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A Study on Perceptions of Milk Producers in Andhra Pradesh about the Concept of Eco-Health Practices in Dairy Farming

GRK Sharma¹, Yerramareddy Roopa²

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Author's Affiliation

¹Professor and university head, ²PhD Scholar & Author for correspondence, Department of Veterinary and Animal Husbandry Extension Education, Sri Venkateswara Veterinary University, Tirupati, Andhra Pradesh 517501, India.

Corresponding Author:

GRK Sharma, Professor and university head, Department of Veterinary and Animal Husbandry Extension Education, Sri Venkateswara Veterinary University, Tirupati, Andhra Pradesh 517501, India.

E-mail: sharmagr@yahoo.com

Abstract

The present study was conducted in three different regions of Andhra Pradesh state and one district from each region was selected purposively. 120 milk producers were randomly selected i.e 20 from rural and 20 from urban area of each district comprising 40 from each district with the help of interview schedule. The independent variables like age, educational qualification, family type, main occupation, land holding, experience in dairy farming, mass media exposure, extension contact, information seeking behavior, economic orientation, scientific orientation and management orientation were significantly associated with perception level of milk producers at $P < 0.01$. The present study highlights the perception level of milk producers about Eco-Health practices in dairy farming and the importance of personal, socio-economic, communication and psychological profile for changing the perceptions and for executing the any programmes related to dairy sector for environmental safety, public health and product safety

Keywords: Perception; Eco-Health Practices; Milk Producers; Dairy Sector; Andhra Pradesh.

Introduction

India has been the largest producer of milk and milk products from last few decades. Majority of the Indian dairy sector was occupied by marginal and small farmers where quality is a big concern because most of the milk produced and distributed through informal chains. For gaining more profits majority of the farmers were following unethical practices and using misapplications which are not safe for public and environment (Ozturket al. 2019). Although a great extent of trainings are being carried out in the state departments on dairy production system, but the sad part is that farmer are interested in producing more milk rather than clean milk. One Health collaborative effort involving experts from a wide range of disciplines working for reducing the problems. Positive perception on Eco-Health practices in dairy farm assist milk producers to

increase their awareness and make them to explore more for increasing returns by following simple management practices, create coordination with stakeholders involved in dairy sector and make them aware of the public health risks associated with adulteration. So the study was planned to document the perception levels of rural and urban milk producers from three districts of Andhra Pradesh state towards Eco-Health practices in dairy sector with respect to environmental aspects, human aspects and product safety.

Methodology

The present study was conducted in three regions of Andhra Pradesh state. One district from each region that is Chittoor district from Rayalaseema, Krishna district from Coastal and Vishakhapatnam district from North coastal region were selected.

Table 1: Perception of milk producers about Eco-Health practices with respect to environmental aspects.

Perception about	Districts																	
	Visakhapatnam						Krishna						Chittoor					
	Rural			Urban			Rural			Urban			Rural			Urban		
	A	UD	D	A	UD	D	A	UD	D	A	UD	D	A	UD	D	A	UD	D
Do you agree that climatic conditions are changing drastically	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)
Production may change due to climate change	6(30)	10(50)	4(20)	9(45)	8(40)	3(15)	9(45)	9(45)	2(10)	10(50)	9(45)	1(5)	9(45)	11(55)	0(0)	11(55)	9(45)	0(0)
Human activities are responsible for climate change	12(60)	8(40)	0(0)	13(65)	7(35)	0(0)	15(75)	5(25)	0(0)	16(80)	4(20)	0(0)	14(70)	6(30)	0(0)	17(85)	3(15)	0(0)
If humans follow the same undesirable activities will bring harm to environment	13(65)	7(35)	0(0)	14(70)	6(30)	0(0)	15(75)	5(25)	0(0)	16(80)	4(45)	0(0)	15(75)	5(25)	0(0)	17(85)	3(15)	0(0)
Environmental temperatures, pollution, deterioration of soil and water are the major problems for dairy farming in Andhra Pradesh	6(30)	10(50)	4(20)	6(30)	14(70)	0(0)	6(30)	14(70)	0(0)	9(45)	11(55)	0(0)	7(35)	13(65)	0(0)	11(55)	9(45)	0(0)
Is it crucial to control environmental pollution from dairy sector	12(60)	8(40)	0(0)	10(50)	10(50)	0(0)	12(60)	8(40)	0(0)	15(75)	5(25)	0(0)	13(65)	7(35)	0(0)	16(80)	4(20)	0(0)
Do you agree that farm input cost may increase due to environmental pollution, rising temperatures, soil and water deterioration	8(40)	12(60)	0(0)	9(45)	11(55)	0(0)	10(50)	10(50)	0(0)	11(55)	9(45)	0(0)	13(65)	7(35)	0(0)	15(75)	5(25)	0(0)
Controlling the changes in environment, soil and water can increase profitability in dairy farm	6(30)	14(70)	0(0)	7(35)	13(65)	0(0)	8(40)	12(60)	0(0)	11(55)	9(45)	0(0)	10(50)	10(50)	0(0)	14(70)	6(30)	0(0)
Methane is one of the responsible gas for increasing environmental temperatures	2(10)	8(40)	10(50)	3(15)	8(40)	9(45)	6(30)	9(45)	5(25)	6(30)	10(50)	4(20)	5(25)	8(40)	7(35)	8(40)	9(45)	3(15)
Treating dairy effluents before releasing into the environment is an important step in dairy farm	0(0)	16(80)	4(20)	1(5)	16(80)	3(15)	2(10)	16(80)	2(10)	4(20)	16(80)	0(0)	3(15)	17(85)	0(0)	5(25)	15(75)	0(0)

Poor microbiological quality of drinking water may adversely affect health and productivity of animals.	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)
Proper dung management can reduce vectors	5(25)	15(75)	0(0)	11(55)	9(45)	0(0)	9(45)	11(55)	0(0)	14(70)	6(30)	0(0)	12(60)	8(40)	0(0)	15(75)	5(25)	0(0)
Dung heaps should be covered with plastic sheets or other fly-proof material	0(0)	6(30)	14(70)	2(10)	6(30)	12(60)	2(10)	4(20)	14(70)	3(15)	6(30)	11(55)	2(10)	7(35)	11(55)	6(30)	9(45)	5(25)
Poor handling of manure and fertilizers can degrade local water bodies	0(0)	4(20)	16(80)	4(20)	8(40)	8(40)	3(15)	6(30)	11(55)	8(40)	9(45)	3(15)	5(25)	8(40)	7(35)	8(40)	12(60)	0(0)
Humans coexist in a complex, interdependent relationship with animals and environments	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)
There is a relationship between environmental pollution, food safety, and health problems.	17(85)	3(15)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)
Irregular use of antibiotics in animal husbandry partly imparted the antimicrobial resistance in human beings.	3(15)	7(35)	10(50)	4(20)	7(35)	9(45)	3(15)	15(75)	2(10)	6(30)	14(70)	0(0)	4(20)	11(55)	5(25)	6(30)	14(70)	0(0)
Continuous changes in environment may lead to emergence of new diseases	6(30)	14(70)	-	13(65)	7(35)	0(0)	12(60)	8(40)	-	15(75)	5(25)	0(0)	13(65)	7(35)	0(0)	20(100)	0(0)	0(0)
There is a dire need for training on eco-health practices	18(90)	2(10)	0(0)	19(95)	1(5)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)

Figure in parenthesis indicate percentage

From every district 20 urban and 20 rural milk producers' areas were selected randomly, complaining 120 from three districts. Rural and Urban milk producers were personally interviewed with the help interview schedule. The milk producers were categorized based on the value obtained by dividing the maximum possible score with three since they were grouped separately into three categories i.e., low, medium and high level of awareness. The range for low, medium and high

perception levels for Eco-Health practices with respect to environmental aspects was <13, 13 to 26 and more than 26 respectively, for human aspects it was <8, 8 to 16 and >16 and for product safety it was <6, 6 to 12 and >12 respectively.

The perception levels was measured on three point continuum i. e. agree (score 2), undecided (score 1) and disagree (score 0) for positive statements and reverse for negative statements.

Table 2: Perception of Milk Producers about Eco-Health Practices with Respect to Human Aspects.

