Profitable pig farming through scientific management

Scientific pig rearing has become very popular among the poor people in several districts of this Zone. In most of the cases, pig farmers are following crossbreeding of deshi with exotic pig breed Tamworth (Tamworth x Deshi) and low cost feeding using locally available ingredients. Because, crossbred pigs resultedfaster growth, better reproductive performance, better feed conversion efficiency, better disease resistance, better adaptability and higher economic returns. The comparative performances of deshi and crossbred pigs have been given in the following table. On the other hand, use of locally available ingredients in feed saved the high cost of concentrated feed. It was observed that use of rice and marua fermented waste in grower ration and replacement of maize with marua (upto the level of 60% of total ration) reduced the production cost up-to 30%. Considering the economics, it has been calculated that with the help of above technology, if a person rears at least 30 pigs, can earn between Rs. 60,000/- to Rs.2,50,000/- per year depending on the marketing value of meat. Due to mass dissemination and wider adoption of these rearing practices/ techniques, a substantial amount of medium sized pig farms have been established in the zone.

		10
Parameters	Desi Pig	T x D Cross
Litter size	4-6	10-12
Mortality (%)	10% less in T x D Desi	cross than
Farrowing interval (days)	220-240	180-200
Weight in one year (kg)	25-30	80-90

Comparative performance of deshi and crossbred pigs



Backyard poultry rearing with improved breed and low-cost technology increased profitability

During last few years, back yard poultry farming boosted the socio-economic statusparticularly of poor women farmers with very low initial investment in the rural areas. Due to unavailability of good poultry germplasm, unavailability of quality feedstuff, high incidence of diseases and attacks of predators, the production performance of poultry birds reared under backyard system was not up-to the mark. Recently, with the help of KVK scientists, some technology interventions like use of improved poultry breeds (RIR, Vanraja, Hit-CARI, Shyama, Gramapriya, Kroilers), use of low-cost mud-based portable housing, little supplementation of locally available feedstuffs along with calcium and zinc, and vaccination against Ranikhet Disease and Fowl Pox were done in backyard poultry rearing system. It resulted into high body weight (4-5 kg) compared to non-treated (2-2.5 kg), increased egg production by 322%, monetary saving in low-cost housing by Rs. 1260/- and increased net income of Rs. 9800/- from Rs. 3800/- per year from a 20 bird unit. This technology is being adopted by many back yard poultry farmers in this zone.



Magur seed production technology

Seed production in fish farming is a very complicated and expensive proposition. This is the most crucial part of the technology. The low cost hatchery has been developed indigenously by the KVK which has two main structures – (a) a circular trough of 1m diameter made of cement; and (b) a circular hatching structure of 90 cm diameter made of iron to which nylon net is fitted and stretched. The fertilized eggs are spread over the circular net fixed inside the hatching trough and water was sprinkled over it through a perforated bottle of which one side tight with water flowing pipe and/or control taps. The tap water supply is essential, as this enables the adjustment of flow and oxygenation as well as allowing the controlled application of treatment to combat the spread of bacterial and fungal disease. Water is supplied through taps from the lower portion of the hatchery. The water comes from bottom of the hatchery. In other cases, circular hatching trough may be made up of galvanized iron sheet with 80 cm diameter and 30 cm height. The water from drum comes to the trough through pipe and water exits through outlet. A round perforated galvanized iron sheet portion is kept at the middle of the trough. A rectangular hatching tray (35 cm x 25 cm) may be made of iron to which nylon net is placed within the trough.

The standard breeding technique was employed with little modification. Two to three years' old fishes weighing about 300-350 gm each are used for breeding. Male is easy to identify as it has elongated and pointed genital papilla whereas gravid females are comparatively heavier having round and bulging abdomen and reddish vent. The brood magur fishes are stocked in a cemented tank, three months before the actual breeding. For induced breeding both male and female are given single dose (1.5 mg per fish) of pituitary extract at the same time. The injected male and female are kept in two separate tanks. After 16 hours of injection, it may be observed that the fishes are then ready for stripping. The eggs are released by gently pressing the abdomen towards the vent, collecting them on a stainless steel container. At the same time the milt are then added and mixed well with help of a feather followed by addition of water to activate the sperm. The injected male needs to be sacrificed to prepare sperm suspension in clean water. The testis is dissected out and cut into small pieces with the help of small scissors and macerated in normal saline water (0.9% NaCl in distilled water) to prepare finally the sperm suspension. The sperm suspension is sprinkled evenly over the eggs followed by clean water addition. Eggs and sperm are allowed to mix by gently moving tray for 4-5 minutes. The fertilized eggs are washed thoroughly and transferred to hatchery. The unfertilized or dead (opaque/white) eggs are removed immediately to prevent fungal infection.

