Socioeconomic Profile of Fish Farmers of Telangana and Usage of Mobile Apps

Kiranmayi Dhenuvakonda[1], Arpita Sharma[1*], K. Pani Prasad[2] and Rama Sharma[1]

[1]*Fisheries Economics, Extension and Statistics Division, ICAR-Central Institute of Fisheries
Education, Mumbai, India.*
[2]*Aquatic Environment and Health Management Division, ICAR-Central Institute of Fisheries
Education, Mumbai, India.*

Authors' contributions

*This work was carried out in collaboration among all authors. Author KD has undertaken the field work
and analysed the results. Author AS has designed the study, interview schedule and provided
guidance and supervision for the study and analysis. Author KPP has provided guidance on fisheries
and fish disease management, author RS has provided guidance in the analysis. All the authors read
and approved the final manuscript.*

Article Information

Original Research Article

ABSTRACT

This study assessed the socioeconomic profile of fish farmers of Telangana and usage of mobile
apps by them. An interview schedule was designed to assess the socioeconomic profile and to
compile information on usage of mobile phones. Information was collected about age, income,
fisheries experience, farm size, production, species cultivated and constraints faced by farmers.
Information on mobile phone usage was studied through possession of mobile phone/smart phone,
usage of mobile phones, usage of mobile apps, awareness of agriculture/fisheries apps and attitude
towards usage of apps related to fisheries. Farmers' attitude towards mobile app related to fish
culture was also studied. Results indicated that farmers' age was in the range of 35-50 years. Yearly
income was in the range ₹2-5 lakhs. They had fish farming experience between 15-30 years.
Majority had pond size of <1 hectare and fish production was between 1-2 tonnes/hectare. It was

_____

Corresponding author: E-mail: arpitasharma@cife.edu.in;

found that all the farmers used smart phones. Most common apps used by farmers were WhatsApp, Facebook, YouTube and State Bank of India personal banking app. It was found that farmers were not aware of any mobile apps related to fisheries and aquaculture and thus usage was also not reported. However, they had a positive attitude towards usage of a mobile app related to fisheries. This study recommends development of mobile apps for fish farmers in a participatory manner which will be useful in disseminating information. Based on farmers' needs a mobile app Matsya Kiran was developed.

Keywords: Fish farmers; mobile phone; mobile app; socio-economics; Telangana.

1. INTRODUCTION

Fisheries is an important sector in India and plays an important role for livelihood security and socioeconomic development of the country, by supplementing family income, generating gainful employment and providing nutritious food to millions of rural people. India is the second largest producer of fish and also second largest aquaculture nation in the world with total fish production of 12.61 Million Metric tonnes in 2017-18. The gross value addition of the fisheries and aquaculture sector during 2016-17 is 0.96% of the National Gross Value Added (GVA) and 5.37% to the agricultural GVA [1]. In India, with reference to aquaculture, Andhra Pradesh is leading in fish production followed by West Bengal. The fish production in Andhra Pradesh in the year 2017-18 is 3.45 MMT [2]. However, the newly formed state, Telangana is not lagging behind. Telangana ranks third in India in fishing resources and sixth largest in terms of fish production. Fisheries sector in Telangana is a traditional and important occupation contributing about 0.5 per cent to the GSDP of agriculture and allied sectors during 2018-19 [3]. In order to strengthen the sector, Government is introducing many fisheries development schemes to improve the productivity, reduce post-harvest losses, increase livelihood support and welfare of fishers in capture and culture of fisheries.

Telangana is not only showing a significant development in fisheries but also in Information and Communication Technology (ICT) sector. There were several initiatives for promotion of ICT in Telangana in agriculture and allied sectors viz, RiceVocs, RKMP's, Digital Telangana Centres by women in 100 panchayats [4]. The term ICT is used to include electronic and print media such as mobile phones, internet, telephone, computer, radio and television. In a study conducted by Ramaraju et al., 2011 [5] it has been reported that the most popular information gadget possessed and accessed by the farmers is the Mobile Phone (82%) followed by Television (73%) and the Newspaper (67%). Mobile as a mode of dissemination of information is preferred by 25% of farmers, followed by Information centre/Kiosk (12%) and Television (8%).