Perception about	Districts																	
	Visakhapatnam						Krishna						Chittoor					
	Rural			Urban			Rural			Urban			Rural			Urban		
	A	UD	D	A	UD	D	A	UD	D	A	UD	D	A	UD	D	A	UD	D
Regular testing of milk producer against zoonotic diseases is one of the important management practice in farm	6(30)	3(15)	11(55)	7(35)	5(25)	8(40)	6(30)	8(40)	6(30)	9(45)	8(40)	3(15)	7(35)	7(35)	6(30)	11(55)	5(25)	4(20)
It is necessary to test a milker for diseases	6(30)	3(15)	11(55)	7(35)	5(25)	8(40)	6(30)	5(25)	9(45)	8(40)	8(40)	4(20)	6(30)	7(35)	7(35)	10(50)	6(30)	4(20)
Sick milker can milk the animals	14(70)	1(5)	5(25)	12(60)	2(10)	6(30)	10(50)	4(20)	6(30)	5(25)	7(35)	8(40)	8(40)	7(35)	5(25)	4(20)	7(35)	9(45)
Washing hands, trimming nails, covering head and cleanliness during milking is essential	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	19(95)	0(0)	1(5)	20(100)	0(0)	0(0)
Do you agree that knuckling method of milking is a best practice	12(60)	0(0)	8(40)	6(30)	5(25)	9(45)	5(25)	8(40)	7(35)	4(20)	7(35)	9(45)	6(30)	7(35)	7(35)	3(15)	6(30)	11(55)
Dairy animals should be inspected every day in addition to observation at milk.	4(20)	4(20)	12(60)	5(25)	7(35)	8(40)	8(40)	6(30)	6(30)	8(40)	7(35)	5(25)	7(35)	8(40)	5(25)	10(50)	5(25)	5(25)
Using milk from diseased animal is not a bad practice	14(70)	0(0)	6(30)	11(55)	0(0)	9(45)	6(30)	6(30)	8(40)	4(20)	6(30)	10(50)	6(30)	5(25)	9(45)	4(20)	4(20)	12(60)
Is it the right practice to sell or consume the milk of an animal immediately after antibiotic treatment	10(50)	8(40)	2(10)	8(40)	9(45)	3(15)	14(70)	4(20)	2(10)	7(35)	8(40)	5(25)	12(60)	4(20)	4(20)	7(35)	6(30)	7(35)
Antibiotics have a permanent effect on milk production	5(25)	13(65)	2(10)	4(20)	12(60)	4(20)	5(25)	9(45)	6(30)	4(20)	8(40)	8(40)	5(25)	9(45)	6(30)	4(20)	5(25)	11(55)
Antibiotics have no side effects if used irregularly	0(0)	17(85)	3(15)	0(0)	16(80)	4(20)	0(0)	14(70)	6(30)	0(0)	11(55)	9(45)	0(0)	13(65)	7(35)	0(0)	9(45)	11(55)

Immediately stopping the course of antibiotics when the disease subsides is a wrong practice	2(10)	4(20)	14(70)	4(20)	2(10)	14(70)	6(30)	6(30)	8(40)	9(45)	5(25)	8(40)	7(35)	6(30)	7(35)	11(55)	5(25)	4(20)
Vaccine can permanently reduce milk production.	10(50)	4(20)	6(30)	8(40)	5(25)	7(35)	5(25)	9(45)	6(30)	5(25)	8(40)	9(45)	6(30)	7(35)	7(35)	4(20)	5(25)	11(55)

Figure in parenthesis indicate percentage.

Table 3: Perception of milk producers about Eco-Health practices with respect to product safety.

Perception about	Districts																	
	Visakhapatnam						Krishna						Chittoor					
	Rural			Urban			Rural			Urban			Rural			Urban		
	A	UD	D	A	UD	D	A	UD	D	A	UD	D	A	UD	D	A	UD	D
Following clean milk production practices can increase production and farm economy	10(50)	10(50)	0(0)	12(60)	8(40)	0(0)	15(75)	5(25)	0(0)	16(80)	4(20)	0(0)	15(75)	5(25)	0(0)	18(90)	2(10)	0(0)
Regular checking of containers cleanliness is essential for maintaining milk quality	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)
Dairy animals cannot not be milked in same shed where they are housed normally	0(0)	10(50)	10(50)	2(10)	7(35)	11(55)	5(25)	6(30)	9(45)	7(35)	6(30)	7(35)	6(30)	7(35)	7(35)	8(40)	7(35)	5(25)
It is necessary to provide separate milking area for milking animals	0(0)	5(25)	15(75)	2(10)	7(35)	11(55)	5(25)	6(30)	9(45)	7(35)	6(30)	7(35)	6(30)	6(30)	8(40)	8(40)	7(35)	5(25)
The milking place should be clean, dry and protected from flies	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)
The milking area should be cleaned after every milking	0(0)	4(20)	16(80)	2(5)	7(35)	11(55)	4(20)	5(25)	11(55)	7(35)	5(25)	8(40)	6(30)	6(30)	8(40)	10(50)	7(35)	3(15)
Pre-dipping of teats with sanitizing solution for at least 30 seconds can increase milk quality	0(0)	20(100)	0(0)	3(15)	17(85)	0(0)	4(20)	16(80)	0(0)	6(30)	14(70)	0(0)	4(20)	16(80)	0(0)	8(40)	12(60)	0(0)
Milk adulteration is a bad practice	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)	20(100)	0(0)	0(0)
Dairy products should always be stored in hygiene and cool temperatures	6(30)	14(70)	0(0)	9(45)	11(55)	0(0)	12(60)	8(40)	0(0)	15(75)	5(25)	0(0)	14(70)	6(30)	0(0)	17(85)	3(15)	0(0)

Figure in parenthesis indicate percentage

Results and Discussion

The collected data was tabulated and analysed with the help of SPSS version 23.

Table 1, 2 and 3 indicate the perception of milk producers on Eco-Health practise with respect to environmental aspects, human aspects and product

safety respectively. From Krishna and Chittoor district majority of the milk producers had greater perception levels compared to Visakhapatnam district but still not up to the mark. Milk producers had greater perception levels for environmental aspects compared to animal aspects and product safety. Majority of the people still following the traditional practise which are undesirable to present situations. This may be due to lack of participatory training programmes that are mainly focusing on general management practices, lack of published information on risks related to unhygienic and false practices and unhygienic farm condition. So there is a need for regular and consistent extension advisory services delivery for understanding the interaction between animals-human-environment and there is a need to raise awareness regarding risks related to this interaction. The public health and animal health officials should work together for bringing the awareness and changing the perceptions of the milk producers. The results are in agreement

with the results of Gupta et al.(2020), Singh. (2019) Ozturk et al.(2019), Lindahl et al.(2018), Rati and Shehrawat (2015) and Andrew et al.(2012). It is clear from Table 4 that majority of Visakhapatnam rural milk producers had medium perception levels regarding environmental aspects (65%), low perception levels regarding human aspects (60%) and medium perception levels regarding product safety (75%). Majority of Visakhapatnam urban milk producers had high perception levels score regarding environmental aspects (60%), low perception levels regarding human aspects (40%) and medium perception levels regarding product safety (60%). Whereas majority of the Krishna (75% & 80%) and Chittoor (90% & 75%) district milk producers from rural and urban area had high perception levels with respect to environmental aspects. Majority of the urban milk producers of Krishna (45% & 60%) and Chittoor district (60% & 75%) had high perception levels regarding Eco-Health practices with respect to human aspects

Table 4: Distribution of milk producers according to their perception levels.

Perception with Respect to	Category	Districts					
		Visakhapatnam		Krishna		Chittoor	
		Rural area (n=20)	Urban area (n=20)	Rural area (n=20)	Urban area (n=20)	Rural area (n=20)	Urban area (n=20)
Environmental aspects	Low (<13)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
	Medium (13-26)	13(65)	8(40)	5(25)	4(20)	2(10)	5(25)
	High (>26)	7(35)	12(60)	15(75)	16(80)	18(90)	15(75)
Human aspects	Low (<8)	12(60)	8(40)	5(25)	4(20)	2(10)	5(25)
	Medium (8-16)	2(10)	5(25)	9(45)	7(35)	13(65)	3(15)
	High (>16)	6(30)	7(35)	6(30)	9(45)	5(25)	12(60)
Product safety	Low (<6)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
	Medium (6-12)	15(75)	12(60)	13(65)	8(40)	10(50)	5(25)
	High (>12)	5(25)	8(40)	7(35)	12(60)	10(50)	15(75)

Figure in parenthesis indicate percentage

and product safety and rural area milk producers comes under low level category. So awareness of milk producers on Eco-Health practices can change the perspective and milk producers consider the threats due to bad managemental practices, unhygienic milk production and feel responsible for that.

From Table 5 it is clear that age, educational qualification, family type, main occupation, land holding, experience in dairy farming, mass media exposure, extension contact, information seeking behavior, economic orientation, scientific

orientation and management orientation were significantly associated with perception level of milk producers at $P < 0.01$. Two independent variables namely gender and herd size were significantly associated at $P < 0.05$.

The variable age was significantly associated with milk producer's perception towards eco-health practices. It indicates that as age decreases the perception level of milk producers increases. This may be due to the fact that middle and young age milk producers had high level of education compared to old age group. There is a significant

association between milk producer's perception and educational qualification towards Eco-Health practices. Education is must for everything where dairy farming is not an excuse.