Fertilized eggs are spread over the rectangular net which remains suspended inside the hatching trough at 5 cm depth from the water surface. The fertilized eggs are uniformly spread. The water depth should be 12-15 cm. A feeble inflow of water is maintained. Normally the larvae take 18--22 hr of incubation after fertilization to hatch out. The newly hatched larvae retain a large ovoid yolk sac, which gets absorbed in four days. This time they do not take food from outside. The three day old larvae (4th day) are fed with live plankton. On the fourth day the hatchlings are transferred to a rearing tank. The temperature is kept in between 27-30^oC and pH, in between 7 and 7.5.

After four days, the larvae are transferred to a polythene covered earthen bed (160 cm x 120 cm) surrounded by mud ridge to a height of 20 cm. The water depth in polythene covered earthen tank is maintained at 10 cm. The continuous water supply is to be maintained. After providing feed, water is not changed within 1 hr. The larvae are fed with live zooplankton for 10-15 days twice to thrice in a day. Planktons are collected from ponds at morning or evening time by a plankton-net. The collected plankton is filtered through a fine net. 2-3 ml of plankton per litre water is sufficient for larvae. The dead zooplankton requires to be removed by siphoning at least twice a day. After 15 days, the magur fry reach to 10-12 mm size. Then the fry is reared in well prepared pond or outdoor cemented tank.

This technology does not require much investment and space, and it can be prepared very easily. Many fish farmers of West Bengal are using this technology for mangur seed production.



Dairy farming as livelihood income

Mr. Sumanta Ghosh, a progressive dairy owner from Village- Padmabila, Block- Chakdah, District- Nadia, West Bengal, started his dairy farming with two crossbred milch cows during the year 2010 which was increased by 26 milch cows and 11 calves / heifers by 2015. He achieved tremendous success in the business by that time. If we look into his past, Mr. Ghosh had only 2.5 acre land. Out of which he used 1.5 acre land for annual and perennial fodder production and rest land for animal shed and own dwelling place. His all five family members devoted their time for animal rearing and ultimately, that business turned into a commercial venture. Shed and animals were maintained by Sri Ghosh himself but fodder cultivation was supported by outside local labourers. The real and important fact was that Mr. Ghosh did not take any kind of credit from either Government or Private Institutions. The necessary trainings were taken from the Scientists of KVK Nadia and from the Department of Animal Resources Development, Nadia, West Bengal. The KVK Nadia supplied fodder crops namely Maize, Barseem, Cowpea, Oats, Rice bean, Sorghum, N. B. Hybrid which were successfully grown by him. His fodder growing land was also a point of attraction to neighbouring livestock farmers and also to the Officials of Animal Resources Development department, Nadia, West Bengal. Sri Ghosh had been awarded with "Best dairy cattle farmer in Nadia district" during 2013-14 by NABARD, Nadia. In addition, he established one gobar gas plant to supply energy to his animal shed, own house and feed preparing machine. The slurry, byproducts of gobar gas plant, is very rich in inorganic matter and is being used for fodder cultivation in his own agricultural land.