The mobile devices has come up with a lot of handy tools known as 'app' that are widely used by the common people in their day to day life. The mobile apps are used for different purposes such as from playing games to online ticket booking, from reading books to learning cooking, from online chatting with friends to online financial payments. Mobile apps are becoming popular in agriculture and allied sectors too, with the potential for further advancement. Mobile apps have given new thinking and approach to farmers for making a decision about getting the information of market and weather from concern person. Now the farmers can communicate with customers to sell their product at a good price and at the same time they can have up to date information about market as well as weather [6].

A study has reported that a total of 124 mobile apps are available and provide fisheries related information in various fields like angling, aquaculture, aquarium management, marine fisheries and fisheries governance, marketing and biology; out of which 22.58% apps are of Indian origin [7]. However, there is not much information on awareness and usage of mobile apps by fish farmers. The socioeconomic characteristics of particular demography strongly influence their responses to the technological changes and participation in the development schemes [8]. The lack of authentic information on socioeconomic condition of target group is one of the serious limitations, in the successful implementation of developmental policies [9]. So, in addition to socio-economic profile of fish farmers, it is important to study the usage of mobile phones and mobile apps by them. Considering the importance of usage of mobile phones, a study was done with the objectives to assess the socio-economic profile of fish

farmers, usage of mobile phones and attitude of fish farmers if a fisheries related mobile app is designed for them.

2. MATERIALS AND METHODS

For the study, state of Telangana was selected purposively. Telangana is a newly formed 29th state in the south of India. The rationale for selecting Telangana, lies in the fact that the state has a great potential of ₹4,500 crore to ₹5,000 crore in fisheries sector under reservoirs, tank and ponds and ranked 6th in fisheries production with approximately 3.5 lakh tonnes of production in 2018 as per Department of Fisheries (DoF), Telangana (2018). The state fisheries have a vast fishery potential with 74 reservoirs having water spread area of 1.77 Lakh Ha, 23,874 tanks having water spread area of 5.92 lakh ha., 474 ponds having water spread area of 781 Ha., and 4818 Kms of rivers and canals. The fishermen population is 27,14,255 and there are 3,930 fishers cooperative societies with a membership of 2,39,365. The fisheries sector contributes considerably for food security, nutrition and health, livelihood security to rural population and welfare of fishers. The vision of the State Department of Fisheries state is optimal utilization of natural resources for fish production, promote freshwater aquaculture, supported by infrastructure and trained human resources [10].

Among all the districts of Telangana, Karimnagar and Khammam are important with reference to fisheries with highest fish and seed production and also relatively higher number of aquaculture farms. Hence these two districts were selected for the present study and its map is presented in Fig. 1. A total of 60 fish farmers from these two districts were selected as respondents using random sampling method. Information about fisheries of these 2 districts is given in Table 1.
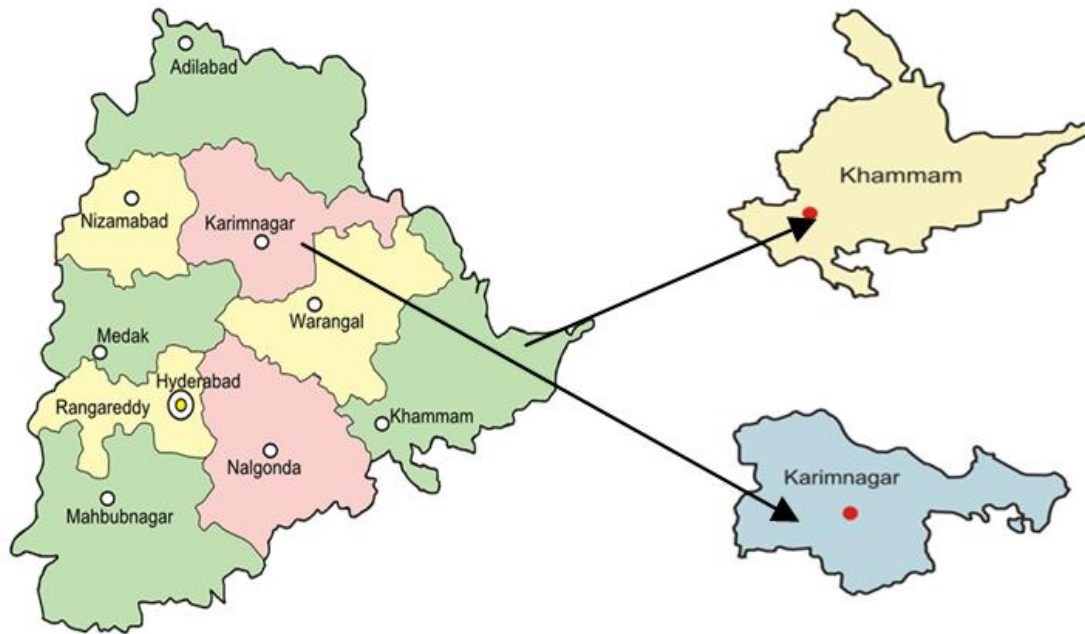

