

# 'Fish Advice' Application: *Journey Towards Changing Life*



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**&**  
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## Acronyms

FA	Fish Advice
GoB	Government of Bangladesh
a2i	Access to Information
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
SSC	Secondary School Certificate
HSC	Higher Secondary Certificate
TCV	Time, Cost & Visit
DoF	Department of Fisheries
FAO	Food and Agriculture Organization
UPO	Upazila Fisheries Office
DFO	District Fisheries Office
UDC	Union Digital Centre
GDP	Gross Domestic Product
BDT	Bangladesh Taka
SPSS	Statistical Package for Social Sciences
TV	Television
SMS	Short Message Service
FCR	Feed Conversion Ratio

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## Executive Summary

The fisheries sector in Bangladesh has been playing a vital role in providing employment opportunities for the unemployed people, earning foreign currencies, in fulfilling the protein as well as ensuring the food security and enhancing the socio-economic development. Bangladesh has some remarkable achievements centering the fisheries sector over time. The study entitled ““Fish Advice” Application: An Outcome Level Study” has been conducted to demonstrate the coverage of receiving online App solution among the target people of 9 districts (Bogra, Comilla, Feni, Jessore, Moulavibazar, Mymensingh, Noakhali, Rajshahi and Barisal).

The study also initiated to explore the benefits of the app, to identify the satisfaction level of the service receivers, to compare reduced time, cost and visit with earlier status and to analyze the benefits of cost achieved through introducing the service. The study was conducted following the purposive sampling method and data was collected from the related people with the fisheries. The study revealed that the newly introduced app has brought significant benefits for the respondents in the selected areas.

The respondents have been satisfied after starting using the app. Findings of the study showed that about 34% respondents are highly satisfied. It has reduced significant time, cost and visit of the people related with fisheries. About 90% of time has reduced after initiating the app and the respondents are now getting the information within very short time, with low cost and within very short span of time

Now, the respondents are using the saved time and money for familial tasks, in business purposes, for daily works, for educational purposes and for seeking jobs. Besides, the annual income and fish production of the respondents have increased after using the app. It was noticed that about 86% and 85% of the respondents have mentioned that their annual income and fish production have increased as they have started using the FA application.

## 1. Introduction

Bangladesh is a country surrounded by hundreds of rivers and endowed with vast water resources. The climate of Bangladesh is unique for aquaculture and fisheries resources management. The world's largest flooded wetland, the Bengal Delta, and the three main river systems that flow from the Himalayas into the Bay of Bengal contribute to Bangladesh having the third greatest aquatic fish biodiversity in Asia. Bangladesh's fish farmers represent almost 7% of the world's inland fish production. The fisheries sector makes important contributions to the country's food security, nutritional status and economic growth through income generation, employment, and foreign exchange.<sup>1</sup> At present the Fisheries Sector in Bangladesh represents as one of the most productive and dynamic sectors in the country. About 1.25 million people are directly involved in Fisheries sector in Bangladesh. Over 12 million additional rural people indirectly bear their livelihoods from fisheries related activities. Among rural dwellers, four out of five are dependent to some extent on fisheries resources. The coastal and marine zone of Bangladesh is one of the richest ecosystems of the world, having high biological diversity. The country is rich in fishery resources, including 260 freshwater fish species, 475 marine fish species, 24 freshwater shrimp species, 36 marine shrimp species, and other important species. The newly-settled maritime boundary with neighboring states, Myanmar and India has huge potential for marine fisheries in artisanal, industrial and coastal sub-sectors. More than 17 million people, including about 1.4 million women depend on fisheries sector for their livelihood by fishing, fish farming, fish handling, processing etc.<sup>2</sup>

Bangladesh is one of the world's leading inland fisheries producers and has a huge water resource all over the country in the form of small ponds, ditches, lakes, canals, small and large rivers, and estuaries covering about 4.34 million hectares. The fisheries sector in Bangladesh is broadly divided into four sub-sectors- inland capture, inland culture, mariculture (artisanal fish farmers) and marine industrial fish farmers. Freshwater aquaculture involves pond aquaculture especially the polyculture of native and exotic species. The country also has a coastal area of 2.30 million hectares and a coastline of 714 km along with the Bay of Bengal, which supports

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<sup>1</sup> Fishing for Food Security; The Importance of Wild Fisheries food Security and Nutrition (2016); <http://pdf.usaid.gov/pdf/docs/PA00M1T3.pdf>; (accessed on 02 August 2017).

<sup>2</sup> A Study on Sector-based Need Assessment of Business Promotion Council–Fisheries Products (2015); <http://www.bfti.org.bd/pdf/Fisherypdf>; (accessed on 01 August, 2017).

large artisanal and coastal fish farmers. Bangladesh is considered one of the most suitable countries in the world for farming of freshwater prawn.<sup>3</sup>

A great portion of the people of Bangladesh is directly or indirectly engaged with fisheries in different suitable areas of fish farming. The fish farmers used to face different types of challenges to get the information centering fish cultivation. In recent years, a wide range of changes affecting fish farmers have taken place, including very large increases in fish production from all forms of aquaculture, declines in most capture fisheries, encroachment and degradation of natural resources, rapid urbanization, infrastructure investments that have negatively impacted fish farmers.