Vanaraja: A suitable poultry strain for backyard farming

Backyard poultry rearing by the rural farm men and women plays a pivotal role in rural economy. But, the growth and productivity of indigenous birds, most commonly reared in the rural condition, were very poor. To mitigate that drawback, several improved birds were developed by various institutes. 'Vanaraja'- a dual purpose variety was one of them which was developed by PDP, Hyderabad. The variety grows faster and lays more numbers of eggs than the indigenous birds with the same inputs and labour. Under FLD programme, North 24 Parganas KVK introduced that bird under the backvard rearing system in some villages. Beneficiaries were satisfied with the performance of that new strain. At the beginning, 500 chicks were distributed among 50 women of different villages. At that point, KVK decided to take one step to act as a mother unit to brood the day old chicks up-to 21-30 days under the supervision of the KVK experts. It was sold to the willing farmers with a minimum profit. Verifying the performance of Vanaraja birds under rural condition and observing the interest among the farmers, ARD, State Agricultural Department started taking up different programmes on Vanaraja under ATMA in the district. They purchased 21–30 days old chicks from the KVK as it was the only source of germplasm in the district. A number of individual farmers with their own interest started rearing those birds according to their capacity varied from 50 to 500 birds. Most of them were keeping birds for around 2 months and used to sell when they were attaining body weight of around 2.0 kg. As the birds like green leaves or grasses, the feed cost for rearing these birds is comparatively lesser. At the beginning, the market price of these birds was lesser but after having the flavor of the meat of this variety, the price was increased. Now, some of the farmers have become small entrepreneurs in the district. The important thing is that majority of these farmers are rural women. The KVK is trying to increase the infrastructure so that it can supply more and more number of chicks to fulfil the demand.



Chital (Notopterus chitala) farming with Tilapia: A profitable venture for fish farmers

Feather back, Chital (Notopterus chitala) is a hemophilic important freshwater fish found widely in lentic waters. This species is widely distributed in deep and clear waters in the rivers, beels, reservoirs, haors, baors and ponds in North 24 Parganas district. Chital is one of the most important notopteroid in India, commands high market demand and has been prioritized as a new candidate species for aquaculture. In recent years, the catch of this species has been declining fast due to environmental degradation. The species is highly priced and due to its high demand and popularity, it has been declared as "State Fish" of Uttar Pradesh, India. Now- a-days, farmers want to diverse their fish farming from IMC culture for fetching more profit. Considering the fact, the KVK conducted FLD programme on Chital fish farming with Tilapia during past few years in the district. The stocking density of Chital should be 200 nos./ 0.13ha pond. Before stocking of Chital, fry Tilapia brooder should be stocked @ 15kg/ 0.13ha pond. Tilapia is a prolific breeder and after 21 days, they are capable of releasing their fries. These fries will be used as live food source of Chital fry. Chital fish is a highly carnivorous fish and their fry should be stocked after 21 days when fries of Tilapia are available in the pond. Due to predator-prey relationship of Chital and Tilapia fry, feed cost is reduced. If proper water quality of pond is maintained, after one year, Chital fish attains the body weight of 1kg/ fish and additionally, Tilapia production reached up to 0.3 t / 0.13 ha. It is better to wait for another year for the growth of Chital fish. In the second year, Chital fish attains the body weight of 4kg/ fish, and the production of Tilapia reaches up to 0.6t/ 0.13ha. The market value of Chital fish is Rs 400/ kg. So, from Chital fish, farmers can earn grossly Rs.240000/- from 0.13 ha and from Tilapia, Rs.60000/per 0.13 ha of pond in two years. For these two years the total gross cost is around Rs. 60000/-. Therefore, the net return is Rs. 240000/-. More than 100 fish farmers have adopted this culture in the district. Considering the interest of the farmers, Line Departments like Fishery department, Agriculture Department etc. of West Bengal State also started taking up different programmes under ATMA and others in the district.





Indigenous poultry farming through low-cost incubator in North and Middle Andaman Islands

Indigenous poultry farming plays vital role in the socio-economic and cultural life of resource poor rural farmers of North and Middle Andaman Islands. The majority of farmers keep poultry birds under traditional scavenging system and they use broody hen to hatch eggs. In this region, a very few farmers adopted high input commercial broiler farming, and none of the farmers were practicing artificial incubator for hatching eggs. As low-cost incubator was not available with the farmers in that region and they were mainly dependent on the Department of Animal Husbandry and Veterinary services, North and Middle Andaman Islands or private poultry farms for getting day old chicks.

The Animal Science Section of ICAR-CIARI, Port Blair in collaboration with KVK Nimbudera started one project on "Sustainable duck production in North and Middle Andaman" which was funded by NABARD. Under that project, a '*Mini Egg Setting-cum-Hatching Unit*' was installed at KVK Nimbudera premises. The farmers were trained and FLDs were conducted in the villages namely Basantipur, Harinagar, Shivapuram etc. The facility was extended to the farmers for their use with a minimum charge @ Rs.4/- per hatched chick.

