7	Medicine	1000
8	Other	5000
	Total	**32000**

Input /Support provided:

The identified rural youths were given hands on practical training in the KVK during breeding season. They participated skill development training on stunted fingerlings production followed by one day exposure visit to progressive farmers' field to enrich the knowledge through lecture, interaction, learning by doing and field visit. The technical guidance from KVK and fishery department was provided as and when desired by them. Also, input such as dragnet, plankton net, *hapa*, water quality kit and medicines (CIFAX) was provided to them from ARYA project. The details of inputs are shown in Table 13.

Table 13.

Sl. No.	Particulars	No./Quantity	Rate	Amount (Rs.)
1.	Floating feed	70 kg	Rs. 1500 per 35 kg	3000
2.	Drag Net			2500
3.	*Hapa*	2 no.	Rs. 800/ hapa	1600
4.	Water quality kit			850
5.	Plankton net	1 no.		150
6.	Medicine (CIFAX)			1900
	Total			**10000**

Progress made:

The progress made in the enterprise on stunted fingerling production is presented in Table 14.

Table 14.

Name of enterprise	No. of youths involved	Unit/ No.	Measurable indicators of output in suitable unit		% increase	Economic of enterprise		
			Before adopting ARYA (Rs./ annum)	After adopting ARYA (Rs./ annum)		Gross cost (Rs.)	Net return (Rs.)	BCR
Stunted fingerling production (for 1 ha pond)	7	7	81000	312500	285.8	80000	232500	3.90

A total of 500-600 kg stunted fingerlings were produced from 1 acre of pond per cycle of 3 months duration in a year.
Avg. selling price of fingerlings: Rs.250-300/kg
500 kg of fingerlings X Rs.250= Rs.125000/-
Avg. land holding of 1 ha per youth
125000/acre X 2.5= Rs. 312500/ha (per year)

5.5.2. Backyard poultry:

During the recent years, certain activities and enterprises have been proved to be potential in earning livelihood for the resource poor group and more particularly such activities can be promoted as agro based enterprises with scope and scale on a commercial basis. Backyard poultry has emerged as one such alternative option which provides huge remunerative opportunities for rural youths as it fetches high market value. Also, the disease incidence is less. And it took 3.5 month period of farming per cycle *i.e.* 3 cycles per year is possible.

Input /Support provided:

Poultry bird: 96 chicks, feed and medicines (enrofloxacin, multivitamin, liver tonic, de-wormer, antibiotic, farm disinfectant) were provided to the youth group. The details are in Table 15.

Table 15.

Sl. No.	Particulars	Quantity	Rate(Rs.)	Amount (Rs.)
1.	Drinker	1	220	220
2.	Feeder	2	231	462
3.	Poultry bird	96	55	5280
	Total			5962

Preventive Vaccination:

Various vaccination camps were organized against Ranikhet and Gumbro at the ARYA adopted village under KVK Nayagarh. Mortality rate was reduced up to the extent of 95% after the vaccination camps organized. The details of vaccination camp are given in Table 16.

Table 16. Details of vaccination camp:

Sl. No.	Vaccine Name	Disease	Stage of application	Mortality rate checked
1	Lasota	New Castle and Ranikhet	7th day	90-95%
2	IBD	Gumbro	14th day	90-95%

Progress made:

The progress made in the enterprise on backyard poultry is presented in Table 17.

Table 17.

Name of enterprise	No. of youths involved	Unit/No.	Measurable indicators of output in suitable unit		% increase	Economic of enterprise		
			Before adopting ARYA (Rs./ annum)	After adopting ARYA (Rs./ annum)		Gross cost (Rs.)	Net return (Rs.)	BCR
Backyard poultry (200 birds/unit)	15	15	202500	243000	20	126000	117000	1.92

5.5.3. Mushroom production:

Paddy straw mushroom is widely accepted among the community because of its excellent taste and flavour, simple and easy production technology, abundance of raw materials and enrich in crude fiber and protein. The potentiality of mushroom farming in generating new employment opportunities is very high.

In Nayagarh district, more than 6 q of mushroom is being produced per day. Lack of proper processing and packaging facilities are the major bottleneck for diminishing the market price and shelf life of the produce. A greater demand for primary processing and packaging of the mushroom is a major challenge for the district.

The paddy straw mushroom beds are prepared within the temperature range of 25°C to 38°C, humidity of 85% to 90% and light 1000 lux. After cutting the paddy straw in a length of 1.5 ft, the straw bundles are sterilized by soaking them with hot water or in clean water using 20-30 g of lime or 10 g of Bavistin and 125 ml of formalin in 100 liters of water for 8-10 hours. It also reduces the acidity of the straw. Then the paddy straw bundles are allowed to be air dried for 3-4 hours. For one bed preparation, 10-15 kg straw

straw is required. The full mature spawn of 200 g are mixed with *besan* and wheat bran of 200 g and are divided into 4 equal parts. Then the beds are prepared into 4 lines (east, west

direction) and the spawn mixed with *besan* & wheat bran are spread over the beds. The beds are covered by white polythene for seven days.

When mycelium are developed like small buds the polythene sheets are put out. The beds are watered twice a day. The mature mushroom buds are harvested after 10-12 days. Second harvesting is done after 7 days interval.

Previously, the farmers used to cultivate mushroom without using any disinfectant and got 500-700 g/bed with local available spawn. But, after came in contact with KVK, Nayagarh they used latest systematic technology through KVK training and demonstration programmes. They started paddy straw mushroom cultivation from April to September bearing the extreme temperature condition (15th May to 15th June). They took spawn of new strains (OSM-11) soaking with lime for 6 hrs. By using this technique they earned more profit than the conventional method from 500 no. of beds in six months with a production of 1 kg/bed mushroom. From 500 nos. of bed, 500 kg mushroom can be produced from each cycle. The duration of each cycle is 21 days (1 cycle/month) and it is possible to complete 6 cycles a year.

Input /Support provided:

The youths are provided a 3 days skill development training on mushroom production (both paddy straw mushroom & oyster mushroom cultivation) followed by an exposure visit to progressive farmers' field to enrich the knowledge through hands on training, interaction, demonstration and lecture.

Also, inputs such as water spraying machine, straw cutter, mushroom spawn, white polythene, *besan*, sealing machine, weighing machine and tray were provided from ARYA project. The details are given in Table 18. Also, technical guidance was given by KVK scientists as and when desired and frequent field visit was done by KVK scientists.

Table 18.

Sl. No.	Particulars	Quantity (No.)	Rate (Rs.)	Amount (Rs.)
1.	Sprayer	1	1600	1600
2.	Chaff cutter	1	1020	1020
3.	Mushroom spawn	125	15	1880
	Total			**4500**

Progress made:

Per unit 500 nos. of mushroom bed were prepared per cycle and a total of 500 kg mushroom was produced from 500 nos. of bed.

Avg. selling price of mushroom: Rs. 140/kg

500 kg of mushroom X Rs. 140= Rs.70, 000/-

70,000/cycle X 6 cycle= Rs. 4, 20,000/- (per year)

The progress made in the enterprise on mushroom cultivation is presented in Table 19.

Table 19.

Name of enterprise	No. of youths involved	Unit/ No.	Measurable indicators of output in suitable unit		% increase	Economic of enterprise		
			Before adopting ARYA (Rs./ annum)	After adopting ARYA (Rs./ annum)		Gross cost (Rs.)	Net return (Rs.)	BCR
Mushroom production	23	23	170000	420000	147	150000	270000	2.8

5.6. Capacity Development:

A total of 8 courses were conducted by KVK Nayagarh under Capacity Building Programme on various thematic areas benefitting 160 practicing rural youths (117 males and 43 females) during 2017-18. Thematic areas covered were poultry farming, fishery and mushroom cultivation *etc*. The details of training programme are given in Table 20.



Training and Exposure visit on mushroom production

Table 20.

Thematic Area	Topic of training	No. of courses	No. of beneficiaries		
			Male	Female	Total
Fishery	Hands on training on stunted fingerling production	1	17	3	20
Fishery	Project formulation on stunted fingerling production	1	16	4	20
Poultry farming	Hands on training on backyard poultry	1	29	1	30
Poultry farming	Project formulation on backyard poultry	1	29	1	30
Mushroom production	Hands on training on mushroom production	2	15	15	30
Mushroom production	Project formulation on mushroom production	2	11	19	30
Total		**8**	**117**	**43**	**160**


Training and Exposure visit on stunted fingerling production

Training and Exposure visit on backyard poultry rearing

5.7. Economic profitability:

Net income for stunted fingerling production from 1 ha pond is Rs.232500/- per year and backyard poultry farming is Rs.117000/- per unit per year having 200 birds per unit. Also, from mushroom production the net income was Rs.270000/- having average 500 beds per unit of mushroom per year.