Table 5: Association between milk producer's perception and their independent variables (n=120)

Independent Variable	Chi-Square value (X ²)
Age	49.772**
Gender	7.278*
Educational qualification	80.157**
Family Size	4.253NS
Family Type	12.610**
Main Occupation	17.840**
Land Holding	33.448**
Herd Size	7.288*
Experience in Dairy Farming	15.731**
Gross Annual Income	2.379NS
Dairy Farm Management	0.066NS
Mass Media Exposure	75.616**
Extension Contact	44.178**
Information Seeking Behavior	71.449**
Economic Orientation	61.208**
Scientific Orientation	56.180**
Management Orientation	71.074**

NS-non significant;*-Significant at 5%;**-Significant at 1%

This may be reason that higher the education levels higher the milk producer's perception levels. Family type was significantly associated with milk producer's perception towards Eco-Health practices. This tendency may be attributed to the fact that the majority of milk producers come from nuclear families, where each member has the ability to make own decisions and have fewer members in the family, facilitates higher allocation of money on dairy farm leading them to explore more technologies and change the perceptions in positive way.

Main occupation was significantly associated with milk producer's perception towards Eco-Health practices. The probable reason may be due to the fact that the constant engagement in dairy farming by milk producers may lead to positive perceptions regarding environmental aspects, human aspects and product safety. Land holding was significantly associated with the milk producer's perception regarding Eco-Health practices. This may be due to the fact that greater land holding provide greater incentive in terms of adoption and applicability of technologies which can change the perceptions of milk producers in positive way. Experience in dairy farming was significantly associated with the milk

producer's perception on Eco-Health practices. More the experience, the higher the perception levels. This may be due to the fact that having a lot of experience in dairy sector affects the milk producer's perception since they constantly expose to different circumstances.

Mass media exposure was significantly associated with the milk producer's perception regarding Eco-Health practices. This indicate that milk producers with higher mass media exposure had higher perceptions towards Eco-Health practices. Extension contact was significantly associated with the milk producer's perception towards Eco-Health practices. This indicate that milk producers with greater extension contact had higher perception levels. This could be attributed to the fact that frequent contact with extension officials has increased the information sources regarding dairy farming which may lead to have higher perception levels regarding Eco-Health practices. Information seeking behavior was significantly associated with the perception level of milk producers towards Eco-Health practices.

Milk producers with higher information seeking behavior had higher perception levels regarding Eco-Health practices. There was a significant association between the milk producer's perception and economic orientation. The possible reason could be that, farmers who wants to improve the economic status will try to gain more information regarding preventive measure for producing safe milk. This may lead them to have greater perception levels on Eco-Health practices. Scientific orientation was significantly associated with the milk producer's perception levels with respect to Eco-Health practices.

The probable reason may be that the milk producer's perception on Eco-Health practices were mostly depend on education levels and communication profile which motivate the farmers to know more about Eco-Health practices. Management orientation was significantly associated with milk producer's perception towards Eco-Health practices. This trend may be due to the fact that farmers with more management orientation which is comprises of planning and production management are more likely to have greater perception levels because management orientation in turn decided by factors like economic orientation and scientific orientation.

Conclusion

The findings of the study concluded that the

perception level of milk producers towards Eco-Health practices with respect to Environmental aspects, human aspects and product safety was low in rural areas of Visakhapatnam, Krishna and Chittoor districts compared to urban areas. And even in urban areas it was not up to the mark. This may be due to lack of exposure to different practices which are environmentally safe and had less public health risks. So there is a need that experts from different fields should come together to provide information's and demonstrations for better understanding, to bring the change in the perception levels of milk producers regarding the concepts of Eco-Health and its importance in dairy sector by considering the socio-economic characters, communication profile and psychological profiles.

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Production Economics of Ginger (*Zingiber officinale* Rosc.) in Doti District, Nepal

Sandesh Dahal¹, Binod Adhikari², Hari Poudel³, Anima Pokhrel⁴

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Author's Affiliation:

^{1,2,3}Department of Agriculture, Agriculture and Forestry University, Chitwan, Nepal,
⁴Institute of Agriculture and Animal Science, Paklihawa Campus, Tribhuvan University, Rupandehi, Nepal

Corresponding Author:

Sandesh Dahal, Department of Agriculture, Agriculture and Forestry University, Chitwan, Nepal

E-mail: dahalsandesh49@gmail.com

Abstract

Ginger is one of the major spice crops that contribute substantially in rural people livelihood across the mid-hills of Nepal. Despite being a high-value crop, it is cultivated at a subsistence level and hence the farmers are less benefited than expected. So, a study was conducted to investigate the economics of ginger farming in Doti district. A total of 60 respondents were selected randomly from the purposive sampling frame of ginger growers in Jorayal rural municipality. A semi-structured questionnaire, Focus Group Discussion (FGD), Key Informant Interview (KII), and field observations were used to obtain primary data. And published documents from governmental and non-governmental organizations were used as secondary sources of data. The obtained data were analyzed using SPSS and MS-Excel. The findings revealed that the average area under ginger cultivation as 1.87 ropani with a productivity of 18.18 Mt/ha. The average cost of cultivation was found to be NRs 30669.65 with the B:C ratio of 1.63. The marketing margin of NRs 34.17 was observed with 59.88% of producer share in consumer price. Thus, ginger farming in Doti district was found to be profitable which needs to be commercialized for better profits. w

Keywords: Production cost; B:C ratio; Profit; Rural livelihood.

Introduction

Ginger is one of the most important spice crops, traditionally grown in the mid-hills of Nepal, for the generation of cash incomes. Ginger has the potential to enhance rural people's socio-economic situation by increasing their income as a high-value spice crop (NSCDP 2007) having high export potential (HVAP 2011). So, it has been taken as one of the major sectors in supporting the livelihood of rural people, especially to poor, marginal, and disadvantaged communities who are engaged in agriculture (USAID Nepal 2011).

Nepal is the fourth largest country in terms of ginger production after India, China, and Indonesia (Zoder 2017). In Nepal, the ginger was cultivated over the area of 23,000 hector (ha) of land which

produced about 284,000 Metric Ton (MT) in the year 2017/18 (MoALD 2018). It contributed about 1.3% of total exports with an export value of about 509 million NRs in 2012/13 (TEPC 2018). Ginger is one of the nineteen commodities having high export potentials in Nepal (NTIS 2016). About 75% of the Nepalese ginger is traded in fresh form and the remaining 25% in processed form, mainly as 'sutho' & powdered ginger, almost all to India only (about 99%) (TEPC 2018).

Doti is only the sixth most ginger-producing district in Nepal after Illam, Salyan, Palpa, Nawalprasi, and Morang although it has higher productivity than other major districts (NSCDP, 2014). The total area under ginger production in Doti in fiscal year (FY) was 715 ha that produced

about 10725 MT (MoALD 2018). In the FY 2014/15, the production of ginger in Doti was 16050 MT in the total area of 1070 ha that shared about 60% of the total production of the Far-West region of Nepal (MoALD 2017). After then, the area under cultivation and production have declined in Doti although it has a higher productivity (15 MT/ha) than national average productivity (12.3 MT/ha) (MoALD 2018).

Agricultural growth is a crucial aspect in reducing poverty in Nepal, and increasing market research and product development can help to commercialize the country's agriculture industry (MoAD 2015). Despite being the backbone to rural community livelihood improvement, the profitability of this sub-sector is rarely investigated. Farmers being cultivating in limited fragmented land, the problems of timely availability of input, labor crisis and high cost of production, inefficient marketing channel and lower margin to farmers are most prevalent (Chalise et al. 2019; Mahat et al. 2019; Poudel et al. 2016). However, very few studies have been done focusing on the economic sector of ginger production in Nepal. So, to minimize this gap, a present study was done to analyze the economics of ginger production in ginger zone of the country.

Materials and Methods

Study area

Doti is the major district that contributes to ginger production in Sudurpashchim Province (Province -7) of Nepal. Realizing its potential, Prime Minister Agriculture Modernization Project (PMAMP) has recently established a ginger zone in Doti with the coverage area in Joroyal and Badikedar Rural Municipality. The study was conducted on Joroyal Rural Municipality, ward number 2, 4, and 6 as they come under the area of the ginger zone in Doti.

Sources of data

The farmers were interviewed with a pre-tested semi-structured questionnaire, which served as a primary source of data. Besides, the secondary data was collected from documents published by government bodies, NGOs and INGOs, and several published research articles. In addition to this, focus group discussion (FGD), key informant interview (KII), and field observation were done to verify the collected data.

Sample size and sampling techniques

The ginger growers of Joroyal rural municipality,

wards 2, 4 and 6 were selected as a sample population for the study. Based on the information from the zone profile, major ginger growers which were above 21 years were selected purposively for more reliable, realistic, and complete information. Among them, a total of 60 farmers were selected for study purpose by simple random sampling technique.