Fig. 1. Map of Telangana

Table 1. Fisheries information of Karimnagar and Khammam district, Telangana

Details	Karimnagar	Khammam
Fish and prawn production (in tonnes)	20,841	15,567
Fish rearing tanks/ Reservoirs (nos.)	444	1,156
Water spread area (in ha)	31,094	26,561
Fishermen cooperative societies	155	149
Members	7,972	13,653

Source: Department of Fisheries (2018)

Tool used to collect information was Interview schedule. Socioeconomic profile of farmers was studied through an interview schedule and information was collected about their age, income, fisheries experience, farm size, species cultivated, production and fisheries related constraints faced by them. Information was collected from farmers about usage of mobile phones, usage of smart phones, usage of mobile apps, awareness of any agriculture or fisheries apps, attitude towards usage of apps related to fisheries and features which they would like to be included if a fisheries related mobile app is designed for them. To collect the specific features which farmers would like to be included in the app a schedule was prepared with open ended questions. Responses were collated and simple percentage analysis was done.

3. RESULTS AND DISCUSSION

3.1 Profile of Farmers

The profile of 60 farmers was studied through an interview schedule from which information was collected about their age, income, farming experience, farm size, species cultivated, production and constraints faced. Information about age is presented in Fig. 2.

3.1.1 Age

The farmers' age ranged from 35 to 50 years and average age was 42 years. Majority of the farmers (71.7%) were found to be in the middle age group (35-50), followed by young age group

(25%). Only few farmers were found to be in the old age group, constituting 3.3% of the total farmers.

3.1.2 Income

Information on annual income (in Rupees) of the farmers was collected and is presented in Fig. 3. Average annual income of farmers was found to be ₹2.5 lakhs per annum with 75% of them earning between ₹2-5 lakhs. Range of income was ₹ 1,00,000 to ₹ 10,00,000/- They are involved in fisheries activities during culture period i.e. about 8 months.

3.1.3 Fish farming experience

Information on fish farming experience was collected from the farmers and this is presented in Fig. 4.

Average fish farming experience was found to be 22.5 years with a range of 0 to 32 years. Maximum farmers had fishing experience in the range 15 -30 years.

3.1.4 Pond size

Information on pond size was collected from the farmers and this is presented in Fig. 5.