Enterprise-wise net income per unit per year is presented graphically in Fig. 4. It is observed that net income per unit is highest from mushroom production followed by stunted fingerling production and backyard poultry farming.

Table 21. Enterprise wise Income level:

Name of enterprise	Area (Acre)/ No.	Cost of production (Rs. per unit per year)	Gross Return (Rs. per unit per year)	Net Income (Rs. per unit per year)
Stunted fingerling production	1 ha	80000	312500	232500
Backyard poultry	200 birds	126000	243000	117000
Mushroom production	500 beds	150000	420000	270000

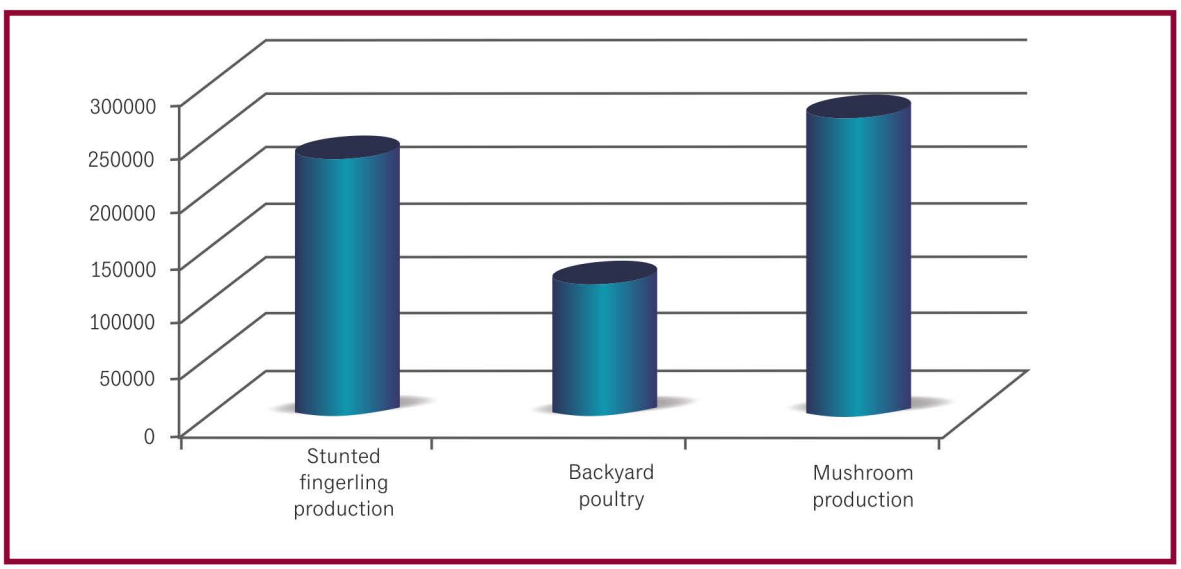


Fig. 4. Net Income per unit per year (Rs.)

Table 22. Income level per rural youth:

State	Name of KVK	Name of enterprise	No. of youths running the entrepreneurial units in a sustainable manner	Annual income per youth before ARYA project (in Rs.)	Annual income per youth after adopting ARYA project (in Rs.)	Difference in average annual income per youth (in Rs.)
Odisha	Nayagarh	Stunted fingerlings production	20	81000	312500	231500
		Backyard poultry rearing	15	202500	243000	40500
		Mushroom production	50	170000	420000	250000

The Fig. 5 depicts the difference between annual income per youth before adopting ARYA project and after adopting ARYA project. The difference in average annual income per youth is maximum from mushroom production which is Rs.250000/- and the difference of the same is Rs.40500/- and Rs.231500/- for poultry farming and stunted fingerlings production, respectively.

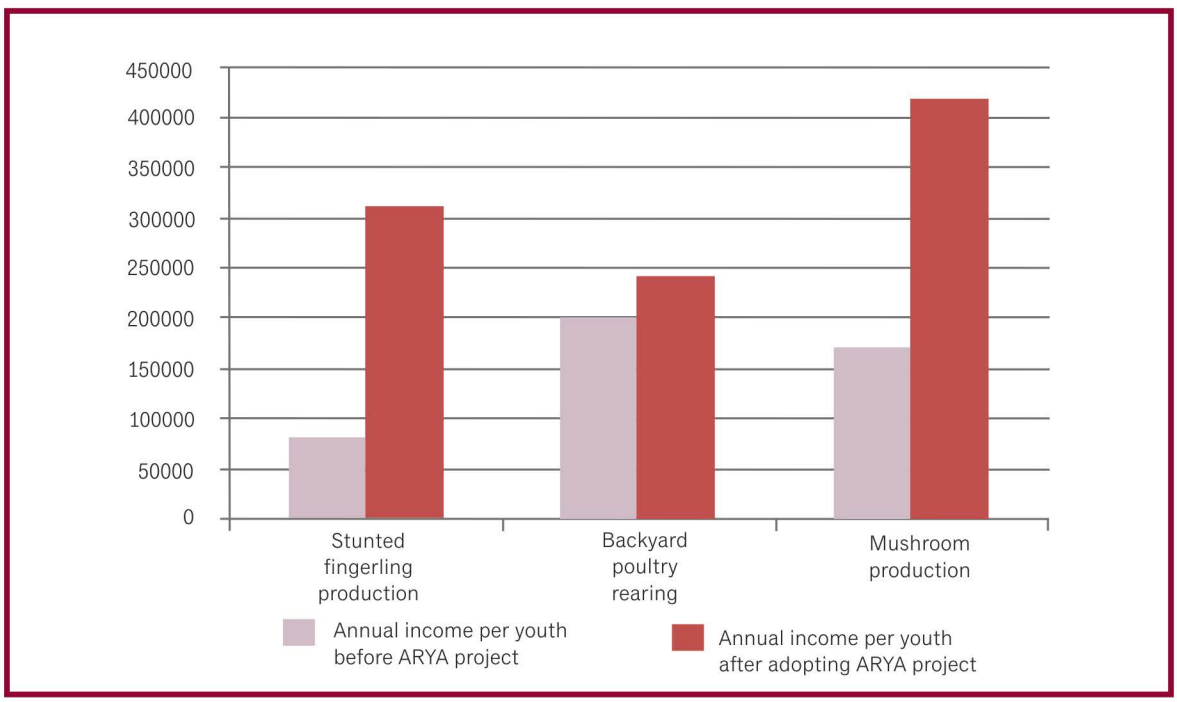


Fig. 5. Annual income per youth before & after adopting ARYA project (in Rs.)

5.8. Impact:

The beneficiaries associated with ARYA project are mainly daily wage earner who used to migrate to the adjacent towns or cities in search of job. Now, they contributed their maximum possible time to the identified enterprises and retained at the village level throughout the year. They have also gained sustainability in income generation during the whole year from these enterprises. As a result they have attained a better socio economic livelihood with a remunerative profit, which encourages other youths of this district to establish such enterprises.

After seeing this improvement of livelihood and substantial increase in annual income of the ARYA youths, 38 other youths of the adjacent villages of the district adopted ARYA enterprises. Among them 12 rural youths adopted mushroom production, 10 youths adopted stunted fingerlings production and 16 other youths adopted backyard poultry rearing.

Adoption of ARYA enterprises by other youths is shown through the Fig. 6. It is observed that around 32% of the other youths adopted mushroom production whereas 26% youths adopted stunted fingerlings production and 42% youths adopted poultry farming.