As a result of scientific intervention and technical support by CIARI, Port Blair and KVK North and Middle Andaman scientists, three rural youths in three different locations of North and Middle Andaman Islands are producing and supplying Vanaraja chicks to the farmers with a very low cost. Thus, the initiative helped farmers to earn more income, and also generated employment opportunities for the rural youths. Due to the motivation of KVK scientists, a 28 years old rural women, Smt. Sujata Bacchar of village- Basantipur purchased "*Mini Egg Setting-cum-Hatching Unit*" from her own. Scientists were continuously providing technical support for successful hatching operation at the farmers' doorstep. Now, Smt. Sujata is supplying Vanaraja chicks to other interested farmers in the surrounding villages. The economic feasibility of adopting this technology is given below. Now, Smt. Sujata has become a source of inspiration for other poultry farmers in the district.

Parameters	Before Adoption	After Adoption		
Farmers' Practice	Natural incubation using	Artificial incubation using 'Mini		
	'Broody hen'	Egg Setting-cum-Hatching Unit'		
No. of chicks produced	252	3444		
Fixed Cost (Rs.)	1840	49700		
Recurring Cost (Rs.)	9684	75600		
Depreciation Cost @ 10% (Rs.)	0	4970		
Gross Income (Rs.)	11340	154980		
Net Profit (Rs.)	1656	79380		
B:C Ratio	1.17	1.92		



Supplementation of concentrate mixture improved performances in peri-parturient does

Goat farming is an important source of income for landless, marginal and small farmers in our country. Rearing of goats depends mainly on the grazing or pasture lands and unutilized forest fringes in almost all districts/states. But, due to lack of sufficient pasture and sometimes, the restrictions put by the local forest authorities, the animal grazing has become very limited day by day. As a result, goats are suffering from malnutrition and other related diseases causing low birth weight and weaning body weight of kid, high kid mortality etc. Supplementing of concentrate mixture during peri-parturient period was found to be an alternative to overcome those problems. Considering that, a multi-locational trial was conducted by KVK Angul, Odisha in five different locations in the district involving 45 advanced pregnant (133.5 \pm 2.1 d of gestation) does. A total number of 45 does were divided in 3 equal treatment groups. The group-1 was kept as control i.e. without any supplementary feeding (grazing only) while group-2 was given with 100 g concentrate mixture per day along with grazing and considered as treatment group-1. The group-3 was supplemented with 200 g concentrate mixture per day along with grazing and was considered as treatment group-2. The study continued till weaning i.e. 5 months of age of kids.



It was found that the lowest body weight of peri-parturient does was recorded in group-1 (23.84 kg) while the highest was in group-3 (24.92 kg). The average daily gain in body weight was 275 g/ d in group-3 as compared to 214 g/ d in group-1. The cost of production for 15 does in group 1 was recorded as Rs. 9000/- while it was Rs. 12600/- in group-3 and Rs. 10800/- in group-2. The BC ratio was highest in group-3 (2.90) as compared to 2.71 in group-1. It was recommended for the goat keepers that addition of concentrate feed in ration of indigenous does during late gestation and early lactation periods along with grazing improved growth performance of kids and reduced kid mortality.

Production and	economic performances
----------------	-----------------------

Groups	Pro	oduction pe	erformanc	ce	Economic performance			
	Post- parturien t weight of does (kg)	Av.birt h wt. of kid (kg)	Av. weani ng wt. of kid (kg)	Kid mortali ty (%)	Cost of rearing (in Rs.)	Gross return (in Rs.)	Net return (in Rs.)	BC ratio
Group1: Grazing only (No supplementary concentrate feeding)	23.84	0.96	4.17	13.33	9000	24394.5	15394.5	2.71
Group 2: Grazing + 100 g of concentrate feed	24.61	1.15	4.75	6.6	10800	29925	19125	2.77
Group 3: Grazing + 200 g of concentrate feed	24.92	1.3	5.43	0.0	12600	36652.5	24052.5	2.90

Poultry farming as a source of increased income

Sri Arabinda Ghosh, S/O- Sri Dayamoy Ghosh is a resident of Village-Batla, P.O.-Batikar, Dist-Birbhum, West Bengal. He is hard working young graduate and started supporting his father in agricultural activities spread over only 0.3 acre land. The main sources of their income were from paddy, mustard, potato and vegetables. But, due to small land holding size, income from agricultural produces was not satisfactory. He came in contact with the scientists of Birbhum KVK. After analyzing situations, scientists of KVK suggested him to start poultry farming. The necessary technical know-how was provided to him. Then, he started broiler farming with 2000 birds capacity during the year 2012 with gross annual income of Rs. 100000/-.