Majority of the farmers (75.1%) had pond size of <1 ha, 16.7% of the farmers had 1-2 ha pond size and 8.3% of the farmers had >2 ha pond. Average size of the farm was found to be 0.12 ha.
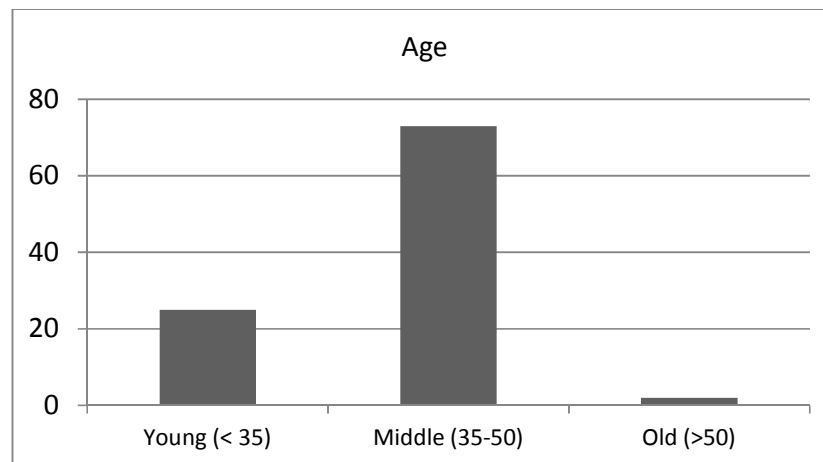

Fig. 2. Age profile of fish farmers of Telangana
Source: Field survey, 2018

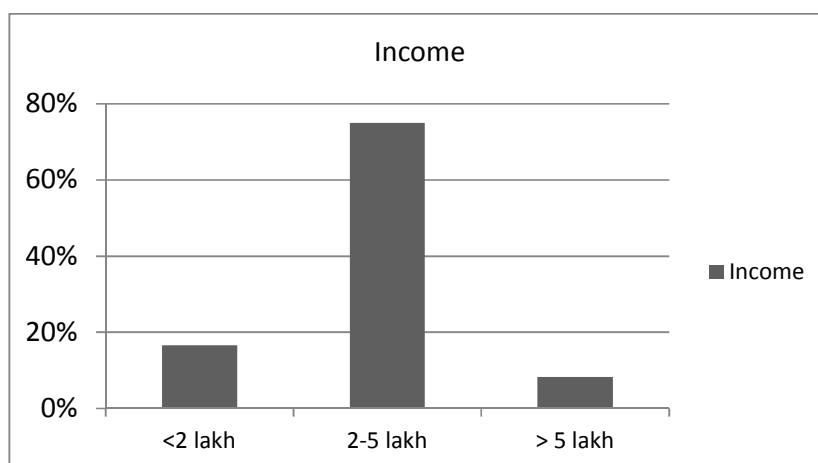**Fig. 3. Income of fish farmers of Telangana**
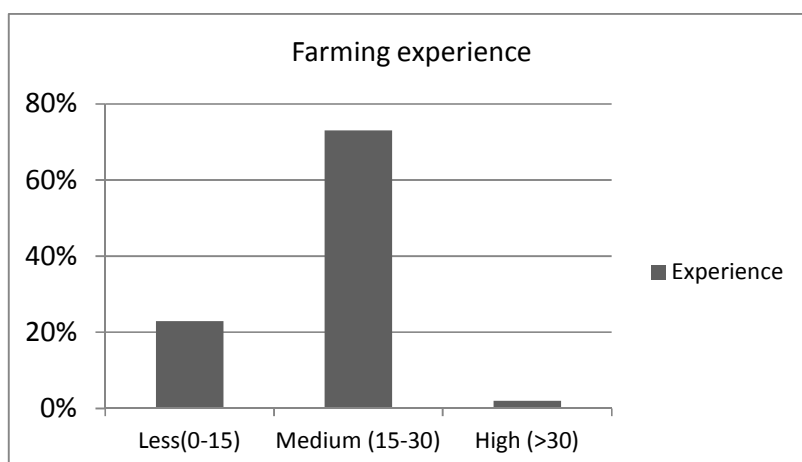*Source: Field survey, 2018*