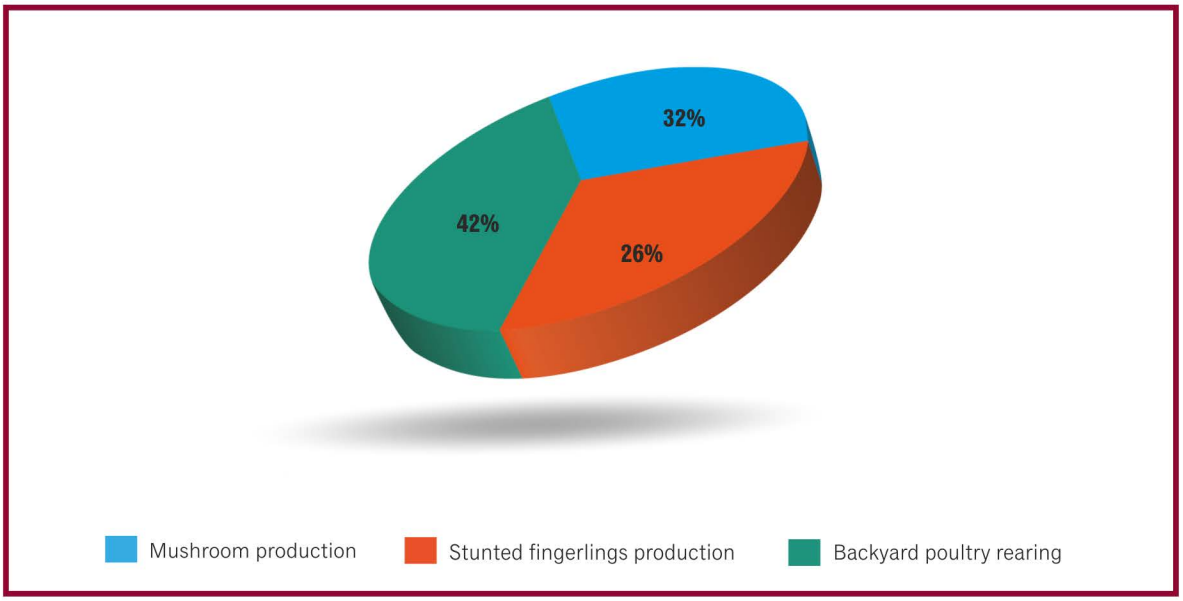


Fig. 6. Adoption of the enterprises by other youths of the district

6. Success story of ARYA youths:

6.1. Economic empowerment through vanaraja poultry farming

Name of the Beneficiary: Pranab Bag
Village: Heramba Gopalpur, District: South 24 Parganas

Pranab Bag

Introduction:

ARYA project is being implemented in Heramba Gopalpur village of South 24 Parganas district, West Bengal from 2016. Total population of the village is 6672 in which the percentage of the rural youths is 42. Mainly mono-cropped agriculture and the low to medium land situation are the major constraints for conventional agriculture of the village. Proper marketing of agricultural produce is the bottleneck for agricultural sector. In the village out of 6672 total population, 82 are cultivators, 1299 are marginal farmers, 1077 are agricultural laboures, 16 are house hold industry workers and rest of the people *i.e.* 3957 are non-worker. Animal husbandry, here, plays a pivotal role for augmenting additional income. Poultry and duck farming followed by rearing of non-descript cattle are the subsidiary activities of the farmers.

Vanaraja farm of Pranab Bag

The introduction of ARYA project in the village provided an opportunity to create additional income and employment generation through the identified enterprises.

Sri Pranab Bag of this village, aged 40 years is a H.S passed farmer. He earned a sum of Rs.5700 per month of which Rs.1500/- was earned from dairy sector and Rs.4200/- was earned as daily wages. In this financial condition he adopted vanaraja poultry farming in intensive system under ARYA project.

Progress made:

- Currently he is rearing 700 vanaraja birds in intensive farming
- 3 labours working in the farm
- The farm is semi mechanized in operation
- Production of average meat: 2.3 kg/bird within 2 months period
- Average 1610 kg is produced from the unit/cycle
- Cost of meat is Rs.150/kg live weight
- Gross income- Rs.241500.00/ cycle, Net income- Rs.72000.00/cycle (2 months), 4 cycle/year

Benefit to youth:

- Before adopting ARYA his income was Rs. 5700/month
- After adopting ARYA his income is Rs. 20125/month
- His income increased by 253%

- Reduction in cost through use of homemade feed partially.
- Market linkages established with LDC, Govt. of West Bengal
- Employment generated for 3 farmers.
- Humane to scientific slaughter.
- Hygienic meat production

Perception of others in the village:

As the produce was marketed through PPP mode with Livestock Development Corporation Limited, ARD Department, Govt. of West Bengal, many rural youths expressed their interest in this project.

Conclusion:

From the project, initially 200 birds was supported along with other supporting materials like feed and medicines. Presently the youth has expanded the farming up to 700 capacity and running the farm successfully. As the farmers are running the farm as "all in all out" system in the village, it becomes more sustainable venture.

6.2. Hi-tech shade net betelvine *boroz*

Name of the Beneficiary: Smt. Anima Bag
Village: Lakshmi Janardanpur, Block: Pathar Pratima,
District: South 24 Parganas

Smt. Anima Bag

Introduction:

South 24 Parganas is, indeed, a complex district, stretching from Kolkata to the remote riverine villages in the south up to the mouth of Bay of Bengal. The average temperature in the district varies from a maximum around 38 ℃ to a minimum of around 13.5 ℃. The annual average rainfall is 1800 cm, more than 75 percent of which receives during the monsoon. Agriculture and pisciculture are the major economical support of this district. About 68% of the total cultivable land is low lying, mostly mono-cropped and low yielding because of excessive rainfall resulting in water-logging situation. Impeded drainage system in monsoon makes the situation even worse. In low lying land situation where water stagnation is relatively high (2-3 ft) during rainy season, only traditional (local) variety of paddy is grown. Second crop is not cultivated in *rabi*-summer season due to late release of land as well as for scarcity of irrigation water and salinity problem.

In this backdrop, ARYA project is instrumental in offering remunerative options in farm enterprise to the rural youths. In this project 'Hi-tech Shade Net Betelvine Cultivation' is intervened and five youths of Pathar Pratima block were selected.

Mrs. Anima Bag (Age: 33) was one of such youths. She is from a very poor scheduled caste family with average income of Rs.7000.00 per month, mainly from her own backyard poultry farming

(20 no. of birds) and his husband's wage, as he works as daily labour in neighbour's *boroz*. Under ARYA project a durable *boroz* structure using GI pipes was conceptualized and made up of non-degradable items, thus reducing the disease and pest infestation. Also, this modern *boroz* is fitted with micro-sprinkler irrigation facility, which not only reduces irrigation cost, but also maintains proper temperature and humidity within the *boroz* during hot summer and dry winter. Another advantage of this hi-tech *boroz* is the uniformity in shading; thereby uniform coloration of leaf is achieved.

Progress made:

- One hi-tech climate resilient betelvine production system (*Boroz*) was established in Mrs. Anima Bag's field in an area of 500 sqm of land in the year 2017.
- Cost of the demonstration structure was of Rs. 2.35 lakh of which 10% was borne by her.
- Harvesting is done at 27 days interval. In each harvest around 12000 numbers of leaves are harvested. Thus, yearly production is 168000 to 180000 leaf per 500 sqm *boroz*.
- Leaf is marketed in local established betel leaf market @ Rs.1200/- per thousand. Total yearly income per *boroz* is Rs.202000/- (approx.).

Benefit to youth:

- Yearly cost of cultivation per *boroz* structure is only Rs. 48000/- including all inputs (manure, fertilizer, pesticides & micro-nutrients) and hired labourer.
- Presently her net income is around Rs. 16800/- per month from this betelvine farming only.

Constraints faced:

The main constraint, so far analyzed, is the huge initial investment cost for erection of the structure. Most of the interested farmers are looking for the institutional support in installing such type of hi-tech system in their farm.

Perception of others in the village:

Youths are very much interested in this type of hi-tech system. Already more than 50 numbers of farmers have expressed their interest over this type of betelvine farming for their own.

Conclusion:

This hi-tech shade net betelvine *boroz* has not only created an interest among rural educated youths in farming, but also changed the betelvine farming concept, as a whole. This climate smart and environment friendly betelvine farming system has been well accepted by most of the betelvine farmers of the block and they are trying to implement it of their own, either through institutional support or at their own cost.

6.3. Small scale carp hatchery

Name of the Beneficiary: Anup Chhatui
Village: Paschim Kultali, Block: Mathurapur-II,
District: South 24 Parganas

Introduction :

Carp is the most popular fish used for cultivation in the freshwater ponds of the district. This is due to the fact that their growth rate is much higher than other freshwater fish species. Better consumer preference, lower price than other fish and better conversion ratio than most of the other freshwater fish make carp more

cultivation-friendly in the locality. However, lack of quality seeds of carp is the main constraint for fish culture in the locality and unconfirmed lineage of the seeds vended by outsides sellers hampers proper growth of the fish in the local ponds. Hence, establishment of a small scale carp hatchery in the locality under the ARYA project was a necessity for the aspiring youths.

The enterprise on small scale carp hatchery was implemented in the village of Paschim Kultali in the block of Mathurapur-II of South 24 Parganas district. The population of the village is 2700 of which 25% comprises of rural youths. The farming system is rainfed with *kharif* paddy, vegetable cultivation on land embankment beside ponds and in mainland with life saving irrigation during *rabi* and fish and prawn cultivation.