Sri Ghosh was selected for the on-farm trial (OFT) programme on broiler farming and provided with RIR for backyard farming. Sri Ghosh was also given intensive skill development training programme under Agriculture Skill Council of India (ASCI) organized by Birbhum KVK on the job role 'Small Poultry Farmer' during the year 2019-20 and certified by Agriculture Skill Council of India. He also attended large number of various awareness programmes and exposure visits to public as well as private sector poultry farms for gaining first-hand experience on scientific rearing and low-cost feed formulation for poultry. He procured coloured broiler both *Krishibro* and *Caribro* from the KVK. The capacity of his poultry farm has now been increased to 3000 birds by the year 2021 with gross annual income of Rs. 300000/-. Side by side, he also started farming of coloured broilers with150 birds capacity and Rhode Island Red (RIR) birds under backyard system. The economics of his enterprise are given in the tables given below. Now, he has become a promising poultry farmer in Birbhum district. A large number of rural youths and women farmers have started their poultry business after following the success of Mr. Ghosh.

A) Backyard poultry rearing

Technolo gy option	At 6 th (in	A (. hweek gm)	v. body Mean = At we (in M	v weight ± S.E.) 40 th zek gm) F	t At 5 wee (in g M	2 nd ek m) F	Age at first egg (in day)	Egg product ion up to 72 week	Egg weight at 40 th week (in gm)	Cost of cultivat ion (Rs./ unit i.e. 20 nos.)	Gross return (Rs./ unit i.e. 20 nos.)	Net return (Rs. /unit i.e 20 nos.)	B:C rati o
Rhode Island Red(RIR)	551. 17± 4.17	437. 81± 3.23	2349 .24 ±14. 75	1768 .39 ±12. 35	2941 .43± 17.8 2	22 98. 14 ±1 2.5	184.58± 0.92	157.23± 1.10	53.09±0.26	12675	21168	8493	1.67

B) Coloured broiler rearing

Technology option	Av. body weight (Mean ± S.E.) at 6 th week (in gm)	Cost of cultivation (Rs./unit i.e. 30 nos.)	Gross return (Rs./unit i.e. 30 nos.)	Net return (Rs. /unit i.e 30 nos.)	B:C ratio
Krishibro	1542.45±10.45	3985	11700	7715	2.93
Caribro	1623.37± 10.87	3985	12480	8495	3.13

C) Broiler farming

Av. body weight (Mean ± S.E.)at 6 th week (in gm)	Cost of cultivation (Rs./unit i.e. 3000 nos.)	Gross return (Rs./unit i.e. 30 00nos.)	Net return (Rs /unit i.e. 3000 nos.)	B:C ratio
2311.78±38.86	Chicks-120000,Feed-350000, Medicine-9000,Others-6000, Tota1=485000	Sell of birds- 535000	50000	1.1

Intercropping (fish) in aquaculture: An innovative approach for enhancing fish farmers' income

The culture of Minor barbs with Indian Major Carps i.e. intercropping technology in aquaculture has been proven successful by the ICAR-CIFA, Bhubaneswar in terms of higher biomass production from per unit water use. As per discussion at different scientific platforms and considering the water bodies of Nayagarh district of Odisha, Nayagarh KVK was suggested to demonstrate this technology to the farmers' field directly. As a result, during the year 2020-21, demonstration programmes were conducted at 10 different locations/ farmers' fields of Navagarh district. Stockings of Minor barb (Java Punti) fingerlings @2000 nos./ ha along with Indian Major Carps (Catla, Rohu and Mrigal) fingerlings @7000 nos./ha were done in the pond with the normal pond management practice as followed. The demonstration was conducted considering the carrying capacity of the pond at initial stage of aquaculture practices and potential growth rate of minor barbs for the initial 6 month of days of culture (DOC). The farmers abled to harvest fish (Java Punti) within 5-6 months of DOC with average body weight of 380g (Java Punti) and fish (Indian Major Carps) with average body weight of 830g at 10-11 months of DOC with net income of Rs. 185400/- per ha per annum with total yield of 21.6q/ha and additional production of 4.2q/ha. Field day was also conducted at farmers' pond involving the line department officials with active participation of other fish farmers from nearby blocks of the district. It is very surprising that within a very short span of time, this intercropping (fish) technology of aquaculture has become very popular among the fish farmers of Nayagarh district. It has spread over 6 blocks, out of 8 blocks of Nayagarh district, and fish farmers are getting very good return from it.



