

Sustainable income generation of the farmers through pig farming: A case study in Terai region of West Bengal

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Abstract

In India, majority of pig farmers are from backward section of population and follow traditional small-scale subsistence production system for their livelihood and food security. Pig farming may be a sustainable income generation way of the farmers in terai region of West Bengal due to availability of market. It was found from the survey that farmers of this region were perceived different constraints on pig farming. The major constraints were shortage of improved breed, lack of marketing network, credit linkage, knowledge and skill. Based on the above situation Krishi Vigyan Kendra, Cooch Behar conducted trainings and experimental programme on scientific pig farming from 2017 to 2019 in terai region of West Bengal. A case study was conducted to know impact of the experimental programme under different socio economic conditions. It was found from the study that annual income, house type, assets, employment generation & credit orientation of the farmers were increased after adoption of scientific pig farming technology. It was found from the study that net income of the farmers was more in case of Large White Yorkshire farming (Rs. 63000-75000) followed by Ghungroo pig farming (Rs. 40000-43000).

Keyword: Training; Demonstration; sustainable income generation; Ghungroo pig; Large White Yorkshire.

Introduction

World livestock production is going to be more and more complicated in order to improve efficiency needed to supply the rising demand for animal protein. Pig farming contributes in many ways to improve the sustainable income generation of marginal small farmers. Pig products provide for high value animal protein, the meat is easy to dress and has superior curing and storage qualities. Additional income is earned from the sale of animals and importantly from their products. This additional income can be used to invest in farm assets, pay for educational cost and health treatments (Klass, 2011). This is a well-accepted notion that the smallholder livestock production systems improve livelihood and food security for the poorest people. In addition to protein for human consumption, pigs are often one of the main sources of cash income in rural areas and provide manure for cropping. Swine rearing promotes better self-reliance along with greater food security to urban households (Mougeot, 2000). The importance of low protein and high protein (soyabean) diets on the nitrogen balance and productivity of pigs and additives like Lithium ascorbate to reduce stress for improvement of pork quality has been well described (Niyazov and Ostrenko, 2020; Ostrenko et al 2020; Tedtova et al). Work has been initiated globally on application of modern technologies like Crispr/Cas9 on pig breeding (Tinh et al 2020).

In India, majority of pig farmers are from backward section of population and follow traditional small-scale subsistence production system for their livelihood and food security. As per 19th Livestock census, out of the total 10.294 million pig population, the exotic/crossbred was 2.456 million while indigenous pigs were 7.837 million. Highest share of country's pig population was found in Assam (15.89%) followed by Uttar Pradesh (12.96%), Jharkhand (9.35%), Bihar (6.31%) and West Bengal (6.30%). Despite its demand in the local market, the country has remained in undeveloped stage in swine production mostly due to social hindrances associated with the pig. The traditional pig farmers follow subsistence driven production system characterized by unhygienic production and low productivity. As per the report of the Department of Agricultural Research and Education (DARE), (2012-13), domestic production of pork was 0.45 mt with an average meat yield of about 39 kg/ animal, which is lower than the world average (79 kg/animal). Pig production, among other species has a higher potential to contribute to more economic gain due to the pigs have higher fecundity, higher feed conversion efficiency, early maturity, shorter generation interval and relatively smaller space requirement. Apart from providing meat, it is also a source of bristles and manure. Pig farming provides employment opportunities to seasonally employed rural farmers and supplement income to improve their living standards.

Cooch Behar district of West Bengal is situated bordering to Assam, the gateway to NE states which harbours the major part of the pig population of the country. Cooch Behar and adjoining districts including Alipurduar and Jalpaiguri is a part of special geographical location known as Dooars, which shares border with Bhutan and Bangladesh. For a considerable portion of the population (>50%) belongs to backward section in this part of the state. Pig production which contributes a significant part of rural economy and traditional culture is very common the region. Visit in the locality is sufficient to enumerate some of the basic problems in pig husbandry practices in the locality. Unavailability of quality germplasm, lack of knowledge and skill for scientific production, less credit orientation are some of the basic hindrances associated with this enterprise. Undertaking more training, demonstration and technology intervention programmes on improved pig farming for the greater benefit of the farming community have been recommended by researchers (Hemchandra et al., 2017, Tsado *et al.*, 2014) and extension functionaries for encouraging small farmers for scientific pig production with the aim to enhance production, productivity and livelihood security. Keeping this in view Cooch Behar KVK conducted different types of training and demonstration programme on pig farming. The present study was undertaken to find out the sustainable income generation of the farmers through pig farming under the guidelines of KVK, Cooch Behar.