Data Analysis

All the collected data were carefully inspected and refined. After then, they were coded and entered into the computer software. Data entry was done by using Software Package, Statistical Package for Social Science (SPSS), and Microsoft excel sheet. Then, the data was analyzed to draw purposeful outcomes. The following information was analyzed during the study.

Cost of production

The total cost of cultivation was calculated using the following formula.

$$\text{Total cost} = \sum \text{variable cost} + \sum \text{fixed cost}$$

The variable cost included the farm expenditures on seed, land preparation, fertilizers & manure, pesticides, planting, mulching, weeding, irrigation, harvesting, packaging, transportation, and labor. The fixed cost here included the taxes, depreciation, and maintenance cost. These costs were listed as miscellaneous cost, as exact information was missing regarding these costs.

Benefit cost analysis

For benefit cost analysis, total costs of production of ginger and total gross return from the product were used and calculated as

$$\text{"B/C" ratio} = \frac{\text{Gross return from the product}}{\text{Total cost of cultivation}}$$

Where, gross return from the product = Quantity of ginger produced (kg) * Price (per kg)

Profit analysis

The profit is the difference between total revenue and total cost incurred. Thus, net profit was calculated as:

$$\text{Net profit} = \text{Total return (revenue)} - \text{Total cost}$$

Marketing margin and producer's share

The difference between the farm-gate price (price obtained by the producers) and the retailer's price (price paid by the consumers) is known as marketing margin. It was calculated as:

Marketing margin=Retailer’s price (Pr)- Farm gate price (Pf)

Similarly, producer’s share is the price received by the farmer expressed as a percentage of the retailer’s price. It was calculated as:

$$\text{Producer's Share (Ps)} = \frac{\text{farm gate price(Pf)}}{\text{retailer price(Pr)}} \times 100$$

Result and Discussion

Production and productivity of ginger

The study site had an area of 1.87 ropani of land under ginger cultivation on average with the production of 1730 kg of fresh ginger (Table 1). The productivity of ginger was found to be 18.18 Mt/ha which is higher than the national average of 12.34 Mt/ha and average productivity of the district, 15 MT/ha in 2017/18 (MoALD 2018). The study site has high productivity as it has suitable climatic conditions and soil characteristics.

Table 1: Area and production of ginger in Doti.

Variable	N	Mean Value
Area under cultivation	60	1.87 (ropani)
Production	60	1730 kg

Source: Field Survey, 2020

Economic Analysis

Cost and benefit analysis

The cost of cultivation was calculated based on variable cost of cultivation of ginger in 1 ropani of land in the study area. The variable cost includes the input cost, management cost, and harvesting cost. It was found that the average production cost of ginger in 1 ropani was NRS 30669.65 (Table 2).

Among different variable costs, the cost of seed covered about one-third of the total cost of production. The farmers were unknown about the seed treatments and hence did not carry out any seed treatment techniques. The farmers in the study area did not use any extra source of water apart from rainfall for irrigation in the ginger field. Similarly, the locally available mulching materials like bamboo leaves, dried weeds, and dry tree leaves were utilized for mulching purpose. Hence, seed treatment, irrigation, and mulching had no contribution to production cost.

The total return from ginger farming was estimated to be NRS 49900 per ropani. This resulted in B:C ratio of 1.63 which signifies that the ginger

farming in the study area is profitable. Similar profitability was reported in ginger cultivation in different parts of Nepal (Acharya et al. 2019; Poudel et al. 2016) including major hill districts (Bhandari, Kunwar, and Parajuli 2015). The B:C ratio was found to be lower than that of Sunsari district (2.06) as observed by Chalise et al., 2019.

Table 2: Cost of Production and Benefit of Ginger in Doti.

Particular	Total Cost (NRS)	Remarks
Seed treatment cost	0.00	No seed treatment was done
Seed cost	20200.00	
Land preparation cost	2449.15	
Planting cost	1583.33	
Mulching cost	0.00	Local resources were used
FYM cost	2579.17	
Weeding cost	1608.00	
Irrigation cost	0.00	Only rainfall was used
Harvesting cost	1750.00	
Miscellaneous	500.00	Coverage for fixed cost
Total cost of production (per ropani)	30669.65	
Total return (per ropani)	49900.00	
B:C ratio	1.63	

Source: Field Survey, 2020.

Profit Analysis

Table 3: Profit of ginger farming in Doti.

Particulars	Amount
Total Cost (TC)	30699.65
Total Revenue	49900.00
Net Profit	19200.35

Source: Field Survey, 2020

On calculating the net profit from ginger farming, it was found that the farmers had a net profit of NRS 19200.35 from one ropani of land in a year. So, ginger farming is one of the major sources of income for the farmers of the study area.

Marketing margin and producers share

The efficiency of marketing system was reflected by marketing margin and producers share. The marketing system operates efficiently when there is a lower marketing margin and higher producer share of consumer price. The present study revealed

that there was a higher gap (NRS 34.17) between the cost paid by the consumer (NRS 85.17) and price received by a farmer (NRS 51). Due to this low farm gate price and higher marketing margin, the producer share in consumer price was moderate (59.88%). Similar results were observed by Timsina, 2009 but the results were different from the findings of Khanal, 2018 who reported a marketing margin of NRS 94 and only 14.55% of the producer's share in ginger. This satisfactory result might be due to the short marketing channel, and accessible market availability in the study area.

Table 4: Marketing margin and producer's share of ginger farmers in Doti.

Particulars	Amount (NRs)
Farm gate price (per kg)	51
Retailer's price (per kg)	85.17
Marketing margin	34.17
Producer's share	59.88%

Source: Field Survey, 2020

Conclusion

The study concludes that ginger farming is done at the subsistence level even it has the high profitability as indicated by B:C ratio of 1.63 in ginger farming. So, by developing farming at a commercial scale, ginger cultivation can be developed as a means to improve the livelihood of the people of the study area. Efficient marketing channels should be developed to decrease the marketing margin and increase producer share in consumer price. Still, the research can be done covering a larger area involving commercial growers.

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Comparative Economics of Fish Co-operative Societies for Production and Marketing of Exotic and Local Breeds of fish for in Kabirdham districts of Chhattisgarh

Virendra Kumar Vishwakarma

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Author's Affiliation

Assistant Professor, Agricultural Economics, AKS University, Madhya Pradesh 485001, India.

Coresponding Author:

Virendra Kumar Vishwakarma, Assistant Professor, Agricultural Economics, AKS University, Madhya Pradesh 485001, India.

E-mail: kvirendra473@gmail.com

Abstract

Study has examined that comparative economics of Fish Co-operative Societies to production and marketing of exotic and local breeds of fish in Kabirdham districts of Chhattisgarh. The sampling has based on stratified randomly selected samples of Fish Co-operative Societies in study area. The selected sample of exotic breeds Fish Co-operative Societies has 06. However, the selected sample of local breeds' fish producer has 10 fish cooperative societies. The required primary data have been collect from the selected respondent by the survey method during the year 2015-19. The fish productivity of exotic breeds of samples Fish Co-operative Societies is 32.91qt per ha. However, the fish productivity of local breeds of samples Fish Co-operative Societies, is 18.53 qt per ha, respectively. The per hectare cost of exotic breeds of samples fish farmer, is Rs 61555.74 per ha, per ha respectively. However, the per hectare cost of local breeds of fish of samples Fish Co-operative Societies, is Rs 39041.93 per ha, respectively. The net return of exotic breeds of samples Fish Co-operative Societies, is Rs 149836.01 per ha respectively. However, the net return of local breeds of samples Fish Co-operative Societies is Rs 49383.59 per ha respectively. The cost benefit ratio of exotic breeds of samples Fish Co-operative Societies is 2.50: 1 respectively. However, in case cost benefit ratio of local breeds of samples Fish Co-operative Societies is 2.05: 1. The four marketing channel have been adopted in the study area and the most of the fish cooperative societies have sold the fish in channel fourth and sold quantity of fish, by fish cooperative societies is 3489.00 qt. and 72.92 percent in the channel fifth. Net received price and incurred marketing cost of samples Fish Cooperative Societies are Rs 5000 & Rs 000 per qt, Rs 5900 & Rs 195.00 per qt, Rs 8499.45 & Rs 1888.86 per qt and Rs 8490.19 & Rs 1443.99 per qt in the channel first, third, fourth and fifth respectively. the marketing efficiency and producer share in consumer rupees of Fish Cooperative Societies are 100.00 % & 100 %, 19.48 % & 75.00 %, 1.05 % & 68.77 % and 3.79 % & 73.96 % in the channel first, third, fourth and fifth respectively. It has observed that the channel first has most efficient for fish cooperative societies. The major socio economics constraints found that, restriction on medicine, feed and manure, lease processed poaching of fish and consumption & fish disposal etc. in the fish production, which in a weak position the fish production of both groups of fish producers. Fish producers are faced various constraints i.e. water stress, lack of the improved production technology unavailability of market and poor marketing facilities and poor credit and fiancé availability, poor storage facility and social and villager class conflict.