Fig. 4. Farming experience of fish farmers of Telangana
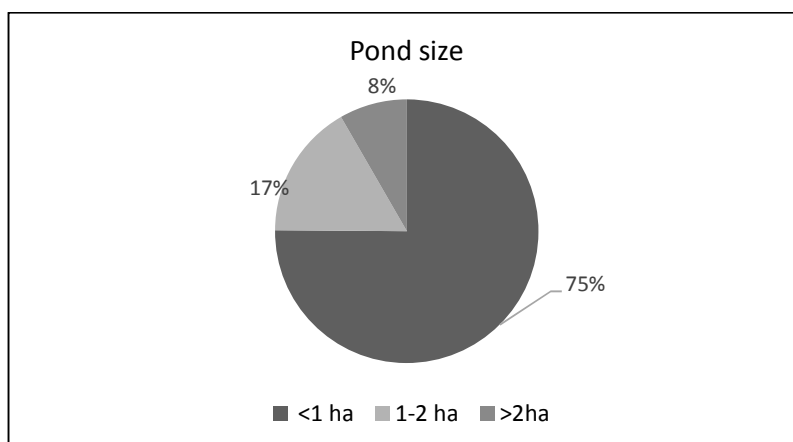*Source: Field survey, 2018*

Fig. 5. Fish pond size
Source: Field survey, 2018

It is clear from the study that the farmers were middle aged, had average annual income of ₹ 2.5 lakhs with small fish farms of 0.12 ha and fish farming experience of 22.5 years. Compre-hensive socioeconomic characteristics of fish farmers is given in Table 2. Similar studies for fish farmers in Telangana are not there on which comparisons could be done. The socioeconomic status of the fish farmers as per the national classification with a typical Indian household with four members in a family and an annual household income between ₹ 2–5 lakhs per annum could be categorized as being in the middle income group and also by using World Bank's definition of middle income families to be those with per capita income between $10 to $50 per day [11].

National Council of Applied Economic Research of India in their survey have concluded that there were 153 million people who belonged to middle income group in 2006 [12]. World Bank, estimated in their 2011 reports that if India's economy continues to grow per projections, India's middle income group would grow by an additional 500 million people by 2025. This would make it, with China, the world's largest middle-income market [13]. With educated fish farmers who are middle class and have aspirations there are immense opportunities for development.

3.1.5 Species cultivated and fish production

As reported by farmers, the fish species which were cultured by them, were Catla, Rohu, Mrigal, Common carp, Grass carp, Murrel and Fresh water prawn. Majority of the farmers reported that the fish production is around 1-2 tonnes per ha.

3.1.6 Constraints faced by fish farmers

Information was collected regarding the constraints faced by the farmers. Responses of the farmers are presented in Table 3.

Kumari and Sharma [14], Vignesh et al. [15], Pandey et al. [16] also have reported similar kind of constraints by aqua farmers.

Table 2. Socioeconomic characteristics of fish farmers of Telangana

Characteristics	Category	Frequency	Percentage (%)
Age(Years)	<35 years	15	25%
	35-50 years	43	73%
	>50 years	2	3.3%
Income (Lakhs)	<2 lakh	10	16.7%
	2-5 lakh	45	75%
	>5 lakh	5	8.3%
Fish Farming Experience	0-15 years	14	23.3%
	15-30 years	44	73.3%
	>30 years	2	3.3%
Pond Size (Hectare)	<1 ha	45	75.1%
	1-2 ha	10	16.7%
	>2 ha	5	8.3%

Source: Field survey, 2018

Table 3. Constraints faced by fish farmers

Constraints	Frequency	Percentage
Lack of scientific knowledge on culture management and modern farming methods	60	100
Availability of quality fish seed of different varieties	57	95
Lack of knowledge on feed management	54	90
Lack of marketing facilities	52	86.7
Low fish yields	51	85
Lack of knowledge on fish processing	48	80

Source: Field survey, 2018

3.2 Information on Usage of Mobile Phones

All fish farmers had smart phones. For further information on usage of mobile phones, enquiry was done regarding the most common apps downloaded and used by them, frequency of usage of these apps, awareness/usage of any apps related to agriculture/fisheries, sources of information related to fisheries, attitude towards app on fisheries and need of app on fisheries.

