Research Article (Open access)

Value chain of Pangasius (*Pangasius hypopthalmus)* in Rupandehi and Nawalparasi Districts of Nepal

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ABSTRACT- A research was conducted based on value chain analysis of Pangasius (*Pangasius hypopthalmus)* in Rupandehi and Nawalparasi districts of Nepal in 6th Jan. 2015 to 15th May 2015. All five Pangas/Pangasius producing farmers, eight traders and eleven consumers were purposively selected and primary data were collected through semi-structured interview of pre-tested questionnaire. Among the five Pangas producing farmers in Rupandehi and Nawalparasi districts, only two had given products in the market. Some of the Pangas farmers collected fry from India and sold them to Nepalese farmers after the fry were grown to fingerlings. Analyzing the benefit cost (B/C) ratio and T-test showed that Pangas production and its marketing was feasible and profitable in Rupandehi and Nawalparasi. Pangas producing farmers of these two districts directly sold their fish to the weekly market sellers. Processing of Pangas fish is not noticed in this area. Pangas are more preferred in winter season (Poush/Magh) than in summer season (Baisakh/Jesth) in this Rupandehi and Nawalparasi region. People preferred Pangas commonly because of low price (comparatively), easy to eat, easy to cook, good taste and its high nutritive value. Study showed that value chain map of Pangasius is dominated by retailers. Since Pangas farming was recently introduced in Nepal, almost all marketed Pangas was taken from India (Sunauli wholeseller). Nepal had high scope for Pangasius culture due to large number of fresh water bodies and optimum temperature.

Key-words- Value chain, *Pangasius hypopthalmus*, Fingerlings, B/C ratio, Farmers, Traders, Consumers

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INTRODUCTION

Being the second richest water resources country in the world, Nepal has a high scope in fish farming. Nepal has rich in fresh water resources including snow fed rivers, lakes, ponds and torrential hills stream, provides the natural habitat to specially the cold fresh water fishes. Due to establishment of diverse topography and climate, the aquatic ecosystems of Nepal offer excellent habitats to different indigenous and exotic fish species of high economic, environmental and academic value (1-3). Different species are distributed in different parts of Nepal from terai, valley, mid hills to Himalayas.

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This vast water resource has been supporting several indigenous fish species which play a great role in balancing the biodiversity as well as in income generating activities of landless and marginal farmers. Capture fisheries is a traditional occupation of Pode, Majhi, Bote, Mallah, Godhi (fisherman by tradition) and other indigenous communities. The pangasius industry is connected with the story of 'Cinderella story' as it emerged as the fastest growing aquaculture sector in the world (4). The sustainability of unplanned production of Pangas has question mark internationally as an industry (5,6). Global value chain analysis is meant of understanding the integration of firms and farms in globalised markets (7). In developing countries, main objective of Global Value Chain analysis has been to identify how these firms and farms to upgrade their position in these markets (8). This approach describes the location of actors within a broadly defined set of vertical and horizontal political, social and economic relations (9,10). Upgrading the products is to strategic change of products or the production process which enhances rewards and/or reduces exposure to risks for a chai n actor (11,12). Upgrading of products is governed by shifting to more functional positions in the chain or

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producing products that have more value added to them. As such, upgrading can occur either by increasing the number and type of functions in a value chain, or the level and type (12). Among different species of fish cultured in Nepal, *Pangasius* culture is new approach which has been introduced to Nepal from India few years ago. *Pangasius* is commonly known as Baikhi/ Baithi in Nepal. The *Pangasius* is the fresh water fish, and omnivorous is nature. The *Pangasius* is fast growing fish, attain the body weight of 1.2-1.3kg within 6 months but generally harvested after 8 months depending on the demand of the market. It requires fresh water but can adjust in blackish water with salinity of 7-10% also. It can tolerate the high stocking density and low biological dissolved oxygen in water as minimum as 0.05-0.1 mg/litre. The optimum temperature for *Pagasius* culture is 22-28°C. It can survive high temperature upto 39°C and low temperature upto 15°C. *Pangasius* is omnivorous with the potentiality of high stocking and poly culture. It is stated that the total production of *Pangasius* in the world is 1.6 million metric ton (13) and the dominated by the leading producer country Vietnam. It has the high market in Europe. The Spain is the leading market for *Pangasius* in the world. Vietnam is exporting *Pangasius* to about 80 countries in the form of frozen product. Nepal also imports *Pangasius* from Vietnam, India, and Bangladesh. Domestic *Pangasius* production makes availability of fresh live fish in local market. People are being more conscious and prefer to consume the live *Pangasius*. While talking about value chain, channel connecting local producer with the market trader and then consumer is common in Nepal. Relating *Pangasius* with value chain, *Pangasius* is the living cash and water bodies/pond is the deposit bank. Value is added in step of transfer of the fish from producer to final consumer for the service added.

METHODOLOGY

The research methodology consists of the procedures involved in selection of research site, preparation of sampling frame, sampling design, sources of information, data collection techniques, analysis of the data and their interpretation

Selection of Study area

This research was conducted in 6th Jan 2015 to 15th May 2015 in Nawalparasi and Rupandehi districts of western region of Nepal.

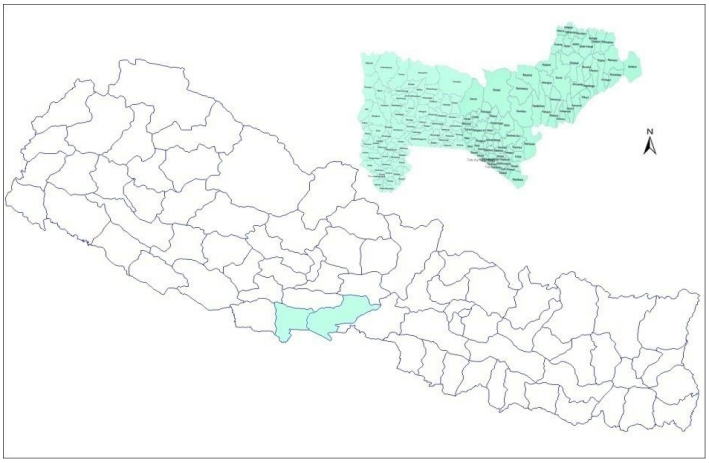

Fig. 1: Map of Nepal showing study area

Selection of Respondents

Respondents were of three categories, namely: farmers, traders and consumers. Therefore, selection of farmers, traders and consumers were done as follows:

Selection of Pangas producing farmers

There were only five Pangas producing farmers in Rupandehi and Nawalparasi districts. So, all of them were selected.

Selection of Traders

Altogether eight traders from Bhairahawa bazzar, Dande bazzar and Kanchhi bazzar were purposively selected and interviewed.

Selection of Consumers

Altogether eleven consumers from Bhairahawa periphery were purposively selected and interviewed.

Questionnaire Preparation

Separate questionnaire for producer, trader and consumer are prepared. Questionnaire for producer included questions about cultural techniques, costs and return. Questionnaire for trader included questions about market structure, fish selling pattern, costs and return. Questionnaire for consumer included questions about Pangas preference, preferable size and consumption pattern. All three types of questionnaire included socio demographic information too.

SOURCES OF DATA

Primary data

Both primary and secondary data were used for study. The pre-tested interview schedule was administered to the sampled farmers, traders and consumers for the collection of primary data.

Secondary data

The secondary information was obtained through reviewing different publication produced by Nepal Agriculture Research Center (NARC), Department of Agriculture (DOA), District Agriculture Development Office (DADO).

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Methods and techniques of data analysis

The information collected from the field were first coded and entered into the computer. Then information collected were analyzed by T-test by using Microsoft excel for quantitative and qualitative data analysis. Descriptive statistics like frequency count, percentage, chart and diagram were prepared.

T-test:

T-test was done to analyze the feasibility of *Pangasius* production by taking two paired variables gross return and total production cost per kattha. To analyze the feasibility of Pangas marketing by taking-

1. Two paired variables: total cost and total return.
2. Two paired variables; unit price sold and unit price bought.

Benefit cost analysis

Benefit cost analysis was done after calculating the total cost and gross return from the Pangas production and Pangas selling separately. Benefit cost analysis was carried out by using formula:

B/C ratio = Gross return/ Total cost.