For instances, farmers had no source of getting fisheries related scientific advice but Upazila fisheries office. This Upazila fisheries office is far distant from most of the firm and individual fish farmers. Far distance to travel and often waiting for the fisheries officials consequently more time and cost to spend. Otherwise the fish farmer called the fisheries officials to visit his/her firm and doing nothing rather waiting for fisheries officers visiting for advice. Even the fish farmers didn't know where to get the solution of problem. The fish farmers used to take advice from local sources; other fish farmers, fish feed and medicine sellers or dwellers. The advice is based on the previous experiences not based on scientific fish farming knowledge. Such old-aged fish cultivation or farming led the production of firm into the least. Sometimes they had to face a great amount of loss only for lack of scientific suggestion.<sup>4</sup>

So, the technological application in fish cultivation was necessary to face the challenges centering this sector. In this regard, the DoF has initiated the app for solving the problems centering the fisheries practice. Fish Advice (FA) contains several scientific suggestion and guideline. It also contains with still picture of the issues such as photo of fish diseases, water problem, pond mud, enemy species, etc. The people have been greatly benefited by using the app as they can avail doorstep service of information, they have been able to increase the production of the fish. They also can avail the service at low cost and their both annual income and annul fish production have significantly increased. Specially, the amount of fish production in last one year has been increased for those fish farmers that have taken the benefits of suing

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<sup>3</sup> Fisheries and Aquaculture in Bangladesh: Challenges and Opportunities (2014);

<https://www.jsicedcentral.com/Aquaculture/aquaculture-1-1001.pdf>; (accessed on 02 August 2017).

<sup>4</sup> A comparative TCV + Study on Fisheries Advice Technique (2016), Access to Information (a2i) Programme, Prime Minister's Office. <http://a2i.pmo.gov.bd/resources/studies/> (accessed on 03 October 2017).

the app. Now, the respondents can get the information of fisheries with very short time, cost and visit and the service has made them satisfied. Most of the respondents have been found as the highly satisfied and satisfied with getting the service. They have mentioned various reasons behind their satisfaction. The respondents have been satisfied as the information can be availed easily, with less cost as well as quickly different problems can be solved. As the time, cost and visit for availing the service have reduced the respondents are utilizing surplus money and saved time for familial tasks, in business purpose, for daily works, for educational purposes and also for seeking other jobs.

## **1.1 Literature review**

Fisheries and aquaculture sector have emerged as the second most important contributors in export earnings of Bangladesh. It is the second largest export industry in Bangladesh and produces 2.5 percent of the global production of shrimp. Though rice is the most widely produced agricultural crop in Bangladesh, fisheries has a unique feature for its role in providing an important source of animal protein and essential elements for the population. In 2010-2011, some 5.5 million people were directly involved in fisheries as the main source of earning (Ghose B, 2014).

Fisheries and aquaculture are playing vital role in the world by providing 142 million tons of fish for human becomes the source of income and livelihood for 45 million people through direct employment and provides more than 180 million employment opportunities as a whole in the global fish industry. Globally, fish provides 20 percent of animal protein to the 2.9 billion people. Yearly availability of fish in developing countries is 16 kg per person per annum compared to world average 18 kg per capita. Growth of aquaculture is rising from a share of 4 percent in 1970 to 38 percent in 2009. So, employment in aquaculture is increasing at a faster rate than world population growth and now accounts for one-quarter of the total number of workers are directly involved in the fisheries sector (FAO, 2012).

With the increasing demand for fish and the decline in capture fish production, small indigenous species (SIS) farming in Bangladesh is becoming more intensive (Ahmed et al., 2007).

Bangladesh continues to be the fourth largest fish producer in the world for Inland water fish capture. FAO predicts Bangladesh to be the first of the four countries, followed by Thailand, India, and China, to experience the highest growth rate in terms of fish production by the year 2022 (World Fisheries and Aquaculture, 2014).

Fish is the primary source of animal protein for Bangladeshi population, especially for poor rural households. Fishes are the major source of animal protein providing 80% of the animal protein intake and 7% of total protein supplies. Rice and fish constitute such an important part of Bangladeshi food culture that it has become a popular proverb- "*mache bhate bangali*" which means "fish and rice make a Bengal (Ghose B. 2014).

Technology necessary for marine fish breeding, culture, management and conservation are limited. Many of the evolved technologies are required modification and standardization suited to more challenging agro ecological zones for balancing the ecological niches. Research focusing fish-culture and management in closed floodplains under unfavorable environments, development of stress and extreme heat and cold tolerant varieties are essential. Scientists must determine variables responsible for yield gap at fish culturist level (BRAC, 2013).