3.2.1 Usage of smart phones and most common apps

Information was collected regarding usage of smart phones by farmers, most common apps available or downloaded by them. This information is presented in Fig. 6.

It was found that all the farmers used smart phones. Most common apps used by farmers were Whatsapp, Facebook, Youtube and SBI personal banking app. Other apps used by farmers include food ordering apps, online shopping, ticket booking apps for train or bus etc.

3.2.2 Usage of apps related to agriculture and fisheries

Information was collected regarding usage of apps related to agriculture and fisheries by the farmers. It was found that no farmers used any agriculture/fisheries related app and were not aware of any such app. Corroborating this an empirical research reported in the field of agriculture have shown that a very small number of apps are available in relation to the significance of agriculture worldwide. This study has proposed that the development of mobile apps should support agricultural activities by providing accurate, certified and validated content and services that would take into account the peculiarities of geographical areas [17].

3.2.3 Sources of information related to fisheries

Information was collected regarding sources of information related to fisheries. Farmers reported that Internet, Krishi Vigyan Kendra and officials from Department of Fisheries (DoF) were the source of information. However, other researches like Rajak and Sharma [18] have reported that the source of information are fish feed companies. In this study however, feed companies were not a source of information.

3.2.4 Attitude and need of mobile app in fisheries

All the farmers showed positive attitude towards development of a mobile app which provide fisheries related information. They responded in positive that there is a need of a mobile app which provides any information fisheries.

3.2.5 Features to be included in mobile app

Based on the positive response from fish farmers towards a need of a mobile app which provided information on fisheries, further enquiry was done about specific features they would like to be included if a mobile app was developed for them. Simple percentage analysis was done and this is presented in Table 4.
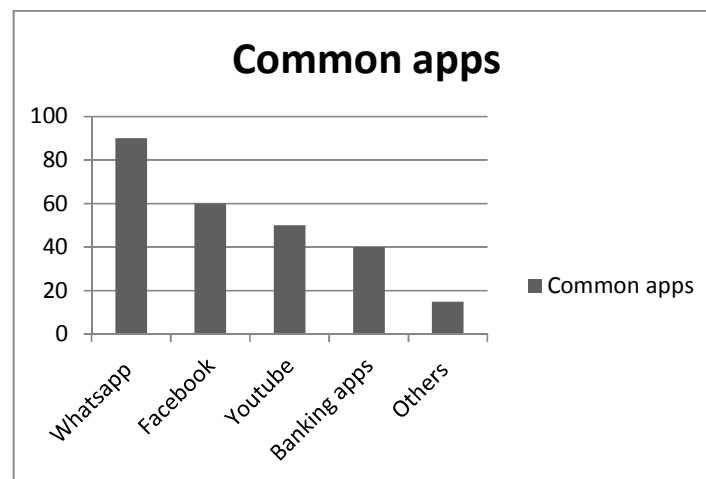

Fig. 6. Common mobile apps used by farmers

7

Table 4. Responses of farmers for the features to be included in mobile app

S. No.	Feature	Frequency	Percentage of farmers
1.	Culture Information	60	100
2.	Disease management	60	100
3.	Market information	55	91.7
4.	Fish seed suppliers	55	91.7
5.	Feed management	56	93.3
6.	Water quality management	60	100
7.	Schemes	54	90

All fish farmers reported that they would like to use a mobile app which have information on fish culture, disease management and water quality management. In addition they are interested to have information on feed management, feed suppliers, market information and Government schemes. It is thus clear from the study that at present, farmers are not aware of any mobile app in fisheries/aquaculture but are keen to use mobile apps which provide information on various aspects of aquaculture. Kafetzi [19] too have reported that farmers use less apps related to farming due to lack of awareness but show interest. All the farmers reported that a mobile app which provides information on these aspects will be highly beneficial establishing the need of a good mobile app. Based on the needs of the farmers a mobile app named as Matsya Kiran was developed.