RESULTS

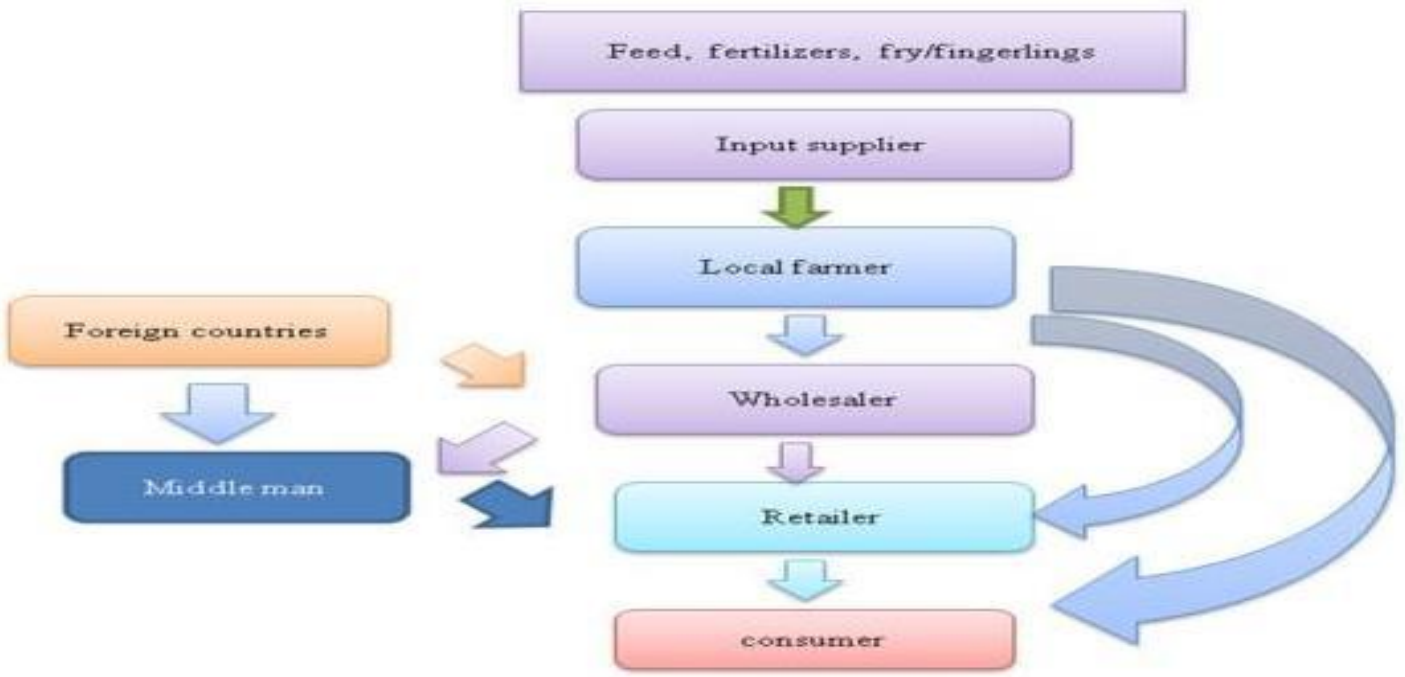

Fig. 2: Value chain analysis of Pangas (14)

In Rupandehi and Nawalparasi districts, there were only five Pangas growing farmers but there was a huge market demand of Pangas. So, nearly all the marketed Pangas were taken from India. Some of the Nepalese Pangas farmers collect fry from India and sell them to other farmers after the fry are grown to fingerlings. Nepalese Pangas grower directly sold their product fish to the weekly market seller. But the product taken from India are distributed to consumer through producer to middle man to wholesaler to middle man to retailer and finally to consumer.

The value chain of *Pangasius* was studied by observing the 3 main actors viz; producer, trader and consumer separately.

PRODUCERS

This figure shows the pond area of five farmers under Pangas production in Rupandehi and Nawalprasi districts. Among different farmers Punya Prasad Chaudhary has the greatest pond area of 0.85 ha with 2 ponds.

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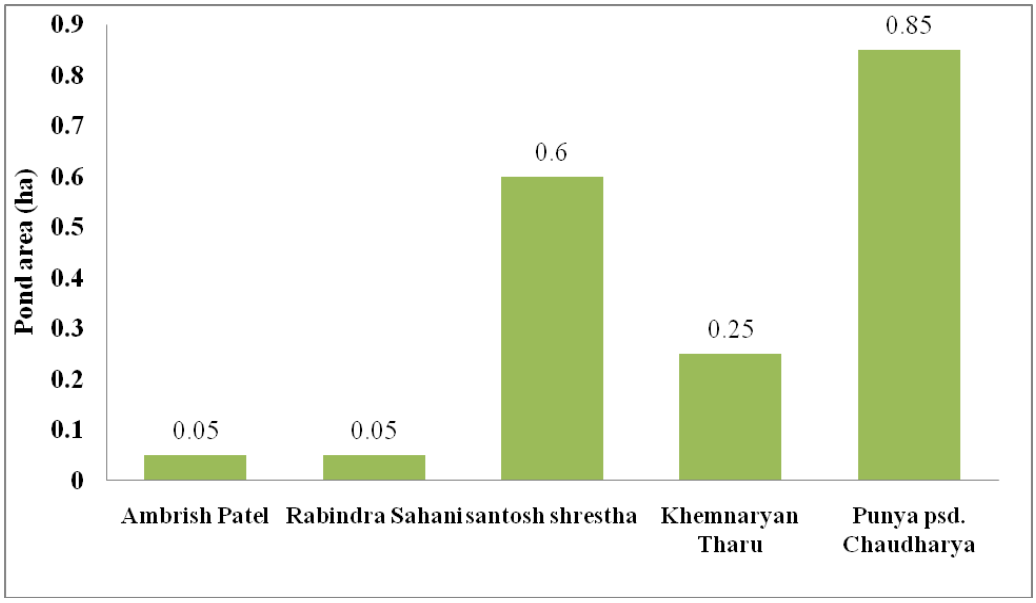

Fig. 3: Areas of Pangas culture among different farmers in two districts (ha)

Stocking fry/fingerling number

In the given figure shows that the stocking density of Pangas is highest in case of Punya Prasad Chaudhary i.e, 38000 fry and Ambrish Patel and Rabindra Sahani stocked lower fingerlings density i.e, Ambrish Patel stocked only 74 fingerling pieces and Rabindra Shahani stocked only 166 fingerling pieces.

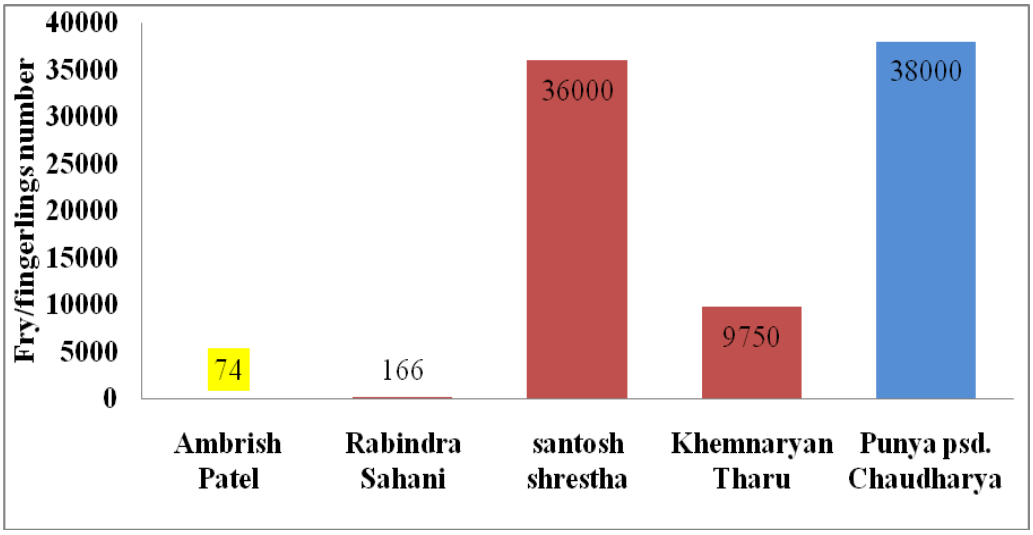

Fig. 4: Stocking the no. of frys/fingerlings by given farmers

Size of fry/fingerling (inch) and total weight (kg) stocked

Rabindra Sahani stocked 150 kg of fish seed with 6 inch size and Khem Narayan Tharu stocked 19.55 kg of fish fry with 1 inch size.

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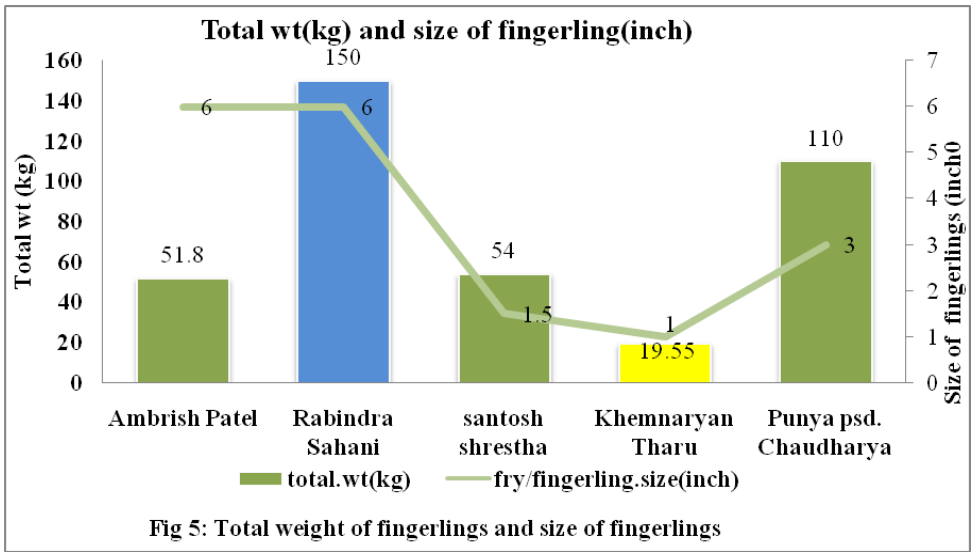