Hatching pool and Spawn collection

Sri Anup Chhatui of village Paschim Kultali, block Mathurapur-II of South 24 Parganas (West Bengal) is a graduate youth. After trying different source of income in which he failed, finally came in contact with ARYA activities and got inspired in fishery enterprise. Mr. Chhatui was provided with hands on practical training in the RA KVK, Nimpith during carp breeding season. During the training programme, breeding of carps in KVK carp hatchery was taught and detailed idea was provided to modify hatchery to suit village situation.

Progress made:

1. Yield/production (in numbers) -
   a) Spawn – 150 bati (approx 1,20,00,000)
   b) Fry – 225 kg (11,25,000)
   c) Fingerling – 1150 kg (57,500)
   d) Table fish – 400 kg
2. Gross income & net income –
   a) Gross income - Rs.275755/-
   b) Expenditure - Rs.89650/-
   c) Net income – Rs.186105/-
3. Establishment Cost of unit: Rs.160000/-

Benefit to youth:

a) Previous income of youth: Rs.5000/- per month (from fish and crop cultivation)
b) Present income of youth: Rs.22980/- per month (from hatchery operation and subsequent sale of seed and table fish)
c) Increase in income – 359% over the previous income.
d) Reduction in cost – Spawns from own hatchery help in reducing the cost of spawn procured previously from outside sources. Also, transportation cost is reduced to great extent.
e) Employment generated for-
   - Netting for collection of brood fish
   - Transportation of fish seed
   - Fish seed vendors
   - Daily labours
   - Farming of spawn, fry and fingerling
f) Big farmers, who used to procure carp seeds from hatcheries situated at far away places and vended by outsides sellers, are now placing orders to this youth.

Constraints faced:

- Water scarcity in pre-monsoon months
- Lack of quality brood fish feed
- Lack of oxygen supply for transportation of fish seed
- Lack of continuous supply of electricity

Perception of others in the village:

- Availability of quality fish seed at reasonable rate
- Almost door step availability of fish seed

- No transportation cost
- Increase in yield of fish
- Free counseling regarding growing of seeds from the group

Conclusion:

Sri Anup Chhatui is very happy and satisfied in this enterprise. This year he planned to install a second hatching pool from his own fund so that more spawn may be produced from a single operation. Now he becomes an active ARYA beneficiary in his locality.

Collection of spawn- A hands-on training at village

6.4. Mushroom production

Name of beneficiary: Mrs. Laxmi Rout
Village: Subarnadeipur
District: Nayagarh

Introduction:

Mrs. Laxmi Rout of village Subarnadeipur, Nayagarh district, aged 29 years, belongs to a middle class family with an educational qualification of intermediate. She is a house wife, helping her husband in post harvesting activities of paddy and doing kitchen garden in backyard. It was very difficult for her to maintain the family with poor financial condition.

People of Nayagarh district are interested for paddy straw mushroom bed preparing in an open place. They accepted mushroom cultivation as alternate livelihood option as the climatic condition of Nayagarh district is favourable for mushroom cultivation. Laxmi Rout was

interested to start the mushroom production. However, she had no knowledge about the mushroom cultivation. She came in contact with KVK, Nayagarh. She expressed her interest towards mushroom cultivation using the waste paddy straw. She adopted technologies of mushroom cultivation after training and observing demonstration unit. She was included as a beneficiary for mushroom production under ARYA programme by the KVK.

Progress made:

- Initially she invested Rs.10000 for the entrepreneurial unit development.
- She prepared 500 nos. of beds in her mushroom unit.
- A total of 500 kg of mushroom was produced during per cycle of 1 month (21 days) duration from her unit (1kg/bed).
- Average selling price of mushroom: Rs.140/kg
- 500 kg of mushroom X Rs.140 = Rs.70000 income per cycle
- Expenditure for 1 bed preparation is Rs.50 per cycle, 500 bed X Rs.50 = Rs.25000 per cycle
- Altogether six such cycles can be done per year
- Gross expenditure is Rs.150000/- for 6 cycles
- Gross income is Rs.420000/- with net income of Rs.270000/- per year

Benefit to youth:

- Previous income of youth- Rs.13500 per month
- Present income of youth- Rs.35000 per month
- Increase in income – 159% over the previous income.
- Reduction in cost – Low cost feed (mixture of chalk and pea powder), threshed straw is used for bed preparation.
- Market linkages established- Door step marketing for fresh mushroom.
- Employment generated– Employment for two youths generated in her mushroom unit.

Constraints faced:

- Non availability of quality spawn
- Non irrigation facility
- Non availability of bounded paddy straw.

Perception of others in the village:

By seeing her successful intervention, 3 other youths established mushroom unit in their villages.

Conclusion:

Mrs. Laxmi Rout is a sustainable mushroom grower and an example of progressive farm woman in her village.

6.5. Backyard poultry farming

Name of beneficiary: Sri Udayanath Padhiary
Village: Jayamangala
District: Nayagarh

Introduction:

Jayamangala village of Nayagarh District, Odisha is a potential village in respect of animal husbandry rearing. The village comes under Critical Devastative Region where mono cropping is followed. The farming system of Jayamangala is mainly rice and pulse. Animal husbandry like poultry and cattle rearing provides an additional source of income for the village. Noticing the potentiality in animal husbandry KVK Nayagarh promoted poultry farming under ARYA project in that village. Sri Udayanath Padhiary, a 28 years old youth of this village is a under matric farmer with land holding of 1.5 acres who adopted vanaraja poultry farming under ARYA project.

Progress made:

He is currently rearing 40 nos. of 21 days old vaccinated Vanaraja chicks at a nominal price from KVK with proper brooding and vaccination. He got training on backyard poultry rearing under ARYA followed by exposure visit to different poultry farms of the district. He was also advised to feed low cost ingredient such as broken rice, maize powder, azolla which reduces the total cost of production. Management practices were jointly looked after by Mr. Padhiary and KVK. Within 3-4 months the birds gained sizeable body weight. He then contacted the local meat shops to supply the birds for profitable price.

Benefit to youth:

- Start-up incentives such as drinker, feeder, medicine, brooding equipment *etc.* were provided to him under ARYA project.
- He also got other technical support from Veterinary Department, Nayagarh as and when required.

Conclusion:

He is planning to set up another poultry unit for rearing 150 nos. of Vanaraja birds with the financial help of the rural bank. Another 10 to 15 no. of youths of nearby village are motivated for rearing backyard poultry as there is assured availability of chicks, feeds and medicine at district poultry hatchery, Nayagarh. This enterprise has better scope for commercialization and income generation among rural youths at the village level.

6.6. Stunted fingerlings production

Name of beneficiary: Sri Tapan Kumar Mohanty
Village: Rampada, Block: Bhapur
District: Nayagarh

Introduction:

Sri Tapan Kumar Mohanty of village Rampada, block Bhapur is a 31 year old young dynamic educated youth. After completion of graduation, he could not get any job. Then he engaged himself in agricultural activity in his 5 acres of land. He had keen interest in aquaculture sector also. He excavated a small pond of 1 acre with the support of watershed development programme, Nayagarh. He came in contact with KVK scientist to learn about fishery sector. Seeing his enthusiasm in aquaculture sector, KVK scientists suggested him for stunted fingerlings production/ yearlings production and included him as a beneficiary for stunted fingerlings production under ARYA.

In Nayagarh district, people are generally aware on stocking fingerlings to increase production as well as survivability in community pond. Moreover, large no. of ponds of the district is seasonal, where stocking of stunted fingerlings is only practised. Sri Mohanty participated in a three days skill development training on stunted fingerlings production followed by one day exposure visit to progressive farmers' field to enrich the knowledge. Lecture, interaction, learning by doing and field visit supported him to get more interest and he started stunted fingerling production. The technical guidance from KVK and fishery department was provided during critical stages of fingerlings production.

Progress made:

- He prepared a 1 acre pond with strengthened bundh. He eradicated the weed fish, aquatic insects from the pond and manured it as per the instructions of KVK experts.
- Then he stocked 1.2 lakh/acre of IMC fry. He used low cost feed as mixture of rice bran and ground nut oil cake at the ratio of 1:1.
- Manuring, water quality and disease management was done frequently.
- In this stunted fingerlings production initially he invested Rs.32000/acre in terms of seed, manuring, liming, feeding and labour.
- He got stunted fingerlings @ 5-6q/acre which fetched him Rs.125000/acre pond.

Application of lime in pond

Benefit to youth:

- Received financial support in term of construction of pond by Watershed Department, Nayagarh and technical support by KVK and Fishery Department, Nayagarh.
- Inputs such as dragnet, plankton net, *hapa*,

water quality kit and medicine (CIFAX) were provided to him by KVK.