Bangladesh is endowed with vast marine, coastal and inland water resources having great fisheries production potential, contributing 3.69% to the Gross Domestic Product (GDP) of the country and almost one-fourth (22.60%) to the agricultural GDP. Fish supplements about 60% of our daily animal protein intake. More than 17 million people including about 1.4 million women depend on fisheries sector for their livelihoods by fishing, farming, fish handling, processing, etc. Different survey revealed that more than 80% of labors engaged in fish processing industries are women and creating more employment opportunities to the country people (Bangladesh Delta Plan 2100).

Fish trade is a significant source of foreign currency earnings for Bangladesh and delivers benefits at both the macro and microeconomic levels. Fish is the third largest contributor to Bangladesh's export earnings and it is growing annually by 5-8 percent. Revenue from traditional exports of non-fish agricultural products are gradually being outpaced by fishery products. Now, fish has become the most important primary commodity that Bangladesh exports (Moni N N & Khan N N, 2014).

## **1.2 Rationale of the Study**

It is seen that most of the cases, fish farming related people go to the Upazila fisheries office which is the only source of scientific advice and which is provided manually. So, most of the firm people and the fish farmers need to go to the Upazila fisheries office that was far from their residence. The respondents used to go there by travelling long distance, paying much money and spending a lot of time. Beside these, the taken service by the respondents from the local source was not scientific resulting the often leads. So, the fish farmers had to usually face

different types of problems while availing the service from the Upazila fisheries office. For reducing these problems the DoF has initiated the FA app from April 2016 and the respondents have been greatly benefitted by using this app. So, this study has been conducted to demonstrate the coverage of receiving online app solution among the target people. The study will also be helpful to assess the benefits of fish farmers received through the 'FA App' and to find out future action after a review.

### **1.3 Objectives of the Study**

The main objective of the study was to analyze the benefits of cost achieved through introducing the service. The specific objectives of the study were:

- To explore the overall benefits of the 'FA App'.
- To identify the satisfaction level (technical, knowledge, elements etc.) of the service receivers
- To compare the reduced time, cost and visit with earlier status.
- To demonstrate the coverage of getting benefit from the app and suggesting probable strategy.

### **1.4 Limitations of the Study**

Though the study has been completed but there are still some of opportunities by which further studies in future can be initiated for successful. The researchers faced some challenges such:

- Conducting the study within limited timeframe and human resources.
- Appropriate and accurate information were limitedly available in Google play as most of the respondents have collected the app from others.
- To identify the satisfaction level (technical, knowledge, elements etc.) of the service receivers.

### **1.5 Research Methodology**

The study population was all of the fish farmers of Bangladesh who use FA App. Data was collected both from primary and secondary sources. Analyzing the secondary sources was one the key aspects of the study. In this regard, a number of relevant peer reviewed journals published articles, international and national publications on fisheries have been reviewed.

Some books, policy papers, empirical documents, different websites and relevant reports were also reviewed to improve the conceptual understanding and identification of the issues, and the development of data collection tools those were secondary sources of information.

Primary Data was collected from 10 districts<sup>5</sup>. Snowball sampling technique was used for reaching the respondents and 118 respondents provided information based on their experience. In this regard, 103 fish farmers and 5 authority level respondents (from Dhaka, Mymensingh, Barisal, Comilla and Chanpur) have been selected to collect data over phone, through online survey using SurveyMonkey platform, nonetheless, findings sharing & data validation workshop was also organized. A central level workshop was arranged with participation of 10 different category of people- DoF official, innovators, UDC representative and fish farmers participated in the workshop those were qualitative information that supplemented the quantitative findings.

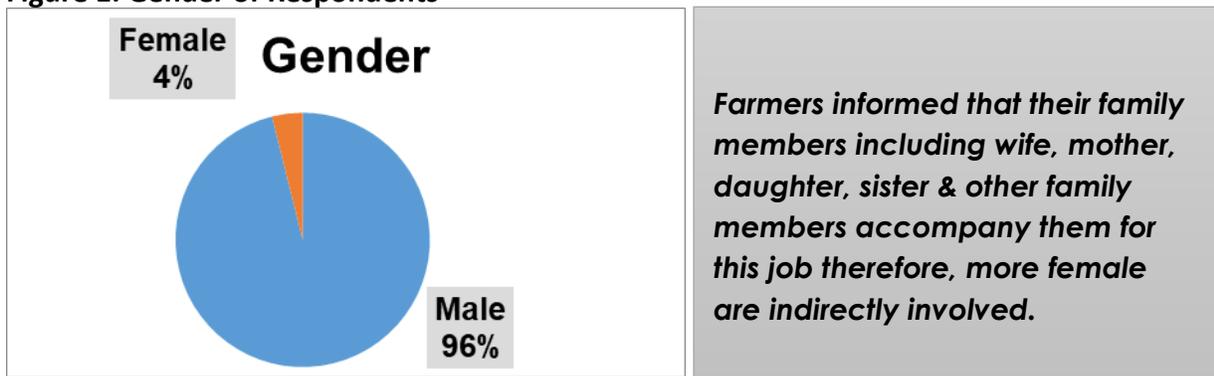
Collected quantitative data was analyzed using SPSS. Then validated data was checked through logical and range checks. A number of tests were developed for checking the internal consistency and quality of data. Analysis was done through mean and percentages for the relevant variables using SPSS and MS excel. The qualitative information was incorporated to complement the fulfillment of perfection of the study.