Fig 5: Total weight of fingerlings and size of fingerlings

Production distribution of Santosh Shrestha and Khem Narayan Tharu

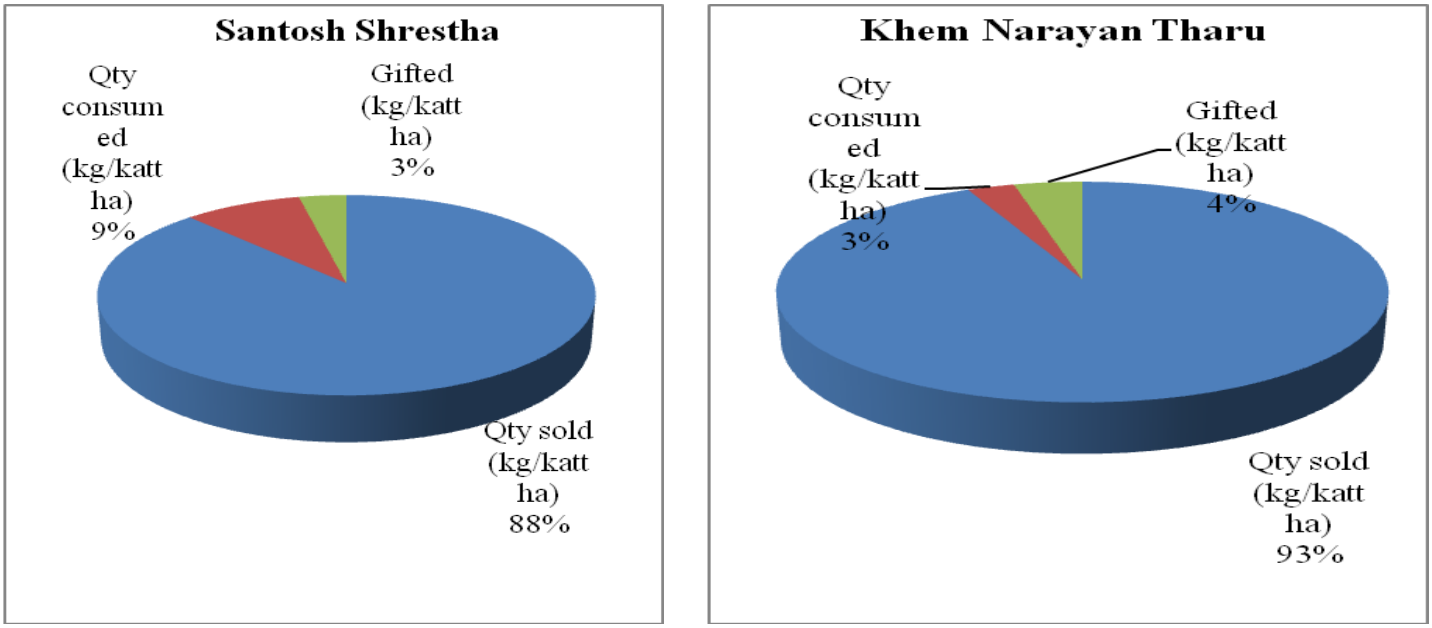

Fig. 6: Production distribution

Figure shows that 88% of total fish produced per kattha is sold in market and remaining 9% is used for home consumption and 3% is gifted to neighbors and relatives in case of Santosh Shrestha. But in case of Khem Narayan Tharu 93% of total total fish produced per kattha is sold in market and remaining 3% is consumed in home and 4% is gifted.

Production cost

The cost of production of pangas fish by farmer is categorized into five different categories namely: cost of fingerlings, feed cost, labour cost, Re-excavation cost and miscellaneous cost. Miscellaneous cost includes different cost such as fertilizer cost, pond management cost, rent, tax etc. The cost of production under different categories of different farmers is given as below table.

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Table 1: Production cost (NRs) of given farmers

Name	Ambarish Patel	Rabindra saha	Santosh Shrestha	Khem Narayan Tharu	PunyaPsd Chaudhary
Cost of fingerlings	9842	33200	11848	9750	11175
Feed cost	4770	17400	31917	34080	37415
Labour cost	30000	24000	26000	27000	30000
Re-excavation cost	3000	2000	4200	2200	1900
Miscellaneous cost	6000	5005	5070	4899	1025

Returns of farmers

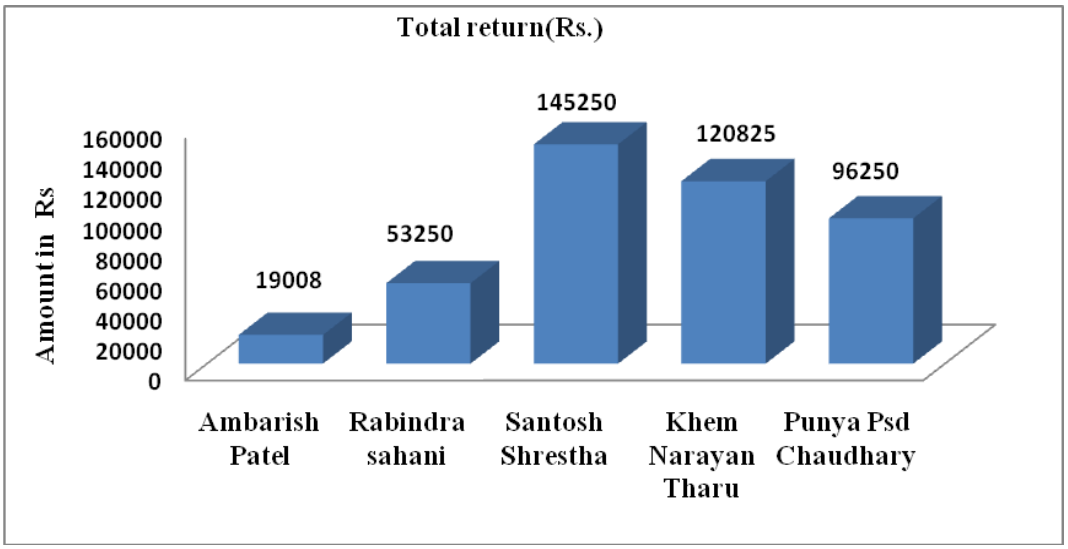

Fig. 7: Total Returns of farmers

This diagram gives us the value of total returns of farmers from Pangas fish production. Total return is highest for Santosh Shrestha ie, 145,250 and lowest for Ambrish Patel 19008.

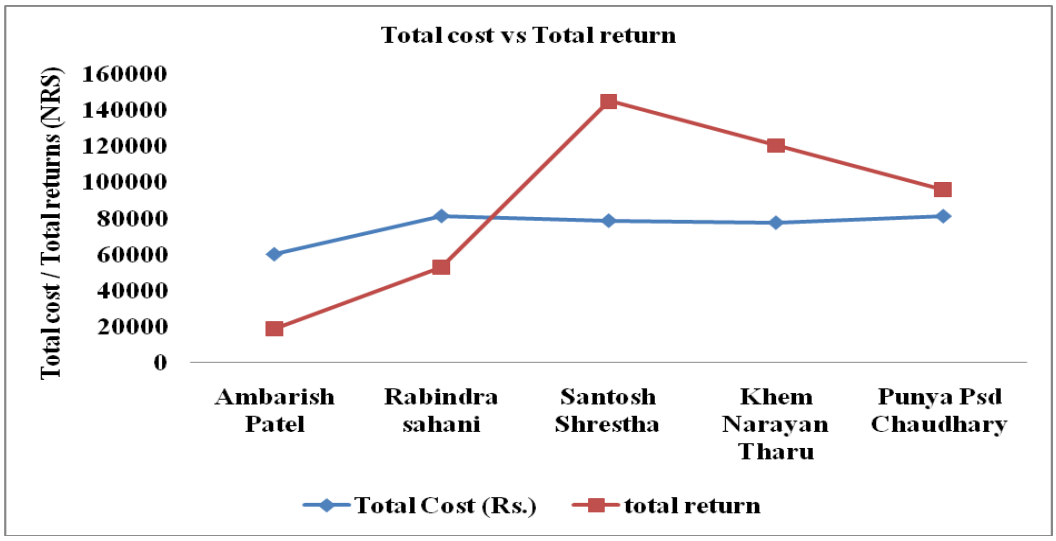

Fig. 8: Comparative study of Total cost and Total return

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Total cost is higher than total return in case of Patel and Shahani so they suffered from economic loss. But in other cases total return is higher than total cost so they are in economic profit.

Benefit/cost Ratio:

Only two farmers give their product to market but the b/c ratio of all farmers are calculated on the basis of their fish stocked and availability in the pond and consumed fish. The b/c ratio of first two farmers are less than one due to their low stocking density while remaining others farmers have b/c ratio of more than one. The highest b/c ratio is of Santosh Shrestha and lowest is of Ambrish Patel i.e. 1.837793383 and 0.314618644, respectively. With proper feeding practices the Pangas fish cultivation is beneficial.

Table 2: B/C ratio of Different Pangas growing farmers

Name	Total Cost (Rs.)	Total return	B/C ratio
Ambarish Patel	60,416	19,008	0.314618644
Rabindra sahani	81,605	53,250	0.65
Santosh Shrestha	79,035	145,250	1.837793383
Khem Narayan Tharu	77,929	12,0825	1.55045
Punya Psd Chaudhary	81,515	96,250	1.180764277

Variation in unit price:

This figure shows the variation in unit price of five farmers under Pangas production in Rupandehi and Nawalprasi districts. Variation ranges from NRs. 240 to 275. Among different farmers Punya Prasad Chaudhary has the greatest unit price NRs 275 and Ambrish Patel has the lowest unit price of N, Rs 240.