- Sri Mohanty excavated another pond of 1 acre this year for stunted fingerlings production from the profit earned.
- He also took a community pond of 1 ha in his village on lease and started fish culture by stocking his own yearlings in that pond. He also stocked grass carp fingerlings for control of aquatic weed.
- He sold his yearlings nearby villages at a remunerative price of Rs.250-300/ kg.
- A total of Rs.312500 was earned from this 1 ha pond per year.

Constrains faced:

- In summer, depth maintenance is a major problem in the excavated ponds.
- Non availability of aquaculture input (medicine & chemicals) in the locality.

Perception of others in the village:

Five youths of his village have started yearlings production by seeing his achievement. He is now motivating other youths for yearlings production in the villages.

Conclusion:

Sri Tapan Kumar Mohanty is very successful in this enterprise. This year he planned to make a project of 1 acre pond for production of yearlings.

Harvesting of stunted fingerlings

7. Profile of ARYA youths earning more than Rs. 10000 and more than Rs. 50000 per month

KVK	Income/ month (Rs.)	Youth Name	Age	Address	Educational qualification	Phone no.	Aadhar no.	Land holding (ha)	Name of adopting enterprise
Nimpith	12000	Amar Giri	29	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	X	9382397076	221412199026	0.264	Broiler pekin duck
	12000	Anita Giri	24	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	X	9775843908	601627329819	0.4	Broiler pekin duck
	13000	Arun Giri	27	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	VIII	9774535214	745352149748	0.4	Broiler pekin duck
	15000	Bidhan Giri	43	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	VIII	9775750267	903994092699	0.84	Broiler pekin duck
	13000	Bidhan Jana	23	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	H.S.	8145945705	900093326821	0.068	Broiler pekin duck
	50000	Bikas Giri	34	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	H.S.	9733736089	854298712881	0.872	Broiler pekin duck
	15000	Sarbani Giri	38	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	X	8001335386	447041769121	0.408	Broiler pekin duck
	20000	Sonali Giri	32	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	H.S.	8371821980	-	0.276	Broiler pekin duck
	20000	Sonali Sasmol	24	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	B.A.	9593015878	482026759598	0.428	Broiler pekin duck
	10000	Suchitra Shit	21	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	X	8768600967	-	0.072	Broiler pekin duck
	15000	Sujata Bag	31	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	B.A	9733338882	303371446267	0.396	Broiler pekin duck
	15000	Aparna Sahoo	29	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	VIII	9564150962	456016722804	0.26	Vanaraja farming

KVK	Income/ month (Rs.)	Youth Name	Age	Address	Educational qualification	Phone no.	Aadhar no.	Land holding (ha)	Name of adopting enterprise
Nimpith	12000	Barun Giri	24	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	IX	9734348639	441435361939	0.82	Vanaraja farming
	12000	Beni-madhab Guria	21	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	H.S	9564778073	-	0.416	Vanaraja farming
	10000	Bhagwat Kr Sahoo	32	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	IX	9734878553	855042496951	0.116	Vanaraja farming
	12000	Rajkumar Das	34	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	VIII	9647104639	695312179082	0.264	Vanaraja farming
	12000	Ratan Jana	24	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	H.S	9593621752	627115284524	0.264	Vanaraja farming
	10000	Srimanta Bag	35	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	IX	9775368938	890366551912	0.26	Vanaraja farming
	15000	Sukumal Giri	23	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	H.S	8514058857	390464569125	0.2	Vanaraja farming
	12000	Sumad-hab Guria	24	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	H.S	8371027051	776110677980	0.248	Vanaraja farming
	10000	Supriti Shaw	30	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	H.S	9734878553	567722209469	0.212	Vanaraja farming
	12000	Susanta Samanta	24	Heramba Gopalpur Gram Panchayat, South 24 Paraganas, WB	H.S	8436067839	882754076226	0.244	Vanaraja farming
	20125	Pranab Bag	40	Heramba Gopalpur, South 24 Paraganas, WB	H.S	-	-	-	Vanaraja farming
	22980	Anup Chhatui	27	Paschim Kultali, mathurapur-II, South 24 Paraganas, WB	Graduate	-	-	-	Carp hatchery
	16800	Anima Bag	33	Lakshmi Janardanpur, South 24 Paraganas, WB	-	7797940035	-	0.05	Betelvine plantation

KVK	Income/ month (Rs.)	Youth Name	Age	Address	Educational qualification	Phone no.	Aadhar no.	Land holding (ha)	Name of adopting enterprise
Nayagarh	72900	Santosh Kumar Nayak	32	Anlapata, Khandapada, Nayagarh, Odisha	IX	9437354899	614477065696	8.0 (2.8 ha pond)	Stunted Fingerlings Production
	25000	Santosh Swain	29	Kiajhara, Kiajhara, Khandapada, Odisha	IX	9937021143	-	2.0 (1 ha pond)	Stunted Fingerlings Production
	25000	Rubina Sahoo	23	Damuni, Nuagaon, Nayagarh, Odisha	III	8456868839	-	1.0 (1 ha pond)	Stunted Fingerlings Production
	26000	Tapan Kumar Mohanty	31	Rampada, Bhapur Nayagarh	II	8457037387	846643665065	2.0 (1.5 ha pond)	Stunted Fingerlings Production
	35000	Laxmi Rout	29	Subanernadeipur, Muthagadia, Nayagarh	X	9938803002	631485683167	0.405	Mushroom Production
	20000	Sanjubala Mohapatra	24	Erundipathar, Gania, Nayagarh	X	9556701757	712939469807	0.405	Mushroom Production
	21400	Basanti Nayak	33	Baulasahi, Ranapur, Nayagarh	X	9090793763	605439252663	2.02	Mushroom Production
	23300	Aashis kumar Das-mohapatra	28	Khandapada, Khandapada, Nayagarh	III	-	332796474456	1.21	Mushroom Production
	22800	Pravhakar Dalabehera	28	Tatapada, Odogaon, Nayagarh, Pin-752092	II	9556742291	819008935407	1.21	Mushroom Production
	21250	Santosh Kumar Dalabehera	35	Tatapada, Odogaon, Nayagarh, Pin-752092	X	7326000550	309204774939	0.81	Mushroom Production
	19500	Sasmita Jena	30	Narshinghprasada, Nayagarh, Pin-752068	IX	8456876836	313017857598	2.02	Mushroom Production
	24100	Mamata Pradhan	33	Lakhanpur, Nabaghanpur, Nayagarh, Pin-752070	IX	7064335262	402144819627	0.81	Mushroom Production
	24600	Laxmi priya Barad	32	Sankheir, Notara, Nayagarh	Under Metric	9178808110	700108848026	0.2	Mushroom Production
	20000	Manas Ranjan Sahoo	31	Champatipur, Nayagarh	Under Metric	9114232015	CRF0958363	0.2	Mushroom Production
	18867	Dillip Kumar Mallik	35	Karabar, Bhapur Nayagarh	IX	9938577803	9346 98883192	0.4	Backyard Poultry Rearing
	19700	Ajit Kumar Dalabehera	25	Balugaon, Nayagarh	X	7978263508	46238183 2788	2	Backyard Poultry Rearing

KVK	Income/ month (Rs.)	Youth Name	Age	Address	Educational qualification	Phone no.	Aadhar no.	Land holding (ha)	Name of adopting enterprise
Nayagarh	15300	Upendra Nayak	25	Anlamada, Gunthuni, Khandapada, Nayagarh	MA	7873091818	26285355 0493	0.8	Backyard Poultry Rearing
	15200	Udaynath Padhiary	28	Jayamangala, Nayagarh	Under Matric	9853675952	-	1.5	Backyard Poultry Rearing

8. Expenditure statement under ARYA project of 2017-18

(In rupees)

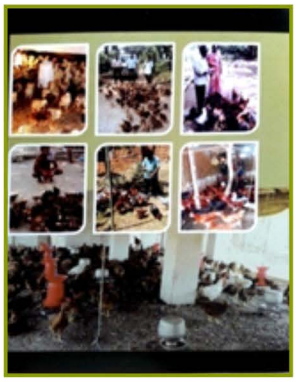
Sl. No.	Name of the ATARI	Opening balance as on 01.04.2017	Sanctioned amount for 2017-18	Fund received during 2017-18	Total Fund available for 2017-18	Expenditure incurred during 2017-18	Receipt/ Bank interest	Unspent balance during 2017-18 (As on 31.03.2018)
1.	ATARI-Kolkata	1179827	7700000	6683077	7862904	5583507	16508	2295905