## 2 Findings of the Study

### 2.1 Demographic and general information

This section briefly explains about the characteristics of the respondents including gender, education level etc.

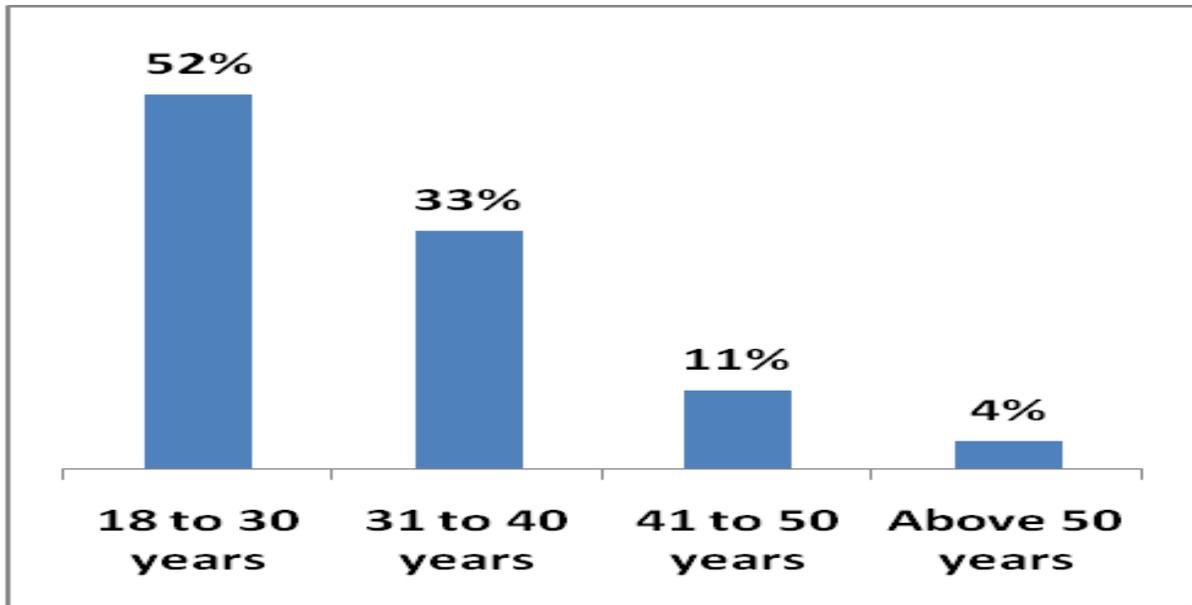
**Figure 1: Gender of Respondents**



<sup>5</sup> Bogra, Comilla, Feni, Jessore, Moulavibazar, Mymensingh, Chanpur, Noakhali, Rajshahi, Barisal.

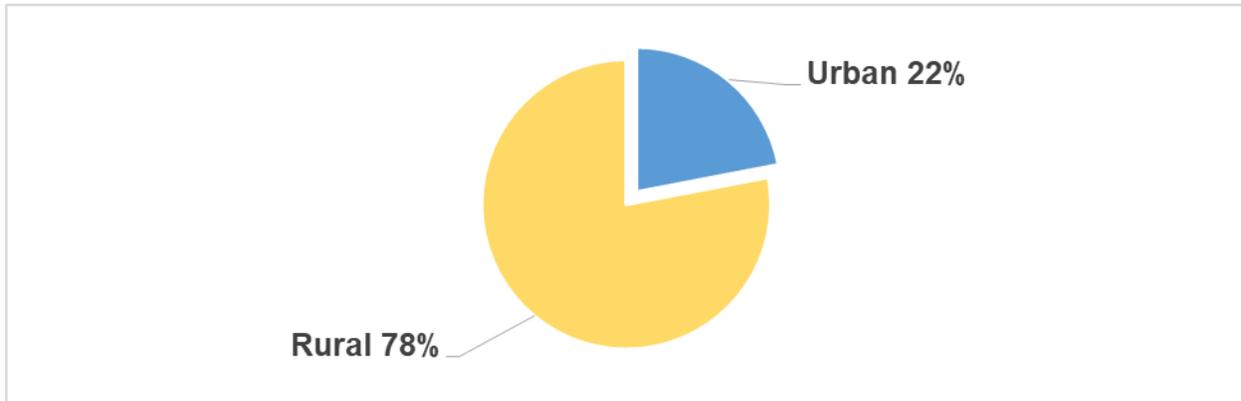
The figure 1 shows that the gender of the respondents study. About 96% male and 4% female have been found who are engaged in fisheries. Engagement of female in the profession indicates women's economic empowerment and it is clear that App is helpful for them to practice fisheries and they can overcome the challenges centering this profession.