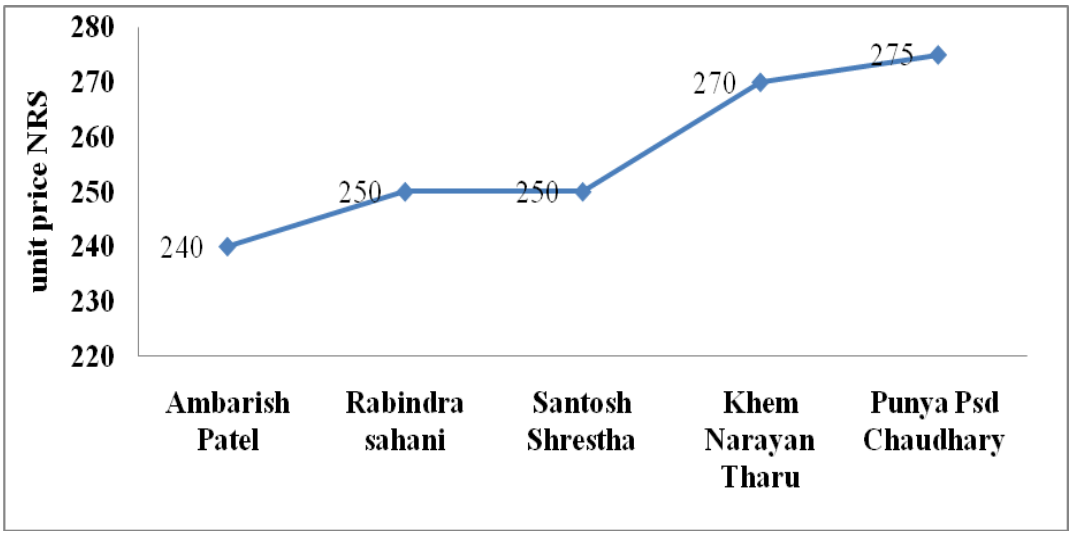

Fig. 9: Variation in unit price of Pangas

TRADERS

Gender participation in fish trading

Figure shows gender status of Pangas traders in Rupandehi and Nawalparasi districts showing involvement of male traders in large number than female traders.

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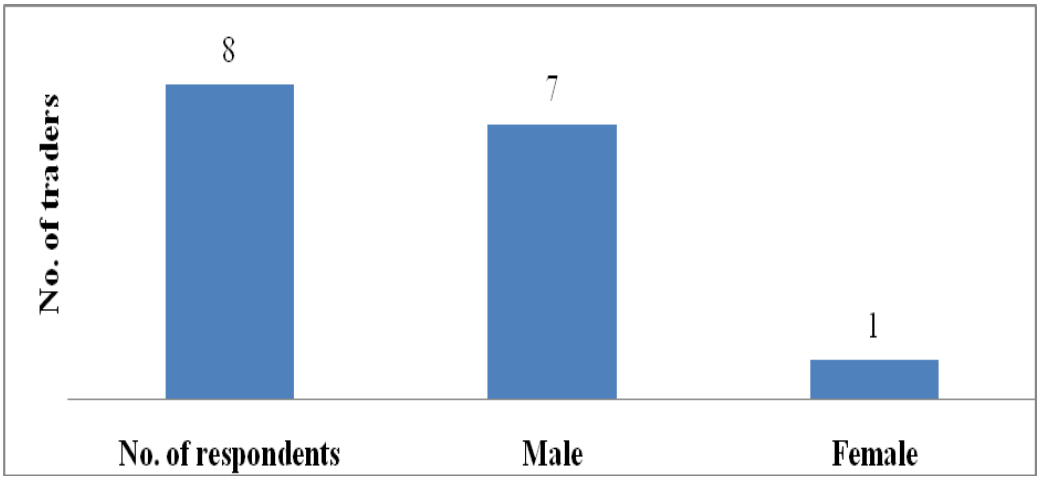

Fig. 10: No. of traders of Pangas fish in weekly

No. of fish traders in different market

Fish traders/ sellers are common for different markets also. Some of sellers of Bhairahawa are also the seller of Dande, Kanchhi bazaar and Thutipipal. There are seven fish sellers in Bhairahawa and only one in Pharsatikar.

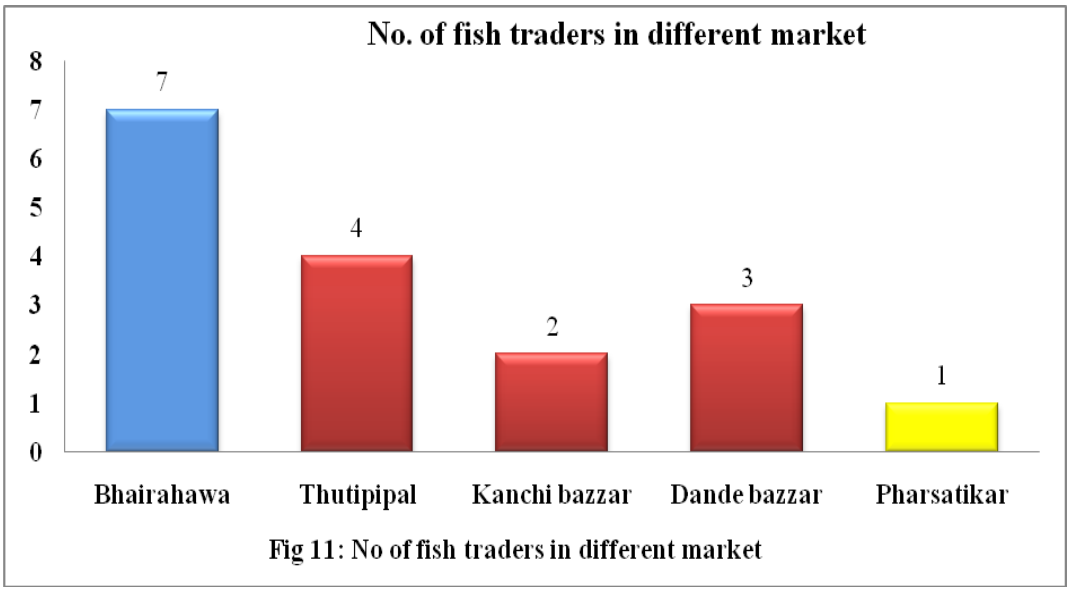

Fig 11: No of fish traders in different market

Maximum amount of Pangas sold in a day:

The given figure shows maximum amount of Pangas fish sold by different traders in a day in Rupandehi and Nawalparasi districts which ranges from 15 to 50 Kg with highest quantity sold by trader Ram Poudel.

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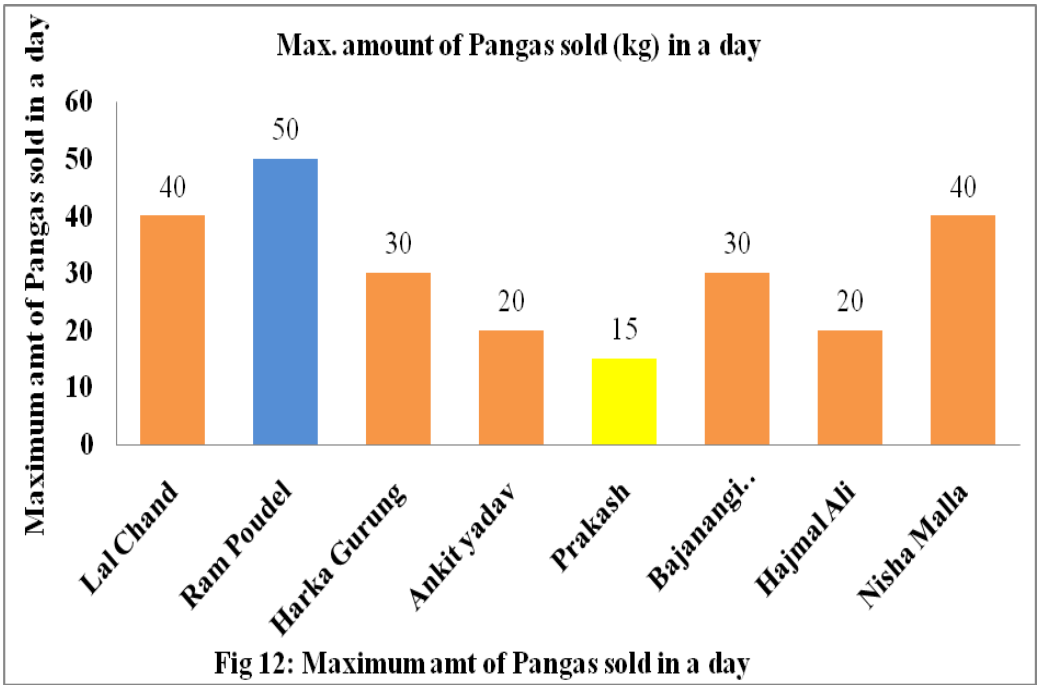

Fig 12: Maximum amt of Pangas sold in a day

Pangas seller vs Non Pangas Seller

Seventy five percent among total seller sold Pangas and rest (25%) didn't sell Pangas.