Keywords: Cost; Return; Cost Benefit Ratio; Local and Exotic Breeds of fish; Marketing cost; Marketing Efficiency and Producer share in consumer rupee.

Introduction

The first fishermen' Co-operative society had organized under the name "Kerala Machhimar Co-operative Society" in districts Ratnagiri of Maharashtra during 1913. After this fishermen co-operative society had established in Madras and Bengal in 1918. Fisheries co-operatives are functioning both in marine and inland sector. The structure of fish co-operative society varies from state to state. Co-operative helped the fishermen for using their resources and promote better with sustainable management of the fisheries themselves. These societies were undertaking the ponds or reservoir on behalf of leased hired as temporary, or permanent. Moreover, societies conduct the different activities like fish production, transportation, input arrangements, harvesting, and marketing of the produce etc. Society also severed for providing services like as credit, cold storage, warehouses and improved technology etc.

The major fish producing countries in the world are China, India, Indonesia, Vietnam and Bangladesh. The contribution of world aquaculture production of China is 45468.960 thousand tonnes, India contributes 4881.0 thousand tonnes, Indonesia contributes 4253.9 thousand tonnes, Vietnam contributes 3397.1 thousand tonnes and Bangladesh 1956.9 thousand tonnes. The net work of 429 FFDAs have brought about 8.08 lacs hectare of water area under modern fish culture operation benefiting approximately 13.86 lacs beneficiaries.

The rapid growth of the sector has generated huge employment opportunity for professional. Skilled and semi skilled workers for the different supports activities such as, construction and the management of the farm, hatcheries, feed mills, processing unit etc. It has been estimate that over 300,000 jobs have been generate in the brackish water sector alone in the main and supporting areas for shrimp culture. Although, information on exact numbers involved in aquaculture is not available.

The total aquaculture production in India is 4881.00 thousand tonnes which is 10 percent of world aquaculture production. India is the second largest country and covers the 0.5 to 3.0 per hectare productivity (Annual report 2016-17) of fish in the world aquaculture production. The share of inland freshwater and aquaculture is departed 46 percent in 1980 and covers 85 percent in total fish production. Fresh water aquaculture has overwhelming 10 folds growth, from 0.37 million tonne in 1980 to 4.03 million tonnes in 2010 with in an annual growth rate of over 6 percent. Freshwater

aquaculture contributes 95 percent of the total aquaculture production.

Three Indian major carps i.e. Catla (catla catla) Rohu (labia rohita) and Mrigal (cirrhines mrigala) contribute the bulk production to the extent of 70 to 75 percent of the total fresh water fish production followed by silver carp, grass carp, common carp, and catfish farming in second important group contributing the balance of 25- 30 percent.

Aquatic resources have reported in India consist of 29000 km of rivers 03 million ha of estuaries, 3.15 million hectare of reservoirs, 0.9 million lacks water and lagoon, 0.2 million ha of flood plain wetland, 0.72 million hectare of upland lake and 2.02 million 2.0 Kilometer are of exclusive economic zone (EEZ). The sea surrounding area in India includes 8,129 Kilometer of cost line, which includes those of Andaman, Nicobar and Lakshadweep Iceland (Ayyappan-2011).

The national mean production level from still water ponds has gone up from 600 kilogram per hectare & per year in 1974 to over 2900 kilogram per hectare & per year at present and several farmers have even demonstrating, higher production level of 8-12 tonnes per hectare & per year (handbook of fisheries and aquaculture, ICAR publication, India).

Chouhan S.K. and Sharma S.K. (1993) The authors has concluded that, the main factors responsible for co-operatives success were close linkage between cooperative societies and state government, fishing ban during breeding months, use of recommended size of gillnets, provision of regulated market and remunerative prices, strong authoritative system, proper and quality of dissemination of improved technology, provision group insurance policy at subsidized premium etc.

Bhatt, R. (1996) examined that the role of cooperatives in marine fisheries sector in the Dakshin Kannada district of Karnataka and find that cooperatives have developed into major institution in only the developed of port fish market centers, capable of influencing the credit and output markets.

D' cruz S.T. (1998) studied and reported that the co-operative umbrella of Matasyafed comprises 292 primary co-operative societies with an average membership of 502, covers about 75 percent of active fishermen of the state. On an average 12.5 percent active fishermen of the state were provided soft loan assistance for acquiring means of production through integrated fisheries Development project (IFDP). The improving trend of the performance indicators of IFDP and the attempt for resources

mobilization of the Rs. 210 cores under IFDP phase IV for the period 1996-2002 are expect to provide impetus for the take off in the co-cooperativisation processed of Matsyafed.

B. Ganesh Kumar, Datta, K. K., Joshi P.K. (2008) revealed that the total marketing cost of auctioner, wholesaler and retailer, vendor, marine fisherman, cooperative society and contractor/fresh water fisherman co-operative society have been found to be Rs. 0.98, Rs. 8.89, Rs 6.61, Rs. 4.50, Rs. 6.00 and Rs 3.51 respectively. The marketing efficiencies for Indian measure crops (IMC), sardine and seer fish have found to vary from 34 percent to 74 percent depending on the length of marketing channel. The marketing efficiency has found more in the case of marine species than fresh water species. The fishermen share in the consumer rupees has shown variation across species, marketing channels and markets.

Specific objectives

This study has attempt in this direction determines the following specific objective.

- To analyze the growth rate of area, production and productivity of fish in Chhattisgarh.
- To work out the cost, return, and profitability from fish production in the study area.
- To examine the marketing cost and price spread under different marketing channel of fish.
- To find the constraints in production and marketing of fish, and suggest suitable measure to overcome the problems.

Methodology

Multistage stratified random sampling procedure has been adopts in this study. There was two stratum divide to all random selected respondent. The participants have selected randomly from each stratum until the decided sample size i.e. sixteen respondents has selected in the entire blocks of Kabirdham district by random sample method. However, randomly select the several special sample i.e. twelve fish producers, twelve fish producer trader, twelve village trader, eight retailers, four wholesalers in the marketing analysis. However, randomly select the several special sample i.e. four fish co-operative societies include some consumers in constraint analysis of the study area. The primary data have been collect through the personal interview from select sample fish cooperative societies. However, secondary data have been collect through personal

contact from journal, internet, and information of fish to directorate of fishery, Chhattisgarh, and deputy directorate of fishery, Kabirdham district. In addition, primary data has concerned about marketing and constraints i.e. local fish producer trader, village trader, wholesalers, retailers, and others market functionaries for analysis of fish marketing. Put the question to ask the sample fish producers from structure questionnaire & schedule at time of interview for gathered to primary information. The filled questionnaire & schedule are check and scrutinized immediately after the interview and the collect information. The collect information is edit and delete for the purpose to fulfill the research objectives. The statistical tools have been use in analysis of collected data. Data have entry in the excel spreadsheet and cleaned for irregularities, the cleaned data has been summarize in to descriptive format in term of frequencies, percentage and averages. The data relating to each management and marketing regime have assembled and reduced to comparable form by using the different statistical tools. Then information has processed and tabulated for use the research analysis.

Marketing channels

The different marketing channels have involved in fish marketing and which has fish passed through different route from producer to consumer in the study area. No sufficient fish markets have available due to low level of fish production, thus most of tinny fish producer have sale the own product direct to consumer, but some medium and large fish producer have adopted the following indirect fish marketing channel in the study area.

Producer- Consumer.

Producer- Producer trader- Consumer

Producer- Village trader / Village retailer- Consumer

Producer- Fish co-operative societies or Fish self-help groups

Producer - Wholesaler- Retailer Consumer

Compound growth rate or Exponential rate

$Y = A \cdot B^t$

$\log y = \log A + t \log B$

Compound Growth rate in percent =

$(\text{Anti log of } B - 1) \times 100$

Where, Y=Area/Production/Productivity
compound growth rate,

A= Constant, B= Regression coefficient, t= time in year

Coefficient of variance = (Standard deviation) / Mean × 100

Absolute change = Value of current year - Value of base year

Relative change = (Value of current year - Value of base year) / (Value of base year) × 100

Variable cost = Labour wise cost (Pond preparation+ Feed application+ Initial liming and fertilizer application+ Seed or fingerling application+ Treatment+ Netting+ Storage cost+ Water refilling+ Repairing of bunds and embankment+ Fish rearing) + Input wise cost (Seed or fingerling+ Feed+ Lime and fertilizer+ Medicine and chemical) + Interest of working capital+ Miscellaneous material

Fixed cost = (Rent amount+ Rental value of pond+ Depreciation+ Interest of fixed capital)

Total Cost = Variable Cost + Fixed Cost

Gross Return = Total fish production × sale price of fish

Net Return = Gross return - Gross Expenses or total fish farming cost

Benefit Cost Ratio = B / C

Breakeven levels of fish produce analysis:

i. Price per quintal of fish=

[Total cost (Fixed cost + Variable cost)/(Total production)]

ii. Production of fish=

[Total cost (Fixed cost + Variable cost) / (Price per unit)]

Marketing information

Marketing cost

MC= C f + C_{m ith 1} + C_{m ith 2} + + C_{m ith}

Where, MC = Total marketing cost of fish marketing. C f = Cost paid by fishermen, C_{m ith} = Cost incurred by ith middlemen

Gross margin:

M= S_{ith} + P_{ith}

Where, M= Gross margin, S_{ith} = Sale value of produce for ith middlemen, P_{ith} = Purchase value for ith middlemen.