**FIGURE 2: Age Range of the Respondents**



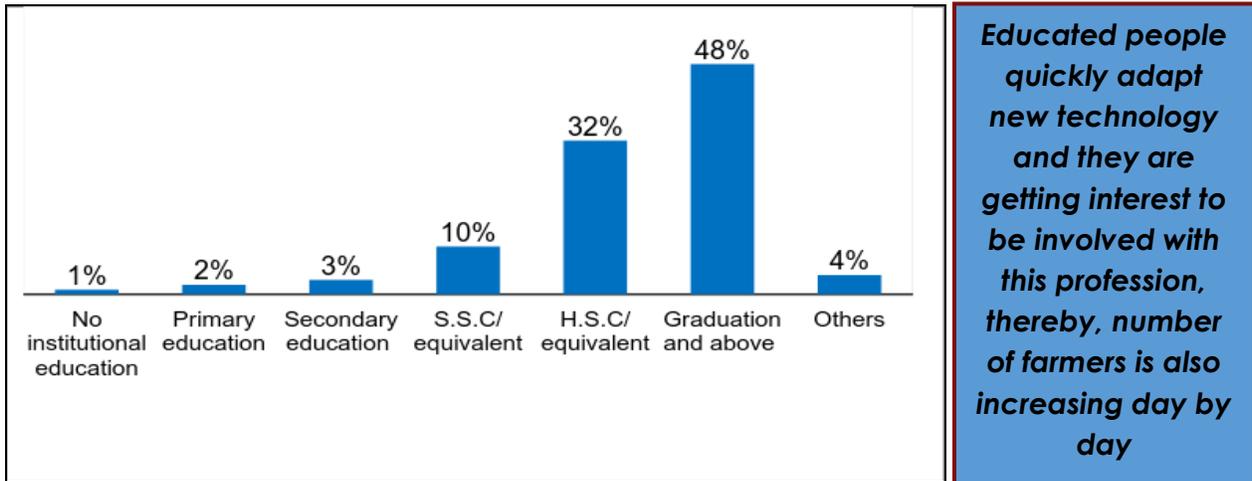
The figure 2 shows that about 52% of the respondents aged within 30 years. About one-third (33%) of the respondents have been found aged between 31 years to 40 years. So, it is observed that the young people are being engaged with fisheries. The involvement of young mostly with this profession points to technological contribution to dynamic aspect of fisheries.

**Figure 3: Living Areas**



The figure 3 shows most of the respondents (78%) are engaged in the fisheries usually live in the rural areas comparing to urban.

**Figure 4: Educational Status**

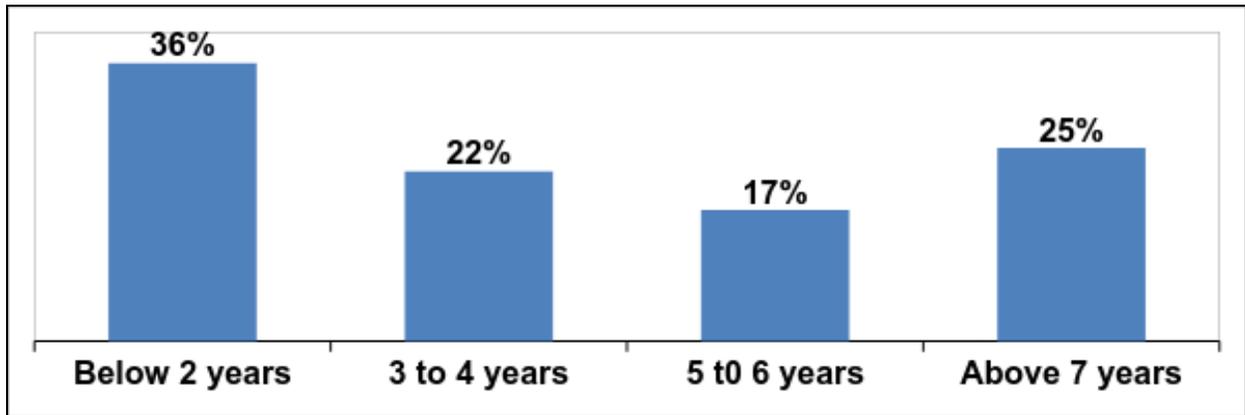


The figure 4 describes about the educational status of the respondents. About 48% of the respondents have been found with having graduation and post-graduation degree. So, the Involvement of much educated people with this sort of profession indicates a breakthrough in social discourse.