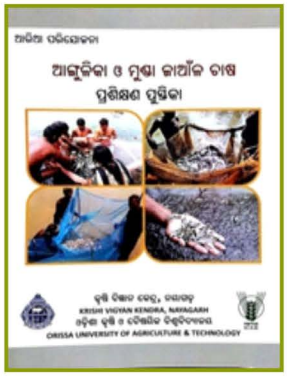
9. Visit of dignitaries to ARYA villages

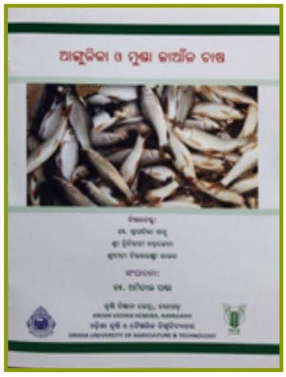
- Director, ICAR- ATARI, Kolkata- Nayagarh
- Nodal Officer (ARYA) ATARI, Kolkata - Nayagarh
- Dean Extension Education, OUAT, Bhubaneswar- Nayagarh
- JDE (Information, DEE), OUAT, Bhubaneswar- Nayagarh
- Block Livestock Development Officers- Heramba Gopalpur, Nimpith
- Officials from LDC, Govt. of West Bengal- Heramba Gopalpur, Nimpith
- Panchayet Representatives- Heramba Gopalpur, Nimpith
- SRF, ARYA, ICAR-ATARI, Kolkata – Laxmi Janardanpur, Heramba Gopalpur, Nimpith

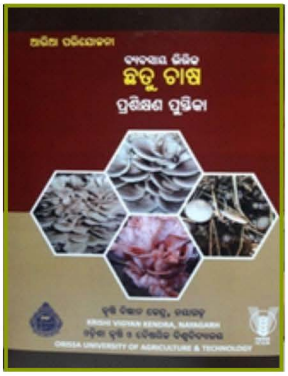
10. Publications

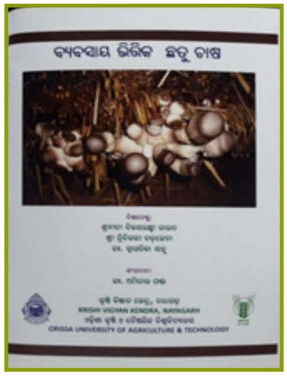
- Angulika o Munda Janla Chasa
- Chhatu chasa
- Baripata abadhha padiare kukuda chasa

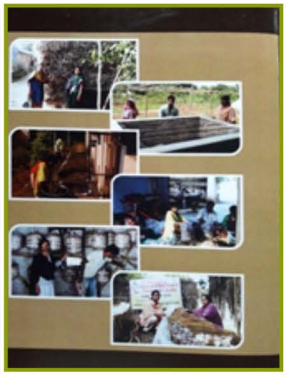


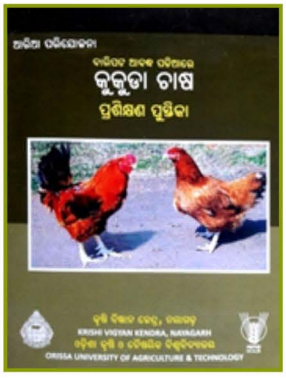


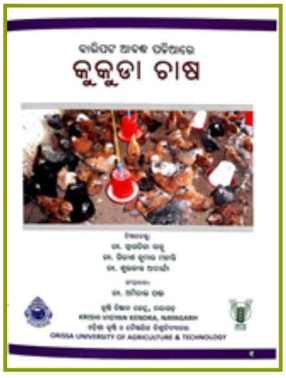












11. Migration status

Agriculture as a vocation is not a lucrative option for the youths. Lack of pride followed by less opportunity to solicit desired income and employment generation, youths generally seek non-agricultural jobs for their livelihood. This has resulted into migration on the part of the youths to nearby towns and cities to get absorbed in jobs of shop helper, factory labour etc. It has also been observed that chunk of landless farmers seasonally migrate to other agriculturally sound districts in search of agricultural jobs like transplanting, harvesting etc.

Modern day agriculture needs to look into two district aspects – attracting youths in agriculture and related vocations and make provisions to retain them in agriculture on a sustainable basis. The launch of the project 'Attracting & Retaining Youth in Agriculture' by Indian Council of Agricultural Research, New Delhi in selected KVK districts of the country has opened the much needed avenue for the youths to consider self-employment as a coveted livelihood option with association of agriculture and associated sectors.

Implementation of this project in South 24 Parganas district of West Bengal by Nimpith KVK is an ideal example to attract youths in carefully assessed areas for enterprise development by the youths with initial financial and technical support out of this project. Migration, which was a common phenomenon of the district, has been to some extent addressed to usher into a new beginning of enterprise development for the youths in the very homeland. The youths are finding interest in self-employment generation through poultry bird rearing, pekin duck rearing, meat processing, carp hatchery and betel vine cultivation on a regular basis to earn sizeable income throughout the year. Mostly the youths who were used to migrate earlier have been included in this project and all 82 youths brought under ARYA have remained in the villages leaving the habit to migrate.

In Nayagarh district of Odisha, the same trend has also been observed among the identified youths brought under ARYA project. Commercial mushroom cultivation, poultry bird rearing and stunted fingerling production have been immensely popular among the youths of that district. In fact, young girls have also become active partners to continue this project for last 4 years on a profitable manner. The gainful employment and adequate income generation have immensely influenced the youths to be actively involved in enterprise development. Though, it is too early to include that the project has successfully reduced the migration in Nayagarh district of Odisha, the information available in the district indicates that youths are opting for self employment generation through agriculture and allied means than to migrate in the places like Bhubaneswar, Khorda, Berhampur, Surat (Gujarat), Tamil Nadu, Kerala and other areas for employment in non-agricultural sector.

A modest beginning towards employment of rural youths in agriculture and allied sector has been made through ARYA project. At the same time, a message across the district could be sent that agriculture can provide gainful employment, lucrative remuneration and recognizable social respect if agriculture is taken as the means for entrepreneurship development. The business model, if it is converted, in the near future will definitely motivate the youths to get involved and to continue the avocation for others to follow. So far, the project has addressed both the issues of entrepreneurship development and checking of migrating trend to a certain extent in the identified districts. The need of the hour is to expose more and more youths towards this successful endeavour and to create the ambience across the districts by all the stakeholders to encourage the youths to take up such prestigious livelihood shunning the path to migrate in other places.

12. Summary

KVK Nimpith, South 24 Paraganas (West Bengal):

West Bengal has abundant natural resources of minerals and suitable agro-climatic conditions for agriculture, horticulture, fisheries and animal husbandry. The state is one of the major producers of rice, potato and tea in India. Besides agricultural products, West Bengal is also a major producer of fish and animal husbandry products. The state produced a total of 1.74 million tonnes of fish during 2017-18 and 0.686 million tonnes of meat during 2015-16.

South 24 Parganas district of West Bengal is the largest district of the state by area and second largest by population and falls in the coastal region of Sundarbans, the largest mangrove delta in the world. Also, 36.47% of total district population is within the age group of 18-40 year (Source: Census 2011). Majority of the area is riverine and flood prone. Soil salinity of the district is one of the major drawbacks for conventional agriculture. The area is also storm and flood prone and hence inundation of saline water occurs in agricultural field. Under this adverse and risky environmental condition, only long duration traditional paddy is cultivated during *kharif* season i.e. majority of the land is mono cropped and most rural households practises subsistence farming. With this backdrop, the expansion of agriculture and sustainable generation of income are the main constraints of agricultural sector. The rural youths migrate seasonally to another places in search of job because of the non-availability of self employment opportunity at village level. To utilize the enormous potentiality of the large numbers of rural youths of the district ARYA project is initiated through proper demonstration and capacity building within the village level. For this purpose KVK Nimpith promoted enterprises like fishery unit including carp hatchery and Asian catfish hatchery, betelvine cultivation in climate smart hi-tech shade net *boroz* and meat processing unit comprising poultry and pekin duck farming.

Betel leaf is one of the important cash crops of the district South 24 Parganas. Ramkrishna Ashram KVK conceptualized a climate smart *boroz* structure using GI pipes on concrete basement fitted with green shade net, 75% on the top and 50% on the side walls. Unlike traditional *boroz*, this new *boroz* is made up of non-degradable items and fitted with micro-sprinkler irrigation facility. Modern shade net *boroz* provide better weather condition and uniform shading which favoured suitable micro-climate for growth of betelvine and quality leaf production. Adopting this modern *boroz*, youth farmers are experiencing better profitability in betelvine cultivation than their traditional betel leaf cultivation system, due to lower cost of cultivation, minimum/no recurring cost for maintenance of *boroz* structure, lower incidence of pests and diseases, higher production and higher market value of the produce (leaf) due to good colour, shape (roundish) and lustre of the leaf. It is also evident that shade net *boroz* is more suitable for production of better quality leaf of mitha pata variety with higher yield than a traditional *boroz*. Youths are getting interested with this hi-tech system of cultivation. Fellow farmers are coming to KVK to gain knowledge about this technology for its adoption by their own. But higher installation cost is the main constraint for the marginal youth farmers to install it by their own.