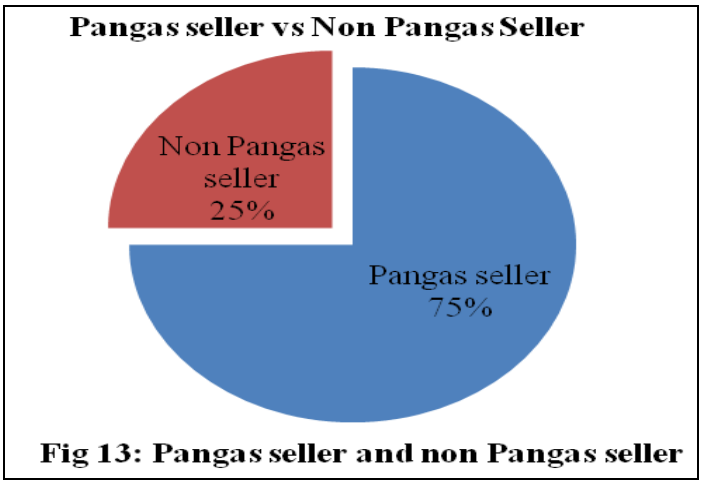

Fig 13: Pangas seller and non Pangas seller

Market Sources of Pangas

88% of total Pangas in market are from India i.e, 75% from Sunauli wholeseller and 13% from Ananada nagar. Rest 12% was supplied from Chhapiya.

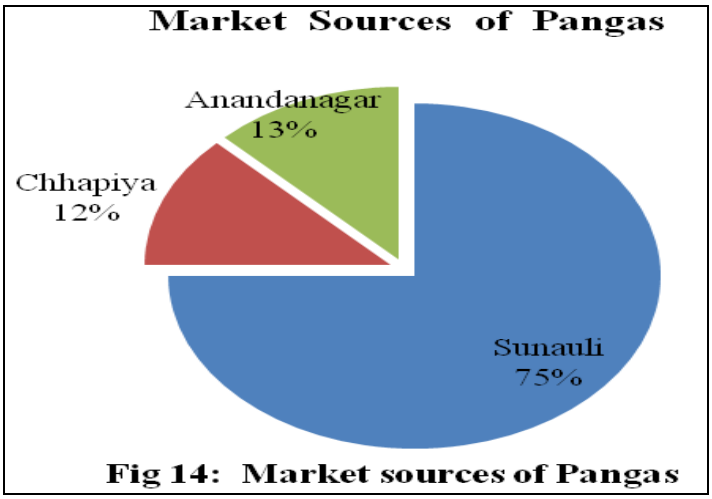

Fig 14: Market sources of Pangas

Grading of Pangas before selling

Among total seller, 62% of them graded Pangas fish before selling and rest (38%) didn't grade.

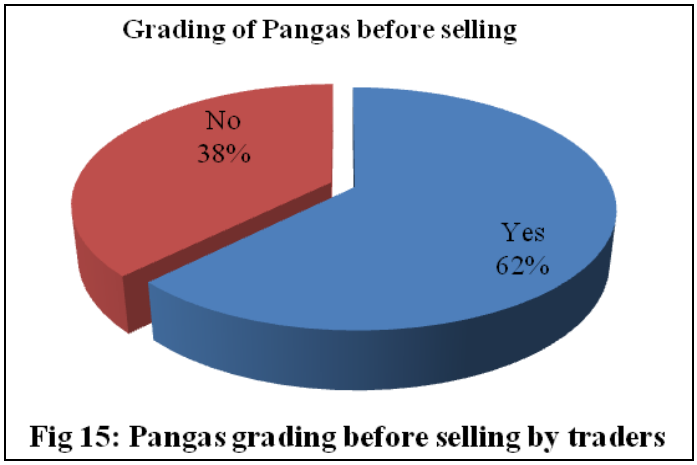

Fig 15: Pangas grading before selling by traders

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Quantity sold and Unit Price

The Figure shows quantity and unit price of Pangas sold by traders in market in Rupandehi and Nawalparasi districts showing highest quantity of 20 Kg by Nisha Malla and lowest of 7 Kg by Lal Chand with unit price ranges from NRs. 270 to 280 respectively.

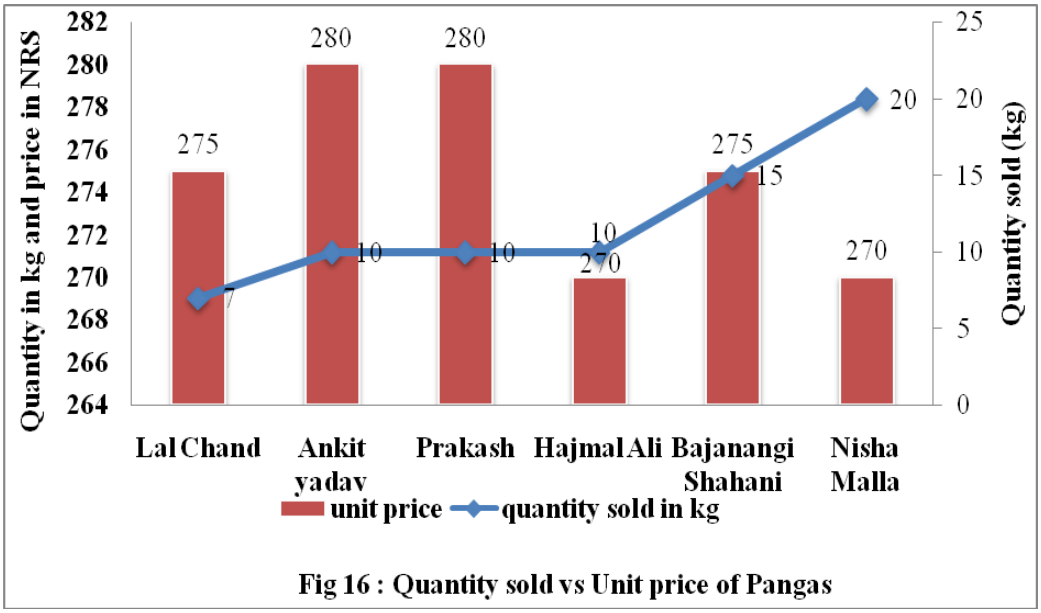

Fig 16 : Quantity sold vs Unit price of Pangas

Cost distribution of Traders per day

Different costs faced by the sellers are considered here. These are Cost of Pangas while buying, transportation cost, storage cost, tax, stall rent etc.

Table 3: Cost distribution of Traders per day

Name	Quantity purchased	cost of	Transportation	Storage	Tax rate	Tax/ day	Stall	Total
Lal Chand	7	200	0	50	8	56	50	1556
Ankit yadav	10	195	0	70	8	80	50	2150
Prakash	10	250	0	70	0	0	50	2620
Bajanangi Shahani	15	200	0	100	8	120	50	3270
Hajmal Ali	10	195	0	70	8	80	50	2150
Nisha Malla	20	200	100	100	8	160	50	4410

Here total cost is highest for Nisha Malla and lowest for Lal Chand

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Total Return vs Total cost

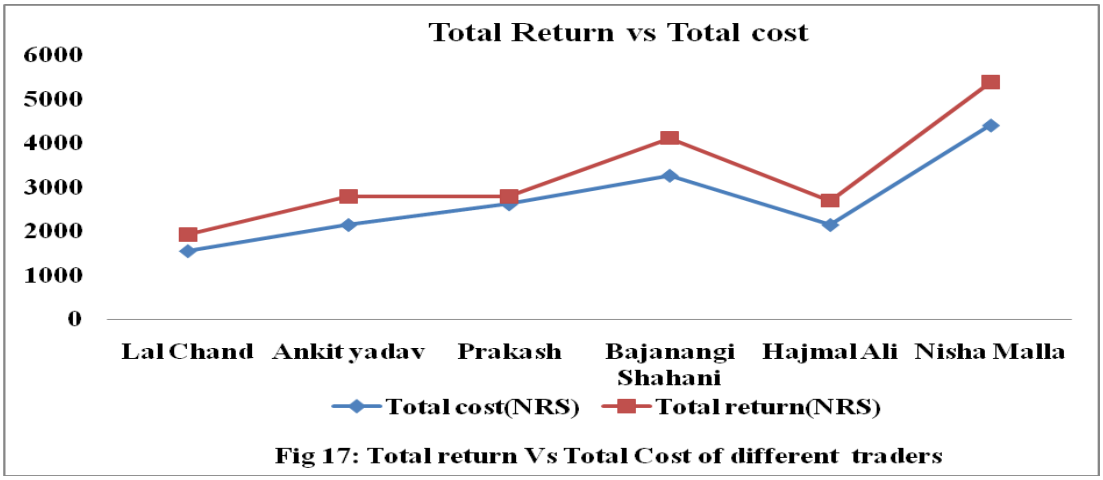

Fig 17: Total return Vs Total Cost of different traders

Here in all cases, total return is higher than total cost hence, it symbolizes that all the respondents/ sellers are benefited by Pangas trading.