Net Margin:

N_{m ith} = P_{r ith} - (P_{p ith} + C_{m ith})

Where, N_{m ith} = Net margin of ith type of market Middlemen, P_{r ith} = total value of received per unit (sale price), P_{p ith} = per unit purchase price

of produce by the ith middlemen, C_{m ith} = cost incurred by the ith middlemen

Farmer Price

Pf = PA - Q

Where, Pf= Net price received by the farmer, PA= Whole sale price, Q= Marketing cost incurred by the fishermen

Estimation of fish farmer's share or producer share in consumer rupees:

Ps = Pf / Pr × 100

Where, Fishermen or producer share in consumer rupee, Pf= Net price received by the farmer, Pr= Price paid by the consumer.

Estimation of the marketing pattern:

C = C_f + C_{m ith 1} + C_{m ith 2} + ... C_{m ith}

Where, C= Total marketing cost of producer, C_f = Cost paid by the farmers, C_{m ith} = Cost incurred by ith of intermediary.

Estimation of marketing efficiency:

E = O / I × 100

Where, 'E' =index of marketing efficiency, 'O' = Output (added value / market margin), 'I' = Input (marketing cost)

Constraints Analysis

Garrett's ranking technique

Percentage position = (100 (R_{ij} - 0.05) / (N_j))

Where, R_{ij} = Rank give for the ith item by jth individual, N_j = Number of item rank by the jth individual.

(Asking the question to sample fish producer and others respondents rank then ranked specific problems, which have faced by fish producer then according to their own perception in this method. The assigned rank is converting into percentage position, which has subsequently transferred into Garrett score using Garrett's table. For each constraint, scores of individual respondents are add together and then divided by total number of respondents. Thus, mean score for each constraint has ranked by arranging them in descending order)

Result Discusion

Study has analyzed accordingly to objective of research. Following result have obtained the with analyses of various objectives of research. Indices of constitution and added membership in fish societies.

Proportionate change of constitution and added membership of fish cooperative societies in Kabirdham district has analysed during the year 2010-11 to 2014-15 (period five years) and presented in table 5.3 II. It has observed that, constitution of fish cooperative societies in Kabirdham district has found to be highest proportionate change with magnitude of 183.33 and to be lowest proportionate change with magnitude 33.33 percent. Added membership of fish cooperative societies in Kabirdham district has found to be highest with magnitude 179.37 percent and lowest proportionate change with magnitude of 19.07 percent. However, proportionate change of constitution and added membership of fish cooperative societies in Chhattisgarh was analysed during the year 2004- 05 to 2012-13 (period nine years) and presented in table 5.3 -I. Constitution of fish cooperative societies in Chhattisgarh has found to be highest proportionate change with magnitude of 116.87 and to be lowest proportionate change with magnitude of 100.00 percent. Added membership of fish cooperative societies in Chhattisgarh has found to be highest proportionate change with magnitude of 125.97 and to be lowest proportionate change with magnitude of 100.00 percent.

Variability in Constitution and added membership of fish societies and self-help groups:

Variability estimated by coefficient of variance for constitution and added membership of fish cooperative societies in Kabirdham district and Chhattisgarh has analysed and presented in table 5.6. It has observed that, during the year 2010-11 to 2014-15 (period five years) variability estimated by coefficient of variance for constitution of fish cooperative societies in Kabirdham district has found to be magnitude of 70.013 and 43.474 percent respectively. During the year, 2010-11 to 2014-15 (period five years) variability estimated by coefficient of variance for constitution of fish cooperative societies in Chhattisgarh has found to be magnitude of 12.490 and 12.069 percent respectively. However, it has observed that, during the year 2004-05 to 2012-13 (period nine years) variability estimated by coefficient of variance for added membership of fish cooperative societies in Kabirdham districts has found to be magnitude of 96.364 percent and 33.047 percent, respectively. During the year, 2004-05 to 2012-13 (period nine years) variability estimated by coefficient of variance for added membership of fish cooperative societies in Chhattisgarh has found to be magnitude of 14.653 percent. Therefore, it has concluded that the added membership has more variable than

the Kabirdham district to Chhattisgarh state and constitution has more Variable than the Kabirdham district to Chhattisgarh state also. Compound Growth rate of adding membership and formation of Fish self help groups

The compound growth rate of constitution and adding membership of fish co-operative societies of the Chhattisgarh has showed positive & significant but compound growth rate of constitution and adding membership of the Kabirdham district has showed the negative & significant. during the years 2013-15: (from table 5.9 & 5.10).

Fish production cost measure for sample fish producer in study area. The fish production cost have compute to fish producer work out independently fish co-operative societies. Fish production cost of exotic breeds of fish co-operative societies have Rupee 62939.01 per hectare. However, fish production cost of local breeds fish co-operative societies have, Rupee 39963.91 per hectare. Perusals of this table reveal that fish productions have needed in labour varied degree of different production practices. However, family labour has the main work force sources of labour requirements. The required labour has used i.e. hired human labour and machine labour for many an operation has to be finished in specific time. The entire type of fish producers have used the most of labour in pond preparation, feeding, netting and seed application practices in together local and exotic breed of fish production. Under variable cost, labour wise involved cost in pond preparation of exotic breeds fish co-operative societies have Rupee 1809.27 per hectare with 2.88 percent.

However, feeding expenses of exotic breeds, fish co-operative societies have Rupee 474.22 per hectare with 0.74 percent. However, netting expenses of exotic breeds fish co-operative societies have Rupee 1340.20 per hectare with 2.13 percent. However, seed application expenses of exotic breeds fish farmers, fish co-operative societies have Rupee 301.54 per hectare with 0.48 percent. Labour wise cost in pond preparation of local breeds fish co-operative societies Rupee 1484.08 per hectare with 3.71 percent. However, feeding cost of local breeds fish co-operative societies Rupee 426.02 per hectare with 1.06 percent. However, netting cost of local breeds fish co-operative societies have, Rupee 965.19 per hectare with 2.38 percent. However, seed or fingerling application cost of local breeds fish co-operative societies has Rupee 230.18 per hectare with 0.57 percent. Under the variable cost in material wise seeds or fingerling cost of exotic breeds fish

co-operative societies have Rupee 41172.60 per hectare with 65.45 percent. However, feeds cost of exotic breeds fish co-operative societies Rupee 1385.30 per hectare with 2.20 percent. However, interest of working capital of exotic breeds fish co-operative societies have Rupee 5293.85 per hectare with 8.42 percent. Material wise cost in seedling or fingerling of local breeds fish co-operative societies have Rupee 25104.55 per hectare with 64.26 percent. However, Feed cost of local breed fish co-operative societies have Rupee 1252.34 per hectare with 3.13 percent. However, Interest of working capital of local breed fish co-operative societies Rupee 3276.27 per hectare with (8.19 percent). Under the fixed cost in pond rent of exotic breeds co-operative societies Rupee 2744.84 per hectare with 4.35 percent.

However, rental value of pond cost in exotic breeds fish co-operative societies Rupee, 1500 per hectare with 2.38 percent. However, depreciation of pond in exotic breeds fish co-operative societies Rupee 274.48 per hectare with 0.44 percent. However, interest of pond in exotic breeds fish co-operative societies, Rupee 188.11 per hectare with 0.30 percent. However, pond rent cost of local breed fish co-operative societies Rupee 2504.68 per hectare with 6.25 percent. However, rental value of pond for local breed of fish co-operative societies Rupee 1000 per hectare with 2.50 percent. However, depreciation of pond for local breed of fish co-operative societies, Rupee 250.46 per hectare with 0.63 percent. However, Interest of fixed capital in pond of local fish co-operative societies, Rupee 169.78 per hectare with 0.41 percent. Involved minor cost of fish production have water refilling, watchman, and treatment in both type of exotic and local breeds, fish co-operative societies.