Backyard rearing of poultry and duck is very much promising being the cost of farming is substantially low. The market price of these meats is high; still the farmers are not getting the proper value due to middle man. Here in this junction, KVK has taken a new venture in a collaborative way with Livestock Development

Corporation of West Bengal, Govt. of West Bengal and with ARYA programme, ICAR, for assured marketing of the produce by setting up one semi-automatic meat processing unit at the village level. Now the farmers of that particular block are getting facility of door step marketing of the animal produce.

Also, the enterprise on small scale carp hatchery was implemented in the village of Paschim Kultali in the block of Mathurapur-II of South 24 Parganas district. The hatchery consists of a water source, a water reservoir, a breeding or spawning pool, a hatching pool and a spawn collection chamber. As availability of quality carp seed in the distant villages of South 24 Parganas was so far a rare privilege, the hatchery was an immediate success to the group of rural youths. Assuming this, the group installed a water reservoir of their own before even starting the hatchery. This year's success has encouraged the group so much that they are planning to install a second hatching pool from their own fund so that more spawn may be produced from a single operation. In the first year of hatchery establishment already 100 local farmers and 25 farmers from other villages have benefitted by procuring spawn, fry and fingerling from the ARYA group. Due to the popularity of the 3 types of fish seed, they are readily sold from the site of the project for which there is no problem for marketing of the seeds. Besides, the enterprise has given several employment opportunities such as netting for collection of brood fish, transportation of fish seed, fish seed vendors, daily labours, farming of spawn, fry and fingerling etc. Hence, this KVK-planned and modified carp hatchery act as a model hatchery for further replication in other villages by progressive rural youths.

A notable increase in the average annual income of the rural youths occur after adopting the project like in poultry farming *i.e.* in vanaraja farming and broiler duck farming the avg. annual income increases from Rs.48000/- and Rs.72000/- to Rs.144000/- and Rs.324000/-, respectively. Whereas in fishery unit i.e. carp and catfish hatchery annual income increases from Rs.60000/- and Rs.54000/- to Rs.228800/- and Rs.167200/-, respectively. For betelvine cultivation the avg. annual income increases from Rs.102000/- and Rs.180000/-. Altogether 237 rural youths are benefitted during 2017-18 and a number of 105 rural youths are running the entrepreneurial units in a sustainable manner. A number of 388 rural youths are trained through 14 training programmes organized in the year 2017-18 in different enterprises. After seeing the remarkable achievement of the involved youths, 98 other youths of the districts adopted the enterprises.

KVK Nayagarh (Odisha):

The geographical area of Odisha is 1,55,707 sq. km with a population of 4.19 crores. Agriculture is the main stay of state's economy and providing livelihood support to a large section of rural population. The climate of Odisha is tropical, characterized by high temperature, high humidity, medium to high rainfall, short and mild winter. Rice and pulses are the major crops grown in the state. Besides, there is vast scope for promotion of allied sectors such as dairy, poultry, pisciculture, mushroom cultivation, agricultural produce *etc*.

Nayagarh district of Odisha accounts 2.5% of states territory and shares 2.29% of the state population. It consists of 1531 inhabited villages. It has 8,83,051 rural population and 79,738 urban population representing 91.7% and 8.3% of the district population as per 2011 census. The youths constitute 33% *i.e.* 2,91,406 nos. of the rural population. During the recent past a trend has been observed wherein the rural youths particularly in resource poor category are moving away from agriculture. The youths migrating (1,16,562) to the places like Bhubaneswar, Khurda, Berhampur, Surat (Gujarat), Tamil Nadu,

Kerala *etc*. are increasing in recent years to work in service sector as they lose interest in agricultural activities. But, there is a promising scope to have better earning from agriculture and allied sectors. In the district, the total fish production is around 8090 MT with a pond area of 2171 ha with avg. productivity of 2.3 t/ha. Also, mushroom cultivation is considered as alternate livelihood option in Nayagarh district as the climatic condition is favourable for mushroom cultivation. In the district, more than 6 q of mushroom is being produced per day.

Identifying the potentiality of the district towards fishery, mushroom production *etc*. KVK Nayagarh promoted ARYA project to attract the rural youths for adopting resource specific need-based alternative remunerative occupation at a sustainable level like stunted fingerlings production, mushroom production, backyard poultry farming *etc*.

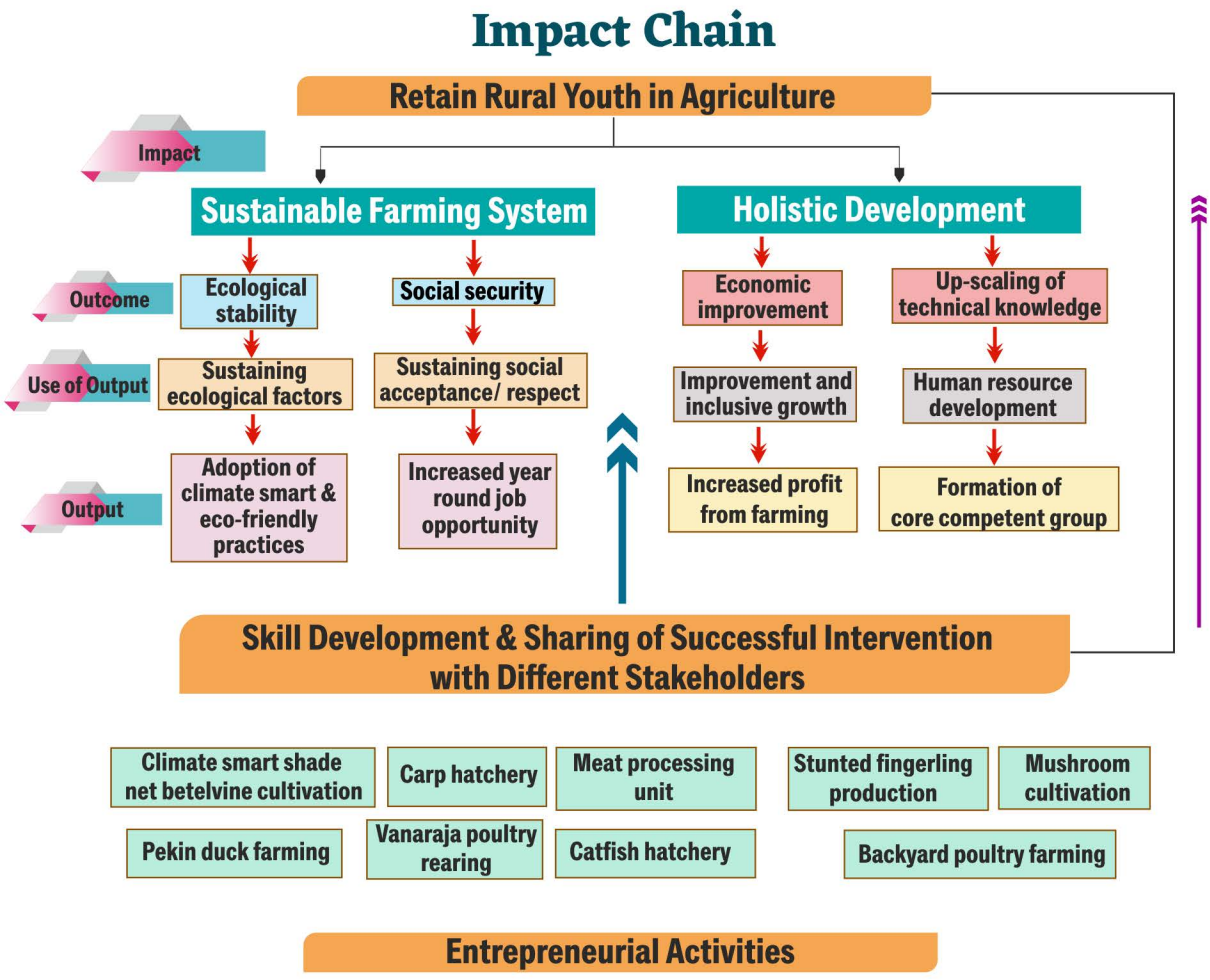
The stunted fingerling production units were set up in village Rampada, block- Bhapur and in Damuni village, block-Nuagaon. Small ponds were excavated in support of Watershed development, Nayagarh. Inputs such as dragnet, plankton net, happa, water quality kit and medicine (CIFAX) were provided from ARYA project. Also, the youth groups were trained on stunted fingerlings production with exposure visit to CIFA, Kaushlyaganga, Khordha by KVK Nayagarh. With the knowledge imparted during the training and exposure visit around 67% profit was gained by this scientific manner as compared to the local practice of fingerlings production.