Benefit cost ratio (B/C ratio)

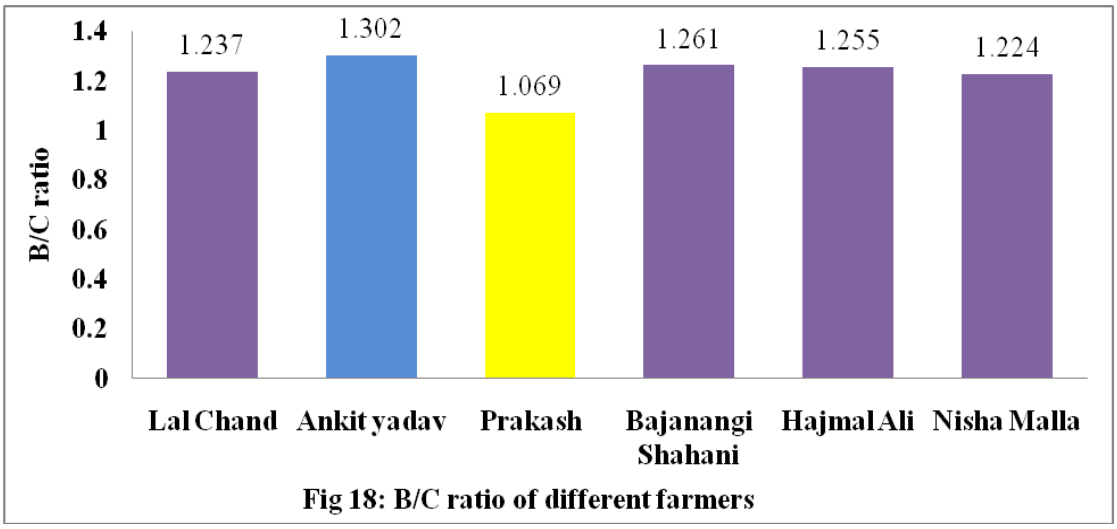

Fig 18: B/C ratio of different farmers

Above figure shows Benefit/Cost ratio of fish traders in Rupandehi and Nawalparasi districts. It shows highest B/C ratio of 1.302 for Ankit Yadav and lowest of 1.069 for Prakash.

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Unit Price Purchase and Unit price sold

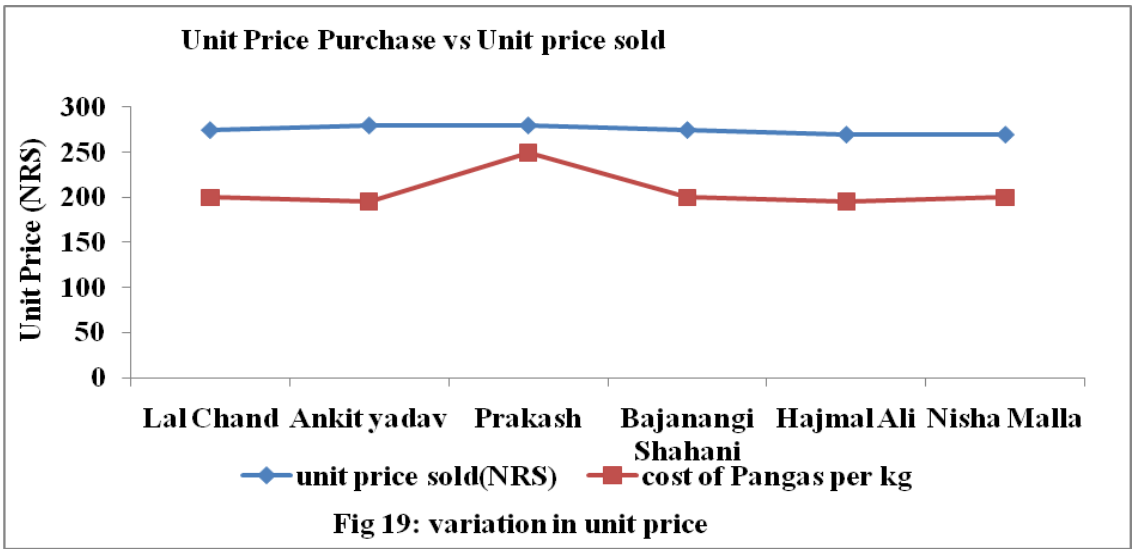

Fig 19: variation in unit price

Figure shows that unit price sold is higher than unit price purchase in all cases. In case of Prakash, the lines become closer to each other because the unit price purchase is highest. Since he bought all Pangas fish from Chhapiya, unit price purchase was higher.

CONSUMER

Consumer type and number:

Figure shows different types of fish consumer in Rupandehi and Nawalparasi districts showing family consumption is higher than consumption in hotel and restaurants.

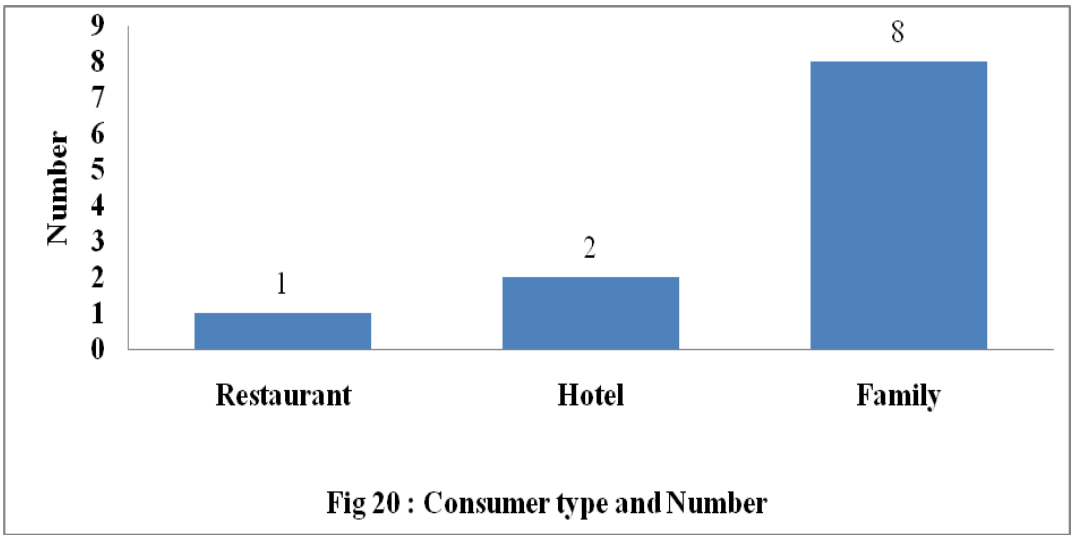

Fig 20 : Consumer type and Number

Family size:

Dhanbir Singh had a joint family with highest family size among all the respondents. Fish consumption per day was also higher for Dhanbir.

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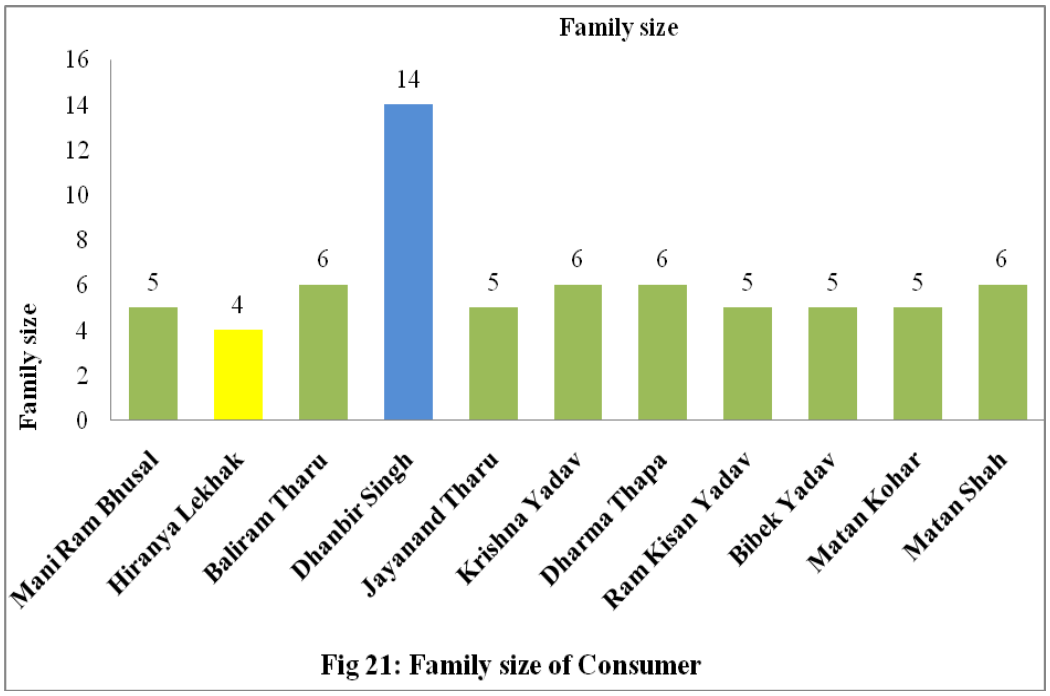

Fig 21: Family size of Consumer

Frequency of fish purchase

Figure shows most of the consumers are purchasing fish weekly (64%) and followed by daily (27%) and monthly (9%).