4. CONCLUSION AND RECOMMENDA-TIONS

The use of mobile apps has been increasing and is being used for the development of rural people. Fish farmers have a positive attitude towards usage of mobile apps and show interest in a fisheries related mobile app. Thus, there is a need to develop mobile apps which provide fisheries related information to the fish farmers of Telangana as well as other states. This study recommends development of location specific mobile apps for fish farmers in a participatory manner which will be useful in disseminating information in their vernacular languages This handy device is an adequate tool to disseminate adequate information to fishers/ fish farmers, students, youth, cooperatives, SHGs, etc.

CONSENT

Informed consent of the respondents was taken before conducting their personal interview.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. DAHDF. Annual Report. Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture and Farmers Welfare, Government of India; 2019.
2. Department of Fisheries, Andhra Pradesh. Statistics; 2018.
Available:http://www.fisheries.ap.gov.in/index.html
3. Socio Economic Outlook. Planning Department, Government of Telangana; 2019.
Available:http://www.indiaenvironmentportal.org.in/files/file/Socio%20Economic%20Outlook%202019%20-%20Telangana.pdf
4. ICT Policy Framework. Information Technology, Electronics & Communications Department, Government of Telangana; 2016.
Available:https://www.telangana.gov.in/PDFDocuments/ICT-Policy-Framework-2016.pdf
5. Ramaraju GV, Anurag TS, Singh HK, Kumar S. ICT in Agriculture: Gaps and way forward, Newsletter, Indian Institute of Management, Ahmadabad. 2011;21(2).
6. Amrita C, Karthickumar P. Need for mobile application in fishing. International Journal of Science, Environment and Technology. 2016;5(5):2818–2822.
7. Sharma Arpita, Kiranmayi D. Virtual fisheries through mobile apps: The way

forward. Journal of Indian Fisheries Association; 2019. (Communicated)

8. Biswas B, Das SK, Mandal A. Socio-economic dimensions and their impacts upon productivity of composite fish farming in north 24 parganas district, West Bengal. Nature. 2018;25(35):41-67.

9. Sen A, Roy M. Socio economic status of fish farmers in Tripura, India. Int. J. Cur. Res. 2015;7:17090-17096.

10. Department of Fisheries, Telangana. Reports; 2018.
Available:http://fisheries.telangana.gov.in

11. Kharas H. The emerging middle class in developing countries. Working Paper 285, OECD Development Center, Paris; 2010.
Available:https://www.oecd.org/dev/44457738.pdf

12. NCAER India. National Survey of Household Income and Expenditure (NSHIE)/Market Information Survey of Households (MISH); 2013

13. Kharas H. the emerging middle class in developing countries brookings institution. World Bank Conference; 2011.

14. Kumari S, Arpita Sharma. Constraint analysis of SHGs in fisheries sector, Raipur, Chattisgarh. Indian Journal of Fisheries Association. 2015;42:81-88.

15. Vignesh K, Kumar S, Rajakumar M, Chidambaram P, Kanaga V, Pasupathi P, Rajarajan P. An analysis of socio-economic profile and constraints of the Indian Major Carps (IMC) seed rearing farmers in Thanjavur district, Tamil Nadu. International Journal of Fisheries and Aquatic Studies. 2017;1(3):6.

16. Pandey DK, De HK, Hijam B. Fish farmers' perceived constraints in transfer of aquaculture technology in Bishnupur district of Manipur, India. International Journal of Fisheries and Aquatic Studies. 2014;2(1):01-04.

17. Constantina Costopoulou, Maria Ntaliani, Sotiris Karetsos. Studying mobile apps for agriculture. Studying Mobile Apps for Agriculture. Journal of Mobile Computing & Application. 2016;3(6):44-99.

18. Rajak S, Arpita Sharma. Market survey of shrimp feed. Indian Journal of Marketing. 2005;35(3):15-20

19. Kafetzis. Mobile applications in agricultural sector: Current situation and prospects. Thesis, Department of Agricultural Economics and Rural Development, Agricultural University of Athens; 2015.