KVK Nayagarh promoted mushroom cultivations through latest systematic technology in Balugaon, District- Nayagarh from March to October bearing the extreme temperature condition. Inputs such as water spraying machine, straw cutter, mushroom spawn, white polythene, besan, sealing machine, weighing machine and tray were provided from ARYA project. Water is the main constraints among the mushroom growers because they have no bore well, tube well and canal also. A target of 200 villagers and total quantity of 2000 q of mushroom production has been made by KVK, Naygarh. Cultivation of coloured mushroom and button mushroom will be given importance along with paddy straw and oyster mushroom. There is a great scope for making value added products from mushroom.

Another enterprise is backyard poultry, established in Karabara, Block-Bhapur, Dist-Nayagarh with rearing of 21 days old vaccinated vanaraja and also rearing day old chicks with proper brooding and vaccination and reared upto 3.5-4 month for marketing. The rural youth groups are provided training imparted on backyard poultry rearing with exposure visit to IPDP, BBSR, CPDO, BBSR and OUAT. They were also provided with start-up incentives such as housing, poultry shed, 21 days vanaraja chicks, drinker, feeder medicine, feed, brooding equipments *etc*.

By implementing the ARYA project through Nayagarh KVK, a total of 85 rural youths are running the entrepreneurial units in a sustainable manner with 44 numbers of beneficiaries. A substantial increase in the average annual income of the rural youths occurs after adopting ARYA programme. In mushroom production avg. annual income increases from Rs.170000/- to Rs.420000/- for 500 beds per unit per year. Also, for stunted fingerlings production the avg. annual income increases from Rs.81000/- to Rs.312500/- for 1 ha pond and for backyard poultry farming the same is from Rs.202500/- to Rs.243000/- per unit having 200 birds. The substantial increase in annual income encourages 38 youths of the districts to adopt the enterprises. Besides, KVK Nayagarh organized 8 training programmes, by which 160 rural youths are trained in the above mentioned identified enterprises.

The overall impact of this project on the two districts is delineated through the following flow chart-



Annexure I : Name of rural youths involved in ARYA project

Sl. No.	KVK Name	Youth Name	Village Name	Name of adopting enterprise
1.	RAKVK, Nimpith	Anup Chhatui	Paschim Kultali	Carp hatchery
2.		Jagadish Roy	Kantamari	
3.		Rajesh Chhatui	Kultali	
4.		Pranab Kr. Naskar	Kultali	
5.		Debkumar Karmakar	Kultali	
6.		Sushanta Bag	Herombogopalpur	
7.		Sudhakar Baidya	Gillar Chat	Catfish hatchery
8.		Anupam Munda	Sankargheri	
9.		Tilak RoyChowdhury	Baikunthapur	
10.		Indrajit Bagani	Kantamari	
11.		Ramprasad Sardar	Mosat	
12.		Satyajit Mondal	Tulsighata	
13.		Aloka Das	Heramba Gopalpur	Broiler pekin duck
14.		Amar Giri		
15.		Anita Giri		
16.		Arati Das		
17.		Arun Giri		
18.		Balaram Naiya		
19.		Bharat Bar		
20.		Bidhan Giri		
21.		Bidhan Jana		
22.		Bikas Giri		
23.		Dipika Giri		
24.		Kanak Naiya		
25.		Kartik Barik		
26.		Krishnapada Bera		
27.		Sarbani Giri		
28.		Shyamapada Maity		
29.		Sonali Giri		
30.		Sonali Sasmol		
31.		Subhas Sansmol		
32.		Subrata Das		
33.		Suchitra Shit		
34.		Sujata Bag		
35.		Sumitra Maity		
36.		Suresh Paria		

Sl. No.	KVK Name	Youth Name	Village Name	Name of adopting enterprise
37.		Urmila Bera		
38.		Aparna Sahoo		
39.		Arati Samanta		
40.		Barnali Hazra		
41.		Barun Giri		
42.		Benimadhab Guria		
43.		Bhagwat Kr Sahoo		
44.		Bharati Bhuinya		
45.		Chabi Das		
46.		Chandana Mondal		
47.		Chandrakanta Arhri		
48.		Ganesh Paul		
49.		Gita Halder (kayal)		
50.		Gouri Nhuinya		
51.		Jamuna Giri		
52.		Kartik Dhara		
53.		Krishna Kaity		
54.		Krishnapada Makur		
55.		Maluka Pal		
56.	RAKVK, Nimpith	Manasi Pradhan	Heramba Gopalpur	Vanaraja farming
57.		Mithu Rani Kayal Makur		
58.		Nakul Bhuinya		
59.		Nirmal Jana		
60.		Prabhat Kr Mondal		
61.		Pratima Giri		
62.		Rajkumar Bar		
63.		Rajkumar Das		
64.		Ratan Jana		
65.		Seuli Das		
66.		Shyamali Arhri		
67.		Shymal Bag		
68.		Sita Jana		
69.		Srikanta Bar		
70.		Srimanta Bag		
71.		Sukamal Karan		
72.		Sukanta Jana		
73.		Sukumal Giri		
74.		Sumadhab Guria		

Sl. No.	KVK Name	Youth Name	Village Name	Name of adopting enterprise
75.	RAKVK, Nimpith	Supriti Shaw		
76.		Supriya Karan		
77.		Susanta Samanta		
78.		Tapan Halder		
79.		Utpal Jana		
80.		Uttam Pradhan	Purba Chintamonipur	Hi-tech shade net *pan boroz*
81.		Anima Bag	Lakshmi Janardanpur	
82.		Biswajit Hazra	Lakshmi Janardanpur	
83.		Parikshit Naskar	Dakshin Kashinagar	
84.		Sabita Giri	Hebambagopalpur	
85.	Nayagarh	Trinath Nayak	Khuntubandha	Stunted fingerling production
86.		Rubina Sahoo	Damuni	
87.		Ambritraj Mohapatra	Kendupalli	
88.		Mahadev Baliarsingh	Nilakanthaprasad	
89.		Ashok Kumar Rout	Duadia	
90.		Arun Swain	Kiajhara	
91.		Santosh Swain	Kiajhara	
92.		Kanhu Pradhan	Bhodangapalli	Backyard poultry
93.		Kupasindhu Jena	Kantabania	
94.		Sanjay Ku Gochhi	Tipura	
95.		Saroj Raul	Tipura	
96.		Sushant Ku Rout	Puania	
97.		Karuna Barik	Gambharidihi	
98.		Timiranjan Maharana	Gambharidihi	
99.		Laxmidhara Barik	Gambharidihi	
100.		Ram Chandra Nayak	Gambharidihi	
101.		Jitendra Behera	Puania	
102.		Pravat Kumar Behera	Puania	
103.		Prakash Kumar Swain	Rampada	
104.		Prasant Kumar Sahoo	Karabara	
105.		Tophan Kumar Rout	Karabara	
106.		JayantiMallik	Karabara	
107.		Basanti Nayak	Malisahi	Mushroom production
108.		Pravat Barik	Temple sahi	
109.		Rajesh Ku.Pradhan	Sikharpur	
110.		Anjali Gayan	Podasahi	
111.		Minati Jena	Kesharpur	
112.		Biswabhusan Pradhan	Itamati	

Sl. No.	KVK Name	Youth Name	Village Name	Name of adopting enterprise
113.	Nayagarh	Prabhati Pradhan	Kalyanpur	Mushroom production
114.		Jyotsna Rani Sahoo	Udayapur	
115.		Kalyani Pradhan	Malisahi	
116.		Pradipta Ku.Nayak	Anlamada	
117.		Sarojini Pradhan	Kalyanpur	
118.		Drupadi Nayak	Gamei	
119.		Trilochan Rout	Sikharpur	
120.		Puspanjali Senapati	Haripur	
121.		Subal patra	Nagapur	
122.		Sabita Sahoo	Berunabari	
123.		Mamata Pradhan	Lakhanpur	
124.		Dhiren Kumar Mohapatra	Kesarpur	
125.		Urmila Nayak	Khatia	
126.		Jitendra Nayak	Sikharpur	
127.		Urmila Prusty	Kalikaprasada	
128.		Sasmita Jena	Narasinghprasad	
129.		Gitanjali Parida	Malisahi	

Photo Gallery

NOTES

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