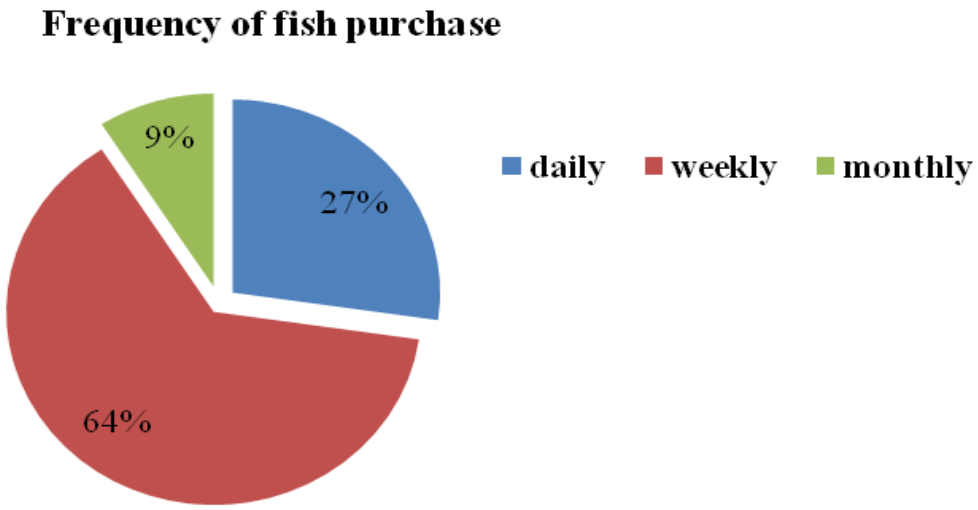

Fig 22: Frequency of fish purchase by different consumers

Preferred species and number of consumer:

Figure shows preferred species of fishes by different consumers in Rupandehi and Nawalparasi districts. Rohu was most preferred species followed by Common carp, Pangas and Mangur.

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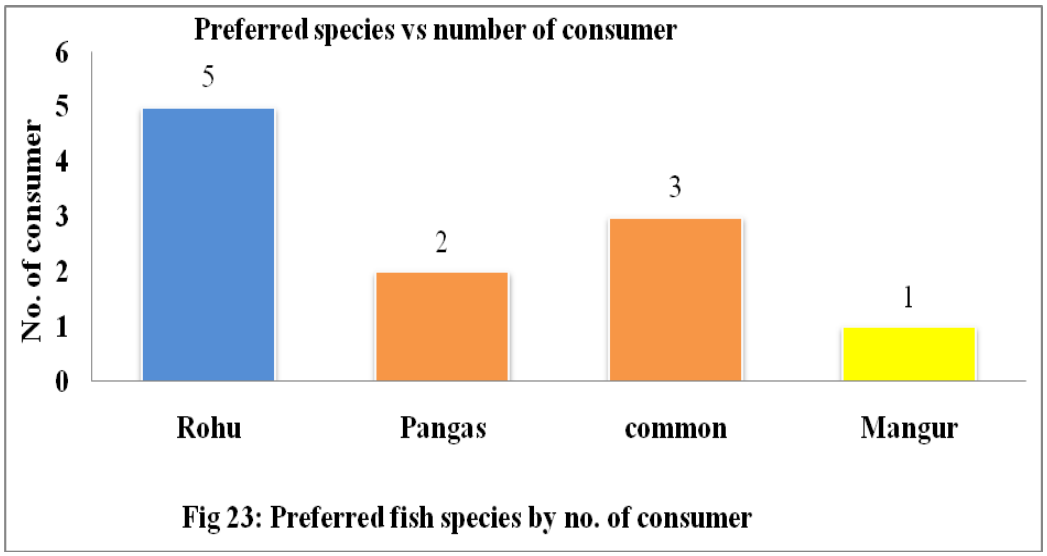

Fig 23: Preferred fish species by no. of consumer

Reasons behind Pangas preference

Consumer preferred pangas fish because of their cheap price followed by ease to eat, its taste and ease of cooking.

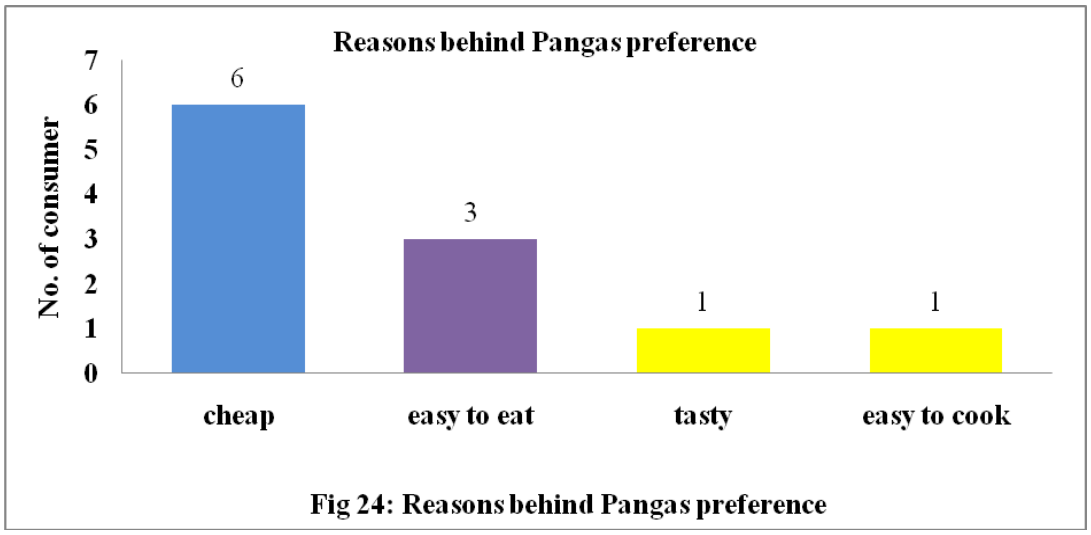

Fig 24: Reasons behind Pangas preference

Amount of Pangas fish purchased (Kg) in a day

Figure shows amount of pangas in Kg purchased by different consumers in surveyed districts with maximum amount (15 kg) by Dhanbir Singh and lowest (0 Kg) by Dharma Thapa with consumpti on range of 0 to 15 Kg. Firure also shows that most of the consumers are purchasing 1 to 2 Kg of pangas.

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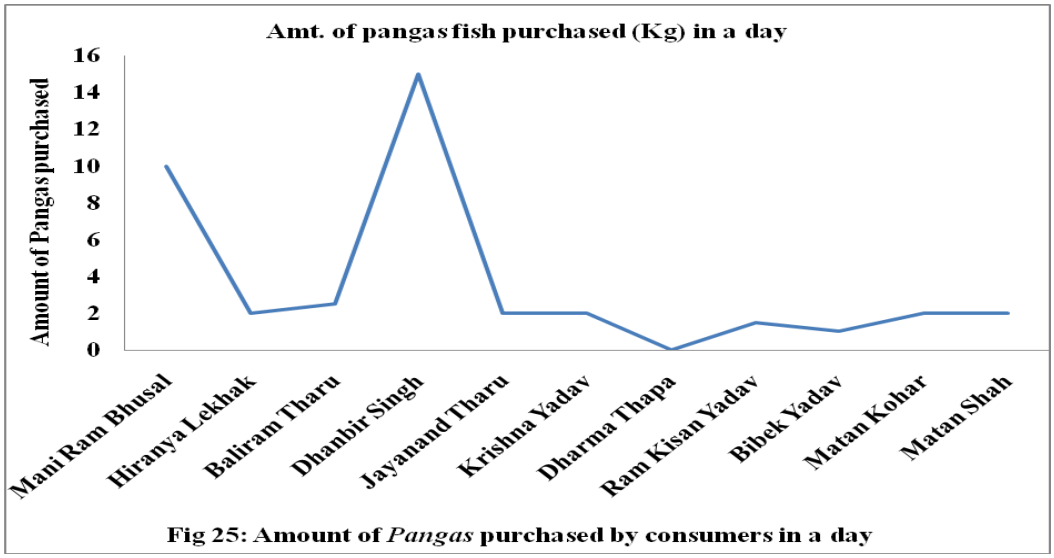

Fig 25: Amount of *Pangas* purchased by consumers in a day

Market preference by consumer:
Above figure shows maximum number of consumers is purchasing fish from Bhairahawa market (55%) followed by Dande (27%) and Chhapiya and Local market with same supply of 9% each.

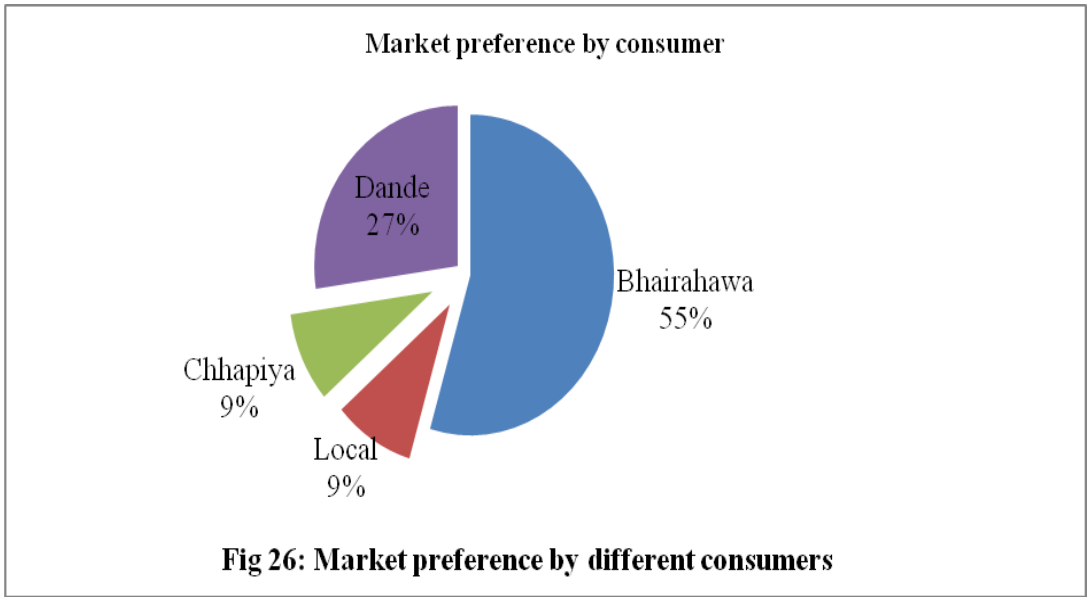

Fig 26: Market preference by different consumers

Price variation of Pangas

Figure shows cost of per Kg pangas fish purchased by different consumers in Rupandehi and Nawalparasi districts. Highest price, NRs. 300, was paid by Ram Krishna Yadav and lowest one, NRs. 230, by Matan Shah. This also shows greater price fluctuation even within same district.