### **2.2 Pre-scenario of using FA App:**

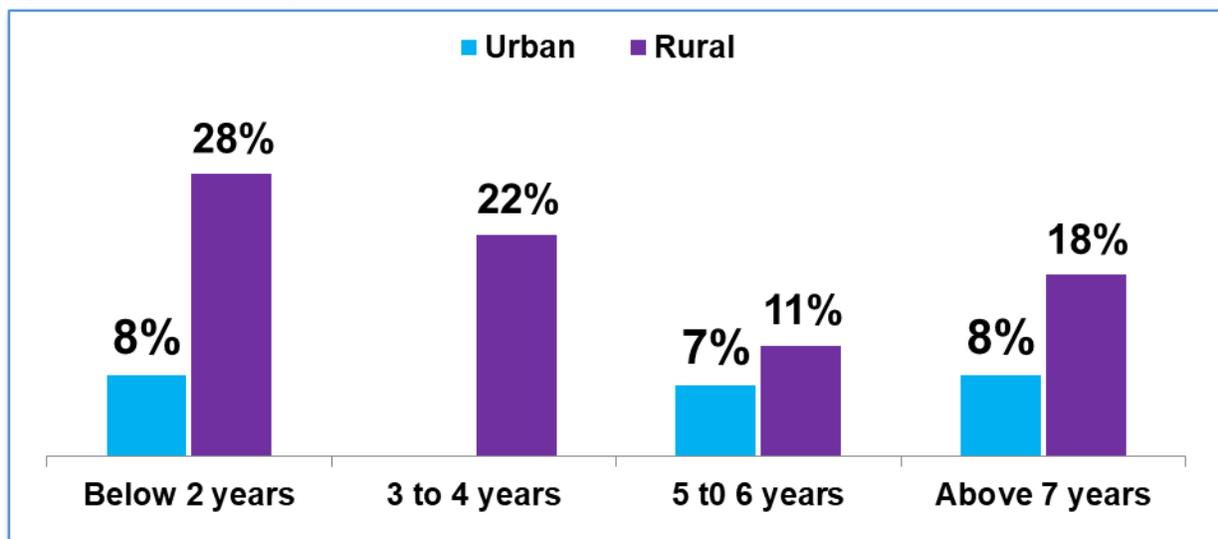
This section briefs respondents' condition before introducing the app including parameter like Time, Cost & Visit.

**Figure 5: Involvement in Fisheries**



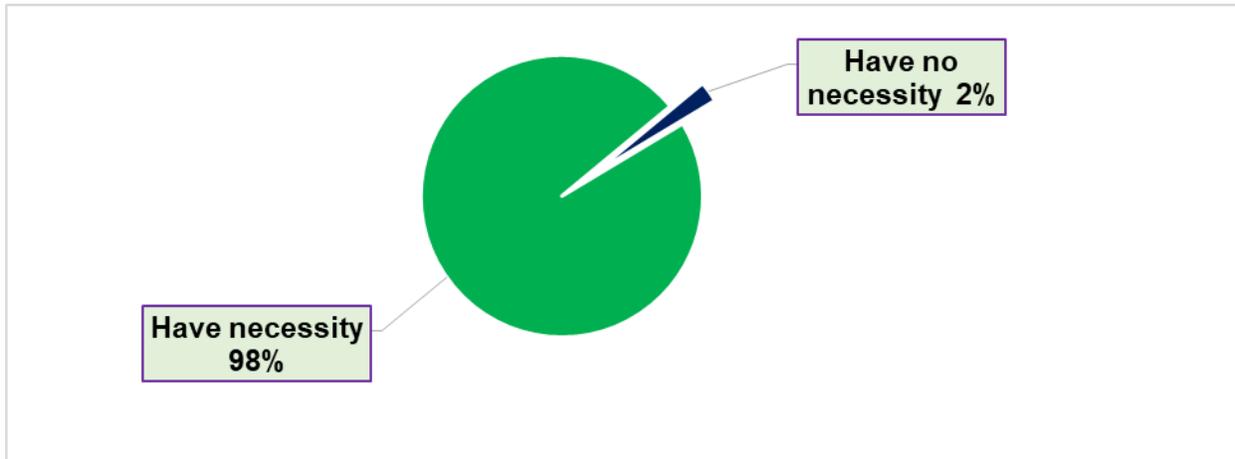
The figure 5 shows that a significant portion of the respondents has recently been involved in fishery activities. In this regard, about 36% of the respondents have been found that are engaged in fisheries for last 2 years. About one-fourth (25%) of the respondents have been found that are involved since above half of a decade.