Observed that all fish producer have major expend in seeds and feeds in material wise cost however, pond preparation, storage, netting, water refilling in labour wise and others i.e. feeding, pond rent, and fingerling application for exotic and local breeds of fish producers. Ninety percent working cost are consider in local and exotic breeds of both fish producer.

Profitability measure in fish production of sample fish producers in study: Gross return, net return, cost benefit ratio, fish production, selling price, total cost, cost of production, and Break-even point in fish production of sample fish producers for local and exotic breeds have calculated independently. Fish producers have common trend that used more recourses and rise more production of exotic breeds in the study area. Fish production of exotic of fish co-operative societies has 32.91 quintal per hectare.

However, fish production of local breeds fish co-operative societies have 18.53 quintal per hectare. Price of exotic breeds fish co-operative societies have Rupee Rupee 6422.86 per quintal. However, fish production of local breeds fish co-operative Rupee 4771.78 per quintal. Fish production cost of exotic fish co-operative societies have, Rupee 62939.01 per hectare. However, fish production cost of local breeds fish co-operative societies Rupee 39963.91 per hectare. Gross return of exotic breeds fish co-operative societies Rupee 206173.80 per hectare. However, gross return of local breeds fish co-operative societies Rupee 88421.08 per hectare.

Net return of exotic breeds fish co-operative societies Rupee 136234.79 per hectare,. However, Net return of local breeds fish co-operative societies Rupee 48457.17 per hectare. Net return for local breeds have low than exotic breeds due to price of exotics breeds is high and its productivity is also high. Cost benefit ratio of exotic breeds fish co-operative societies have 2.15:1. However, cost benefit ratio of local breeds of fish co-operative societies has 1.21:1. Cost of fish production of exotics breeds fish co-operative societies have Rupee 1912.45 per hectare. However, cost of fish production of local breeds fish co-operative societies Rupee 2156.71 per hectare. Break-even points of exotic breeds fish co-operative societies have 9.79.

However, break-even points of local breeds fish co-operative societies have 8.36:(from table 5.6). Fish production of local breeds has low then the exotic breeds due to low productivity in nature, using the improper practices of fish production; apply natural feeding practices, improper and un-recommended dose in local breed fish production by fish producer in the study area.

Cost distribution in fish production of sample fish producer in study area: The cost distribution during production by local and exotic breeds of fish produce have obtained more than ninety percent expense in working cost out of total cost however more than seventy-five percent expense in material wise cost out of total working cost respectively. Labour wise cost of exotic breeds fish co-operative societies have Rupee 9030.73 per hectare with 15.52 percent. However, labour wise cost of local breeds fish co-operative societies have Rupee 5274.68 per hectare with 14.56 percent. Input or material wise cost of exotic breeds fish co-operative societies Rupee 43907.76 per hectare with 75.51percent. However, input or material wise cost of local breeds fish co-operative societies have, Rupee 27488.04 per hectare with 75.87 percent. Working cost of exotic breeds fish co-operative societies have Rupee

58232.42 per hectare with 92.59 percent. However, working cost of local breeds fish co-operative societies have Rupee 36038.99 per hectare with 90.10 percent. Fixed cost of exotic breeds fish co-operative societies have Rupee 4706.59 per hectare with 7.47 percent. However, fixed cost of local breeds fish co-operative societies have Rupee 3924.92 per hectare with 9.80 percent. Fish production cost of exotic breeds fish co-operative societies have Rupee 62939.01 per hectare. However, fish production cost of local breeds fish co-operative societies Rupee 39963.91 per hectare: (from table 5.7).

Marketing pattern of local and exotic breeds of fish in study area: Local and exotic breeds of fish producer have adopted different marketing pattern. Fish production of exotic breeds of fish co-operative has, 2554.00 quintal. However, fish productions of local breeds of fish co-operative societies has, 2375.00 quintal. Fish consumption of exotic breeds of fish co-operative societies has 54.00 quintal. However, fish consumption of local breeds of fish co-operative societies has 108.00 quintal. Sold quantity of exotic breeds of fish co-operative societies has 2500.00 quintal. However, sold quantity of local breeds of fish co-operative societies has 2267.00 quintal. Marketed surplus of exotic breeds of fish co-operative societies has 2500.00 quintal. However, marketed surplus of local breeds fish co-operative societies has 2267.00 quintal: (from table 5.8). While marketable surplus of both local and exotic breeds of fish have not estimate due to unavailability of information.

The marketing channels and disposal pattern of fish in study area: It has observed that used the important disposal patterns in existing study. The samples fish producer has disposing the fish in different marketing channels. Fish passed from consumer to producer through various marketing channel in study area: (from table 5.9). The fish cooperative societies have used four marketing channels for disposal of produced fishes. Sell quantity of sample fish co-operative societies have 127.00 quintal, 598.00 quintal, 3489.00 quintal and 553.00 quintal in marketing channels first, third, fourth and fifth respectively. However, average received prices by fish co-operative societies have Rupee 6972.41 per quintal. However, it has observed that 58.963 percent quantity sold of fish co-operative societies and sold highest quantity of fish in channel fourth: (from table 5.10). Thus, it has concluded that the fish co-operative societies have preferred the channel fourth for disposal of fish in the study area.

Market analysis of fish co-operative societies: The marketing analysis have examined and analyzed

the adopted marketing channel of fish co-operative societies i.e. first, third, fourth and fifth. However, included contents have Producer or farmer price, marketing cost, market margin, difference of farmers & consumer prices, Retailer sale price, marketing efficiency and producer share in consumer rupee of fish farmer: (from table 5.12.2). Producer or farmer price of fish co-operative societies has Rupee 5000.00 per quintal, Rupee 5900.00 per quintal, Rupee 8499.45 per quintal and Rupee 8490.19 per quintal in channel first, third, fourth and fifth respectively. However, marketing cost of fish co-operative societies has Rupee 000 per quintal, Rupee 195.00 per quintal, Rupee 1886.74 per quintal and 1443.93 per quintal in channel first, third, fourth and fifth respectively.

However, market margin of fish co-operative societies has Rupee 000 per quintal, Rupee 1905.00 per quintal, Rupee 2017.45 per quintal and Rupee 1566.87 per quintal in channel first, third, fourth and fifth respectively. However, difference of farmers price and consumer price of fish co-operative societies have Rupee 000 per quintal, Rupee 2100.00 per quintal, Rupee 3904.19 per quintal and Rupee 3009.81 per quintal in channel first, third, fourth and fifth respectively. However, retailer sale prices of fish co-operative societies has Rupee 5000.00 per quintal, Rupee 8000.00 per quintal, Rupee 12403.64 per quintal, and Rupee 11500.00 per quintal in channel first second third fourth and fifth respectively. However, marketing efficiency of fish co-operative societies has 976.92 percent, 106.93 percent and 108.44 percent in channel third, fourth and fifth respectively. However, producer share in consumer rupee of fish co-operative societies has 100.00 percent, 73.75 percent, 68.52 percent and, 73.82 percent in channel first, second, third, fourth and fifth respectively. The channel first has not any marketing cost and market margin due to absent of the Intermediaries. Therefore, channel first is most efficient channel.

Constraints: The yield rates of fish in Chhattisgarh and Kabirdham districts have below than the yield potential and target production level of national and international level. Therefore, break the stable trend of yield per unit of water area in the study area. However, one of the furthestmost problems of the production gap between the existing production technique and scientific based production technology. The prevailing production gap of the fish producer in Kabirdham districts is not only loss every their earning capacity but their standard of living has been also going down. However, the fish producer should become aware

about the improved technology, sold of fish through improved marketing system seem willing to adopt but their poor economic condition, unavailability of resources and other obstacles do not allow them to go away for new technology. The sampled fish producer faces the many problems and constraint in fish production and marketing. The faced problems have analyzed by garrets score ranking technique in the study area.

Faced constraints about village pond utilization: Fish producer have faced various constrains in village pond utilization i.e. satisfaction level of selection criteria for beneficiaries, finishing leased duration, conflict between villagers and fish producers and satisfaction level for process of lease rate determination etc. in the study area (from table 5.23). The fish farmer opinion about the problem of village pond utilization have find with the direct interview. Garrett's score has greater than twenty-four listed in descending order by faced problem of fish self-help groups. It has inferred that, constraints faced by fish self-help groups have i.e. satisfaction level of selection criteria for beneficiaries, finishing lease duration or period, conflict between villagers and fish producers, conflict between community and fish produce and satisfaction level for process of lease rate determination with obtained Garrett's score have i.e. 60, 40, 75, 50 and 24 respectively. However, conflict between villagers and fish producers has major problems than followed the constraints conflict between community and fish produce and satisfaction level of selection criteria for beneficiaries of fish self-help groups.