Materials and Methods

A ground level of survey was conducted in different villages of Cooch Behar District for to know the status of pig farming. It was found from the survey that training & demonstration were need for development of pig farming in Cooch Behar District. Cooch Behar Krishi Vigyan Kendra arranges 3 numbers of training programme on scientific method of pig farming during 2017-18 (Table 1). Total 87 participants were participated in the programme. The programme was conducted with the help of University scientist, block livestock development officer & veterinary doctor. Different training method & tools were used for development of knowledge, skill and attitude of the farmers. It was found from the study that knowledge, skill and attitude of the farmers were increases after the training programme. Trainees were regularly monitored through field visit, phone call and use of different e-resources. It was observed from the study that majority of the trainees started pig farming with the technical help of KVK. But it was observed that knowledge and skill distortion rate of the trainees were high during

implementation of the pig farm. On the basis of study an experimental trial was conducted on scientific method pig farming (breed *Ghungroo, Large White Yorkshire*) in different block of Cooch Behar district (Mathabhanga-II, Cooch Behar-II, Cooch Behar-I and Tufanganj-II Block). 60 numbers of Ghungroo piglets & 10 numbers of Large White Yorkshire piglets were distributed among the 20 number of interested farmers for experimental purpose. Regular vaccinations were provided from Krishi Vigyan Kendra, Cooch Behar. A details case study was conducted on 5 numbers of pig farmers (F₁, F₂, F₃, F₄ and F₅) selected randomly from 20 numbers of farmers (sampling frame). The study was conducted from September, 2016 to March, 2020. The work is done following steps

- a) Benchmark survey: Identification of training need & demonstration programme (Year: 2016)
- b) Data analysis & interpretation
- c) Conducting the training programme with the help of University and KVK scientist, block livestock development officer & veterinary doctors (Year: 2017-18).
- d) Evaluation of training (knowledge, skill, attitude, adoption)
- e) Demonstration of improved Ghungroo & Large White Yorkshire piglet breed under different conditions (Year: 2017-18, 2018-19 & 2019-20).
- f) Evaluation of the demonstration for check of economic sustainability of breed and socio-economic development of farmers (Year: 2019-20).
- g) Impact analysis of the demonstration & the farmers' feedback (Year: 2019-20).

Table no. 1: Training on pig farming, year 2017

Sl. No.	Year	Participant					
		SC	ST	Others (GEN/OBC)	Male	Female	Total
1	2017	12	14	4	30	0	30
2	2017	8	17	0	25	0	25
3	2017	14	12	6	26	6	32
Total		34	43	10	81	6	87
A	% Participation	39.08	49.42	11.50	93.10	6.90	100
B	Adoption	20	38	10	66	2	68
C	% Adoption	58.82	88.37	100	81.48	33	78.16

Results and Discussion

It is found from the study that (Table 1) ST farmers (49.42%) were more participated in training programme followed by SC (39.08%) & Others (GEN/OBC) (11.50%) category farmers. It is revealed from the study that ST farmers were more interested in pig farming followed by SC & GEN/OBC category farmers. This finding is in line with the study found by Seth *et al.* (2016). It is also found from the study that adoption percentage of pig farming technology was more in case of GEN/OBC (100%) category farmers followed by ST (88.37%) and SC (58.82%) category farmers. It is observed from the table 1 that male farmers were more participated (93.10%) in the training programme followed by female farmers (6.90%) and adoption percentage of pig farming was more by male farmers (81.48%) followed by female farmers (33%).

The distribution of technology (T₁ to T₅) according to the socio-economic condition of the farmers is depicted in the table 2. It is shown from the table 2 that five numbers of technological options were experimented in the farmers' field. It is exposed (table no. 2) from the study that majority farmers were marginal farmers (F₁, F₂, F₃, F₃) followed by small farmer (F₄). It is also found from the study that majority of the farmers were primary school pass (F₁, F₃, F₅) followed by high school pass (F₂, F₄).