**Figure 6: Sustainability between 'Rural & Urban' Areas in Fisheries Practice**



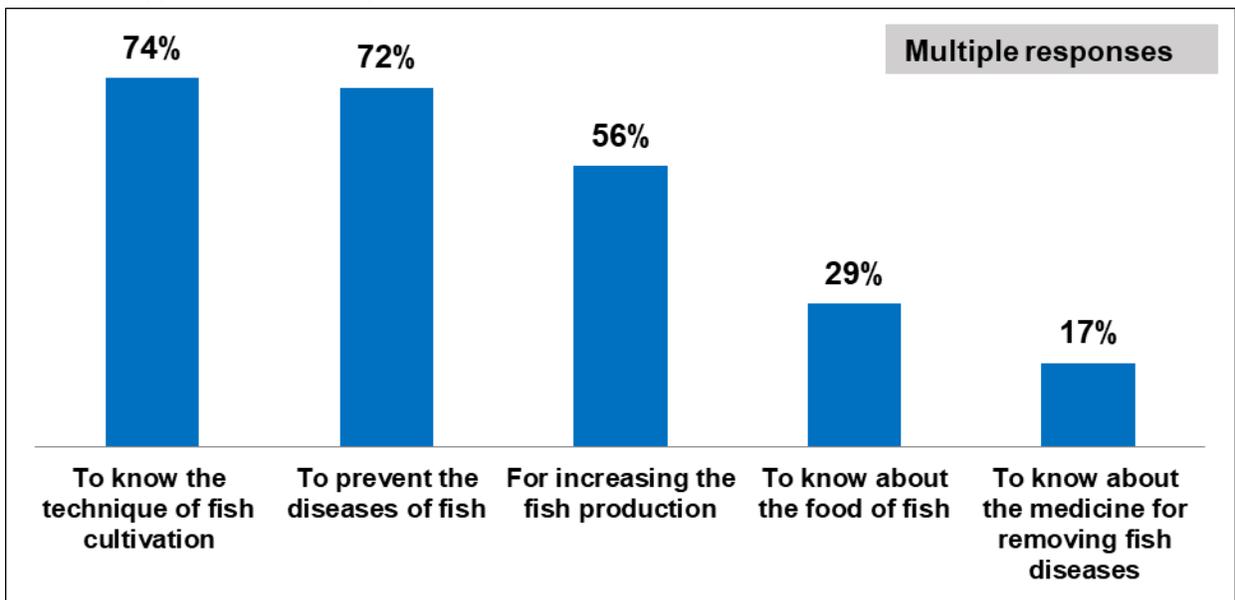
The figure 6 shows that the fish farming are more sustainable in rural areas comparing to the urban. About 28% of the respondents have been found those are practicing fisheries in rural areas for 2 years. In contrast, only 8% are from urban areas. On the other hand, about 8% of the respondents of rural areas have been sustained with this profession since last 7 years.

**Figure 7: Respondents' Realization about Fisheries Information**



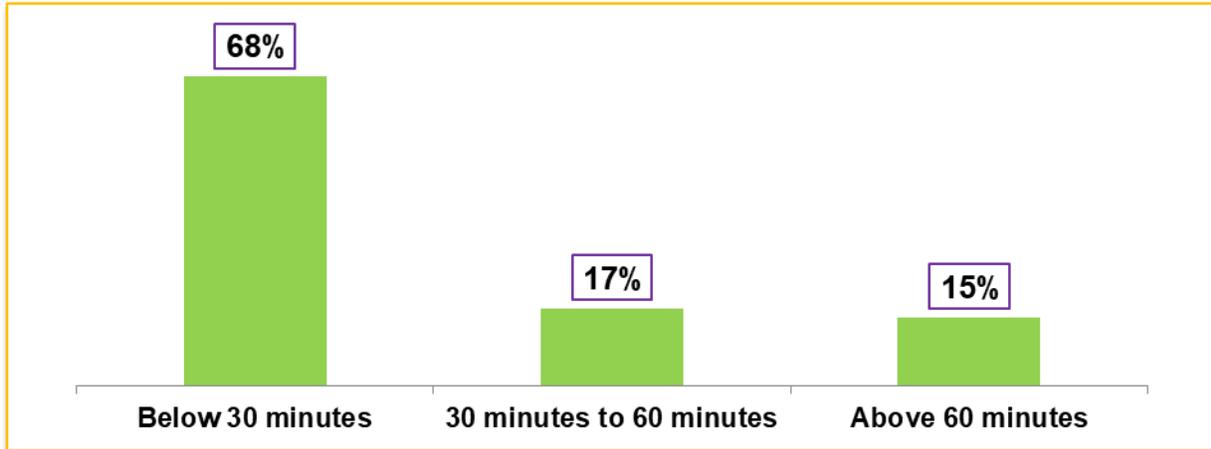
As the practice of fisheries is dependent on different types of information so the respondents need to be touched with getting this necessary information. And the figure 7 demonstrates that almost all of the respondents have mentioned the necessity to get information of fisheries.