Faced constraints about pond preparation: Fish producer have faced various constrains in village pond preparation i.e. application level of soils testing, labour availability, application of silt and predators removing, pond utilization and pond repairs in the study area (from table: 5.24). The fish farmer opinion about the problem of pond preparation have find with direct interview. Garrett's score has greater than twenty-four listed in descending order by faced problem of fish self-help groups. It has inferred that, constraints faced by fish self-help groups have i.e. application level of soils testing, labour availability, application of silt.

Faced constraints about seed, feed, manures and fertilizers: Fish producer have faced various constrained about seed, feed, manures and fertilizers i.e. seed availability, feed availability, transportation, utilization knowledge of feeds & manures, utilization knowledge of fertilizer application and manures, application of manure and fertilizer application,

Faced constraints about disease, predators and weed: Fish producer have faced various constrained about disease, predators and weed i.e. disease, predatory, weed, and skin problem in the study area. Perennial water bodies of pond have a number of predatory animals i.e. snakes, tortoise and frogs, which cause extensive damage to seed population predatory fish species found in perennial water bodies of pond include Murrells, goby, featherbacks singhi, magur, freshwater shark, climbing perch and several catfishes. The aquatic weed infestation is the most issue of both cases in fish production of local and exotic breed.

Also the fish production has suffer the not only the infested aquatic weed and predators but suffer the diseases of fish like as viral disease swim bladder infection has been faced by all category of fishes. The farmer opinion about disease, predators and weed have find with the direct interview (from table: 5.26). Garrett's score has greater than twenty-seven listed in descending order by faced problem of fish self-help groups. It has inferred that constraints faced Constraints faced by fish self-help groups have i.e. disease, predatory, weed, and skin problem with obtained Garrett's score have i.e. 57, 43, 73 and 27 respectively.

However, weeds have major problems than followed the constraints disease and predators of fish self-help groups. Most of fish producer have faced the aquatic weed problem and predator fish in the pond. The predators' fish has eaten the domesticated fish in the pond so create the heavy losses in the fish yield. while weed infestation and predator problem have common in each type fish producer in the study area.

Farmer perceptions about Extension rendered services by FFDA: Fish producer have faced various constrained perceptions about Extension rendered services by FFDA i.e. adopting level of advising by FFDA (technical information), satisfaction level of training programme and Panchayat & FFDA officer setting to conflict in the study area. The farmer opinion about perceptions about Extension rendered services by FFDA has found with the direct interview (from table 5.27). Garrett's score has greater than thirty listed in descending order by faced problem of fish self-help groups. It has inferred that, constraints faced by fish self-help groups have i.e. FFDA advising (technical information), satisfaction level of training programme and with obtained Garrett's score have i.e. 70 and 50 respectively. However, FFDA advising (technical information) has major problems then followed problems the satisfaction level of training programme of fish self-help groups.

Most barriers found in fish production have lack of awareness, low attendance of training programme and improper technical advice provided by FFDA in study area.

Faced constraints about natural calamities and human creative problems: Fish producer have faced various constrained natural calamities and human creative problem i.e. natural calamities (Drought & floods), human creative (Thrift & quarrels) and water stressing in the study area. The farmer opinion about natural calamities and human creative problems has found with the direct interview (from table 5.28). Garrett's score has greater than thirty-one listed in descending order by faced problem of fish self-help groups. It has inferred that, constraints faced by fish self-help groups have i.e. natural calamities (Drought & floods), human creative (Thrift & quarrels) and water stressing with Garrett's score 70, 50 and 31 respectively.

However, natural calamities (Drought & floods) has major problems then followed problems the human creative (Thrift & quarrels) and water stressing of fish self- help groups. Natural calamities and human creative problems have most barriers in the fish farming. Natural calamities include that flood, drought and some infected, viral diseases and human creative problems includes that thrift of fishes, water refilling stress and village & community conflict. Water stressing is most common problems of fish production in off-season of rain by fish producers in the study area and predators removing, pond utilization and pond repairs with obtained Garrett's score have i.e. 24, 75, 50, 40, and 60, respectively. However, labour availability has major problems than followed the constraints pond repairs and application of silt & predators removing of fish self help groups. Labour availability has common constraint faced by all groups of fish producers

Faced constraints about natural calamities and human creative problems: Fish producer have faced various constrained natural calamities and human creative problem i.e. natural calamities (Drought & floods), human creative (Thrift & quarrels) and water stressing in the study area. The farmer opinion about natural calamities and human creative problems has found with the direct interview (from table 5.28). Garrett's score has greater than thirty-one listed in descending order by faced problem of fish self-help groups. It has inferred that, constraints faced by fish self-help groups have i.e. natural calamities (Drought & floods), human creative (Thrift & quarrels) and water stressing with Garrett's score 70, 50 and 31 respectively. However, natural

calamities (Drought & floods) has major problems then followed problems the human creative (Thrift & quarrels) and water stressing of fish self- help groups. Natural calamities and human creative problems have most barriers in the fish farming. Natural calamities include that flood, drought and some infected, viral diseases and human creative problems includes that thrift of fishes, water refilling stress and village & community conflict. Water stressing is most common problems of fish production in off-season of rain by fish producers in the study area.

Faced Constraints about the finance and insurance services: Fish producer have faced various constrained finance and insurance services i.e. loan or fund availability, high Interest or utilization, Insurance conflict and subsidy in the study area (from table 5.29). The farmer opinion about finance and insurance services i.e. loan or fund availability, high Interest or utilization, Insurance conflict and subsidy has found with the direct interview. Garrett's score has greater than twenty-seven listed in descending order by faced problem of fish self-help groups. It has inferred that, constraints faced by fish self-help groups have i.e. loan or fund availability, high Interest or utilization, Insurance conflict and subsidy with Garrett's score 57, 43, 73 and 27 respectively.

However, Insurance conflict has major problems then followed problems the loan or fund availability and high Interest or utilization of fish self help groups. Most of fish producer has faced the loan availability and insurance conflict. Government subsidy scheme and other facility have operated unfair and biased so loan supply has affected in the study area.

Faced Constraints about the marketing and disposal: Fish producer have faced various constrained about the marketing and disposal i.e. transportation, price, payment, delay payment, selling, satisfaction level to market information and storage in the study area (from table: 5.30). The farmer opinion about marketing and disposal i.e. transportation, price, payment, delay payment, selling, satisfaction level to market information and storage has found with the direct interview. Garrett's score has greater than twenty-two listed in descending order by faced problem of fish self-help groups. It has inferred that, constraints faced by fish self-help groups have i.e. transportation, received price, payment, delay payment; selling, satisfaction level to market information and storage with Garrett's score have i.e. 66, 35, 22, 50, 58, 43, and 78 respectively. However, storage has major problems then

followed problems the transportation, selling and delay payment of fish self help groups. The facing problems by fish producer have transportation, large number of Intermediaries, high rate of market fee, storage fee, late information market price and other information, bias transfer of payment and delay payment not gating the appropriate price of fish in the study area.

Conclusion

Investigation it could be concluded that, Growth rate among area, production and productivity. The production and productivity of growth rate has high than the area. However, the most of local and exotic breeds of fish cooperative societies have expended in fish production. Local and exotic breeds of fish cooperative societies have more expenses in material cost than the labour wise and others cost.

All type of local and exotic breeds of fish cooperative societies have more than ninety percent expenses in working cost and seventy-five percent expenses in material wise costs. Fish production of the fish cooperative societies of exotic breeds has high than then local breeds of fish. Sale price of the fish cooperative societies for exotic breeds have high than local breeds of fish. Gross returns of fish cooperative societies of exotic breeds have high than local breeds of fish. Net return of fish cooperative societies of exotic breeds have high than local breeds of fish. Cost benefit ratios of the fish cooperative societies of exotic breeds have high than local breeds of fish.

Five marketing channel have adopted in fish marketing in study area where fish disposed between producer to consumer. Disposal of fish among fish cooperative societies were preferred marketing channel fourth and fifth. Channel first have highest producer price, Channel four have highest marketing cost, Channel fifth have highest marketing margin, Channel first have highest producer share in consumer rupee and marketing efficiency. So channels first has more efficient and profitable than other adopted marketing channels

but fish cooperative societies has prefer the channel four due to more economic in marketing view.

The major socio-economic constraints of the fish cooperative societies have discovered the fish production of local and exotic breeds in the study area. Obtain constraints i.e. unavailability good quality of seed and fingerling, lease problems, social conflict, weed infestation and disease, water stress, natural and human create problems and Improper provide the extension training and services by F.F.D.A. (Fish farmer development authority) and poor & irregular financing services. In addition restriction of use of medicine, feed, manure & fertilizers, leasing process and poaching by society and community. The marketing constraints of fish for local and exotic breeds of fish i.e. transportation, selling, market information, price, storage, fish rearing, retail and wholesale market both poor marketing system.

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Corporate (collective) author

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[9] National Statistics Online – Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/theme_health/HSQ20.pdf (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

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