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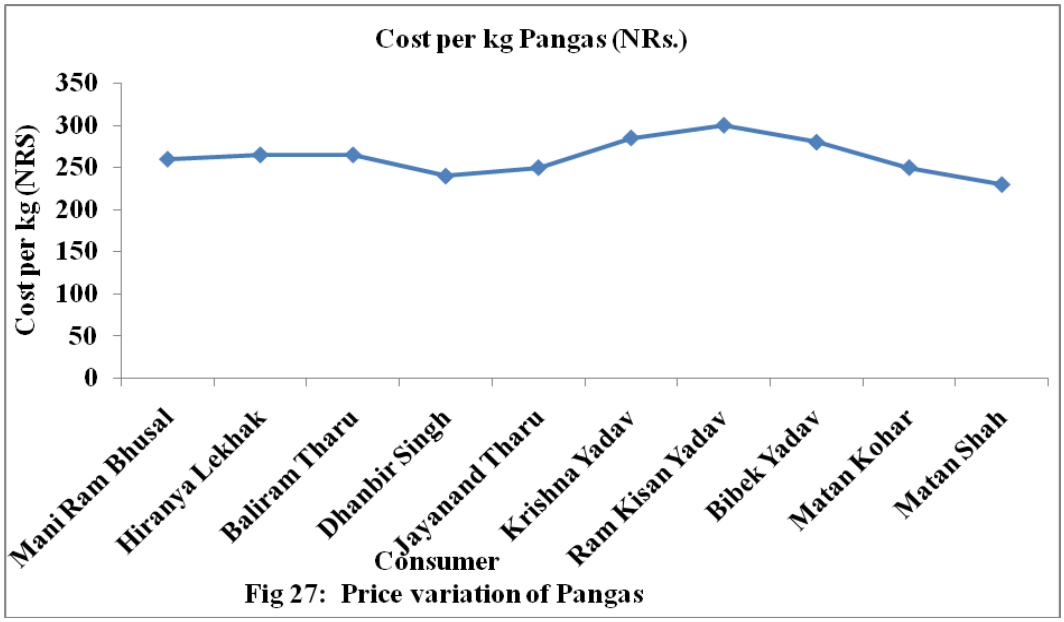

Fig 27: Price variation of Pangas

Feasibility of Pangas production

- Two paired variables (total cost and total return).
- 0.625068927 is the value obtained from T-test
- The tabulated value T at 0.05 level of significance and 4 degree of freedom (d.f.) is 2.776.
- Here, calculated value 0.625068927 < 2.776 (tabulated value), therefore the result is non significant so we accept the hypothesis with the inference that the testing is reliable.

Feasibility of *Pangas* marketing

- Two paired variables (total cost and total return).
- 0.004550502 is the value obtained from T-test
- The tabulated value T at 0.05 level of significance and 5 degree of freedom (d.f.) is 2.571.
- Here, calculated value 0.004550502 < 2.571 (tabulated value), therefore the result is non significant so we accept the hypothesis with the inference that the testing is reliable.

Two paired variables (unit price sold and unit price bought)

- 0.000345977 is the value obtained from T-test
- The tabulated value T at 0.05 level of significance and 5 degree of freedom (d.f.) is 2.571.
- Here, calculated value 0.000345977 < 2.571 (tabulated value), therefore the result is non significant so we accept the hypothesis with the inference that the testing is reliable.

DISCUSSION

Value chain analysis is the main issue in the production and marketing of *Pangasius* and considered as most important approach for generating livelihood options aiming poverty allivation of smallholders among policy makers. Since Pangas is recent application in Nepal, feasibility of its production, market structure and value chain were studied. Input suppliers, producers, traders and consumers were the main actors in the value chain of Pangas at study area. Farmers didn't grow Pangas in large area because it's a new trial for them. Farmers using low fingerling stocking got the low return, hence they suffered from loss (B/C ratio less than one) but farmers using high stocking density got the higher return, hence they were benefitted (B/C ratio higher than one). Production cost included cost of fingerlings, feed cost, labor cost, re-excavation cost and miscellaneous cost (management cost, lime cost, fertilizer cost, rent, tax etc.). The selling price of Farmers varied from 240 to 275 with an average of 257.5 per kilogram. Among eight traders/sellers most of them sold Pangas fish in more than one markets. Some sellers of Bhairahawa market and Dande bazaar are same. Some of them also sold in Thutipipal weekly market also. Major markets are Bhairahawa, Dande, Thutipipal, Kanchhibazaar and Pharsatikar. Unit price of Pangas highly differed from Nepalese farmers to Sunauli wholesaler. Unit price of Nepalese farmers are higher than that from Sunauli wholesaler because of high input cost, low production and recent inclusion in cultivation. Cost of traders can be differentiated in to buying cost, transportation cost, storage cost, tax and stall rent. The benefit cost ratio of all traders was greater than one which signified they all are benefited by Pangas selling. Among all consumers, family consumers were higher in number than Hotel and restaurant consumer. Most of them consume weekly. Pangas was less preferred than Rohu and common but more preferred than Mangur. Bhairahawa was the most preferred market than Dande, Chhapiya and other local markets. The market price of Pangas varied from 230 to 300 NRS per kg with the average price of 262.5 NRS per kg. Both Pangas production and Pangas marketing were feasible in study area because in all cases the calculated T-test value is lower than its tabulated value. The non significant result meant that we could accept the hypothesis with the inference that the testing is reliable. Since it's a newly introduced

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commodity, production was not sufficient. No effective marketing channel was identified and we cannot reach to Indian value chain actors too.

CONCLUSIONS

Analysis showed that Pangas farming and its marketing was found economically beneficial in Rupandehi and Nawalparasi districts. The demand of Pangas fish seems high but number of Pangas producer is very low. There should be increse in the number of producers due to its acceptability by the consumers. Study showed that value chain map of *Pangasius* is dominated by retailers. People preferred Pangas commonly because of Low price (comparatively), easy to eat, easy to cook, good taste and nutritive value. Actually these areas of Nepal have high scope for *Pangasius* culture due to large number of fresh water bodies and optimum temperature.

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REFERENCES

[1] Shrestha J (1999). Coldwater fish and fisheries in Nepal. FAO Fish. *Tech. Pap*. 385: 13-40.

[2] Shrestha T K (1995). Fish catching in the Himalayan waters of Nepal. B. Shrestha, Kathmandu, Nepal. 247pp.

[3] Subba B R and Ghosh J K (1996). A new record of the pigmy barb *Puntius phutunio* (Ham.) from *Nepal. J. Freshwater Biol*. 8 (3): 159-161.

[4] Dung N H (2007). Viet Nam Pangasius, fairy tale of a new Cinderella. Vietnam Association for Seafood Exporters and Producers (VASEP). *Presentation at FAO Global Trade Conference*, Qingdao, China 29-31 May 2007.

[5] Bush, S. R. and M. Duijf (2009). Searching for (un) sustainabilty in Pangasius aquaculture: A political economy of quality in European retailers. Paper presented at the MARE People and the Sea V Conference: *Living with uncertainty and adapting to change*, Amsterdam, 9-11 July, 2009.

[6] Mansfield B (2003). From catfish to organic fish: making distinctions about nature as cultural economic practice. *Geoforum* 34: 3296342. Sea V Conference: 'Living with uncertainty and adapting to change', Amsterdam, 96:11 July, 2009.

[7] Gibbon P (2008). Governance, Entry Barriers, Upgrading: A Re-Interpretation of Some GVC Concepts from the Experience of African Clothing Exports. *Competition and Change* 12: 29648.

[8] Humphrey J and Schmitz H (2002). How does insertion in global value chains affect upgrading in industrial clusters? *Regional Studies* 36(9): 1017 6 1027.

[9] Fine, B., Heasman, M. and Wright, J. (1996) *Consumption in the Age of Affluence: The World of Food*, Routledge, London.

[10] Leslie D and Reimer S (1999). Spatializing commodity chains. *Progress in Human Geography* 23(3): 416-420.

[11] Bolwig S, Ponte S, Du Toit A, Riisgaard L and Halberg N (2010). Integrating Poverty and Environmental Concerns into Value-Chain Analysis: A Conceptual Framework. *Development Policy Review* 28(2): 173-194.

[12] Gereffi, G., & Korzeniewicz, M. (Eds.). (1994).*Commodity chains and global capitalism.* Westport, CT: Praeger.

[13] FAO (2012). The State of the World Fisheries and Aquaculture 2012. Rome: FAO.

[14] Locher, W. (1989). Marketing and Sales. In Training Manual on *Cotton Trading Operations.* International Trade Centre UNCTAD/GATT, Geneva, pp. 79-112.

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