Indigenous bird 'Haringhata Black' transformed livelihood of poultry farmers

Backyard poultry farming has been found as an important livelihood option among the self-help group (SHG) members and farm women in Bankura district of West Bengal especially with *Haringhata Black*. It not only meets the nutritional security but also supports the additional income and as a whole increases the empowerment status. It is evident from the study that beneficiaries are well aware of taste of desi chicks and they are accustomed to rearing birds with their indigenous techniques. Adoption of *Haringhata Black* has found to be accelerated positive and vertical growth as taste of this bird beats other locally available birds like RIR, broilers etc. It has got high disease resistance and low mortality at field level in free ranging system too. It may be concluded that *Haringhata Black* poultry is genetically superior and they play an important role in self-employment in those particular area where the poultry farming is the only source of income e.g. feather can be used for making pillow, broom, other fancy things etc. Through selective breeding and vaccination, the superiority and survivability, respectively of the birds can be improved. Finally, the role of village people in conserving this indigenous/desi fowl breed may have remarkable opportunity.



After came in contact with the scientists of KVK Bankura in an awareness meeting organized by the KVK, Mrs. Sulata Mondal from Nityanandapur village, Sonamukhi block, Bankura district learned about the indigenous poultry production in the district specially about this new breed and its potential. She listened attentively as the KVK team shared their plan for commercialization of local chicken production. It was gut feeling that pushed her to be a part of the plan and made a decision to be part of the programme. The KVK suggested all the beneficiaries to be ready with low-cost poultry shelter and provided training on construction of low cost scientific poultry house using locally available materials. As soon as the shelter was ready, Mrs. Mondal along with other beneficiaries received 100 day old *Haringhata Black* chicks along with feed, poultry keeping guide book, vaccination schedule, an exercise book for record keeping and essential medicines as subsidy for one month.

From the first 100 batch of *Haringhata Black*, she hatched 450 chicks in her first attempt and raised those 450 to maturity. From those 450 birds in the 2nd cycle, she earned by selling 350 birds for worth Rs. 105000/- and egg of Rs. 61200/- after deducting inputs and transportation cost. She used part of her money to renovate her house, expand the poultry shed and paid fees for her children's education. Her story has inspired several women in Bankura district to join commercial production of *Haringhata Black* poultry especially after she

was elected as master trainer by KVK Bankura to mobilize other women in the area to start commercial production. It is a story of a strong-willed woman who has successfully splintered a coating which had for decades remained conglomerated in a vicious cycle of systems challenges, poor poultry keeping practices, fear for failure and general lack of a commercial drive; to free her family from the collar of poverty into improved livelihood.



Mrs. Mondal expressed her gratitude towards KVK Bankura for opening her eyes on the potential of *Haringhata Black* poultry birds. The KVK linked other poultry producers with input suppliers to promote access to essential inputs. Mrs. Mondal's story represents several other untold stories of over 300 farm women in Bankura district whose lives have been transformed through commercial production of *Haringhata Black* poultry. Within a period of one year of implementing the programme, local chicken production had increased from an average of 5-10 birds per beneficiary to 100-300 birds. The number of production cycles also increased from only 1 in 12-18 months to 3 in 12 months which enabling beneficiaries to earn more frequently from the venture. Mrs. Mondal opened a bank account for the first time in her lifetime using money earned from production of indigenous (*Haringhata Black*) poultry farming. She is one of the beneficiaries of the '*Nityanandapur Maa Sarada Krishak Adhikary Gosthi*' aided by WBCADC KVK Bankura with an objective of transforming the rural poultry subsector into a viable commercial enterprise. The story of Mrs. Mondal clearly shows that the increased indigenous poultry production can lead to increased household income, reduced poverty and improved livelihood for the poultry farmers.