It is found from the study that (Table 3) annual income the F₁ farmers (Rs. 210000) was more after pig farming, followed by F₂ (Rs. 96000), F₄ (Rs. 70000), F₅ (Rs. 50000) and F₃ (Rs. 40000) farmers. It is revealed from the study that Technology option 1 (T₁) was more profitable followed by technology option 2 (T₂), technology option 4 (T₄), technology option 5 (T₅) and technology option 3 (T₃). But it is also observed that socio-economic condition of the F₁ farmer was high followed by F₂, F₄, F₅ and F₃ farmer. So it is revealed that technology option of pig farming and basic socio-economic conditions influenced the annual income of the farmers. It is observed from the study that house type of F₃ and F₅ farmer and assets of F₃, F₄ and F₅ farmer were change after the adoption of the pig farming practices. It is also found from the table 3 that credit orientation (F₁ & F₄) & employment generation (F₁, F₂) of the farmers were positively increases. It is revealed from the study that (Table. 4) benefit cost ratio was more in case of Large White Yorkshire farming (3.73-3.92) followed by Ghungroo pigs farming (3.15-3.22). It is also exposed from the study (F₂) that (Table 4 & 5) net income of the farmers were more in case of Large White Yorkshire farming (Rs.63000-75000) followed by Ghungroo pig farming (Rs. 40000-43000).

Table 2: Technology option according to the socio economic conditions of the farmers

Name of the Farmer	F ₁	F ₂	F ₃	F ₄	F ₅
Caste	SC	SC	ST	ST	ST
Land holding (acre)	2.0	1.5	1.6	5.0	1.5
Educational qualification	Primary school pass	Higher secondary pass	Primary school pass	Higher secondary pass	Primary school pass
Technology	Two numbers of Large White Yorkshire breed (male & female), Pucca shelter, good drainage, regular vaccination facility, good quality feed supply (T ₁)	Two numbers of Large White Yorkshire breed (male and female), Mixed shelter, with medium drainage & regular vaccination facility, good quality feed supply (T ₂)	Two numbers of Ghungroo pig breed (male and female), temporary shelter, no drainage facility, regular vaccination, good quality feed supply (T ₃)	Two numbers of Ghungroo pig breed (male and female), Mixed Shelter, good drainage vaccination and good quality feed supply (T ₄)	Two numbers of Ghungroo pig breed (male and female), temporary shelter, good drainage, regular vaccination facility, good quality feed supply (T ₅)

Table 3: Socio economic impact of the experimental trial

Variables	F ₁			F ₂			F ₃			F ₄			F ₅		
	Before	After	Increase	Before	After	Increase	Before	After	Increase	Before	After	Increase	Before	After	Increase
1 Annual Income (Rs.)	150000	360000	210000	110000	206000	96000	90,000	130000	40000	110000	18,0000	70000	90,000	140000	50000
2 House type	Pacca	Pacca	-	Pacca	Pacca	-	Kachha	Mixed	Mixed	Mixed	Pacca	Pacca	Kaccha	Mixed	Mixed
3 Assets	TV, Motorcycle	Not Change		TV, Motorcycle	Not change		TV,	TV, Motorcycle	Motorcycle	TV, Tractor	TV, Fridge, Tractor	Fridge	-	TV	TV
4 Employment generation	-	1	1	-	1	1	-	-	-	-	-	-	-	-	-
5 Credit from bank		Yes		-	-		-	-	-		Yes		-	-	-

Table 4: Economic analysis of Large White Yorkshire and Ghungroo pig breed

Breed	Total Cost* (Rs.)	Profit from meat (Rs.)	Number of piglet in year	Piglet price (Rs.)	Income from piglet (Rs.)	Total income (Rs.)	Net income (Rs.)	Benefit Cost Ratio
Ghungroo pig	18000-20000	34000-36000	8-9	3000	24000-27000	58000-63000	40000-43000	3.15-3.22
Large White Yorkshire	23000-25000	46000-50000	10-12	4000	40000-48000	86000-98000	63000-75000	3.73-3.92

Table no. 5: Cost Breakup (Rs.) of large white York shire and Ghungroo pig breed

Breed	Piglet cost (Rs.)	feed (Rs.)	Others cost (Rs.)(Labour, electric, Medicine, Shelter)	Mortality rate
Ghungroo Pig	2500-3000	3500-5000	1500-2000.00	3%
Large White Yorkshire	4000-4500	3500-5000	1500-2000.00	2%



Conclusion It is revealed from the study that ST farmers were more interested in pig farming followed by SC & GEN/OBC category farmers but in case of technology adoption it is observed that adoption percentage of GEN/OBC category farmers were more followed by SC and ST category farmer. It is revealed from the study that male farmers were more interested in pig farming than female farmer. It is exposed from the study that marginal and less educated farmers were more interested in pig farming. It is concluded from the study that both Ghungroo and Large White Yorkshire are profitable which is influenced the farmers socio-economic condition and additional employment generation. From the comparative point of view it is observed that Large White Yorkshire is more profitable than Ghungroo breed. It is concluded from the study that scientific pig farming is a way of sustainable income generation of the farmers.

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