**Figure 8: Types of Necessary Information**



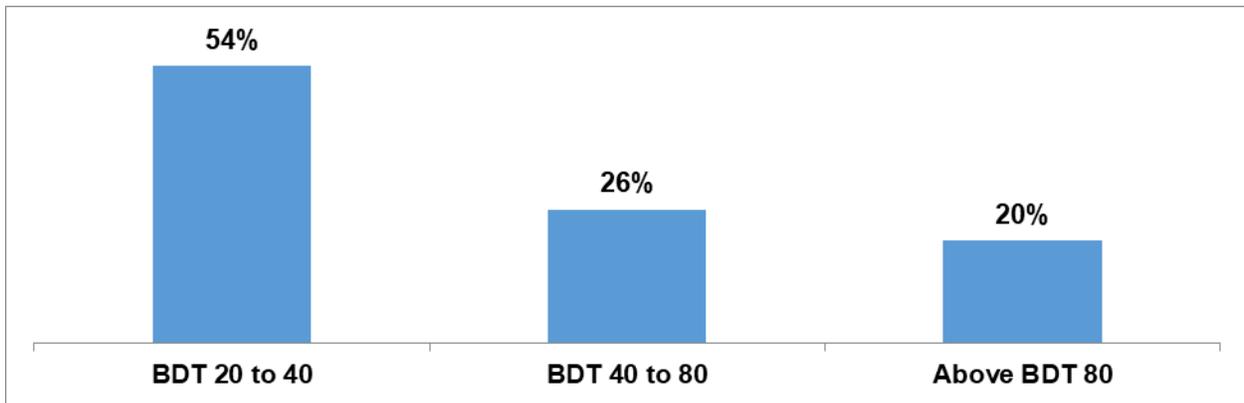
The figure 8 describes that the respondents have necessity of different type of fisheries information. About 74% of the respondents have mentioned that they need information for knowing about the technique of fish cultivation.

**Figure 9: Time Required Previously**



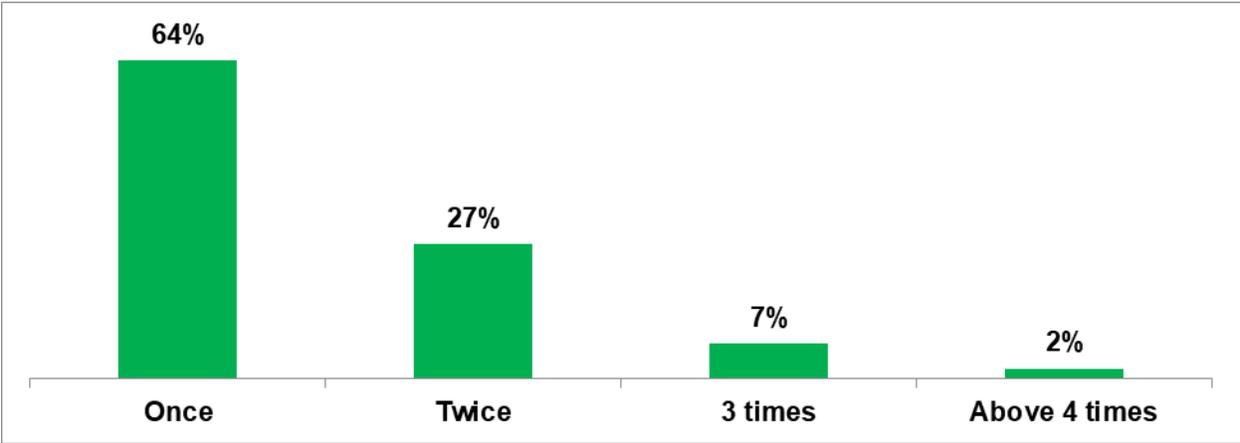
The figure 9 shows that about 68% of the respondents needed 30 minutes to get the information about fisheries and about 15% of the respondents had to spend more 60 minutes.

**Figure 10: Cost Required Previously**



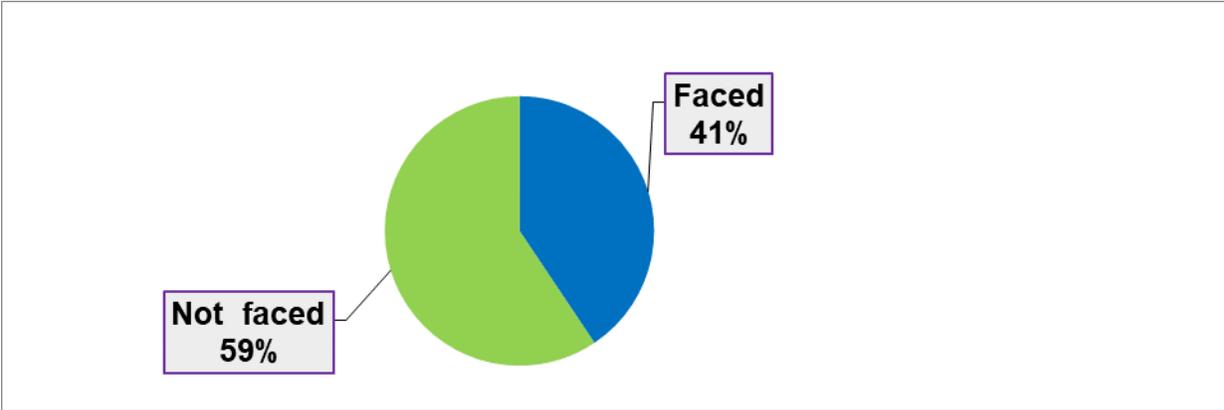
The figure 10 demonstrates that about 54% of the respondents had to spend BDT from 20 to 40 to avail the information. Even above 80 BDT was spent to avail the service.

**Figure 11: Visit Required Previously**



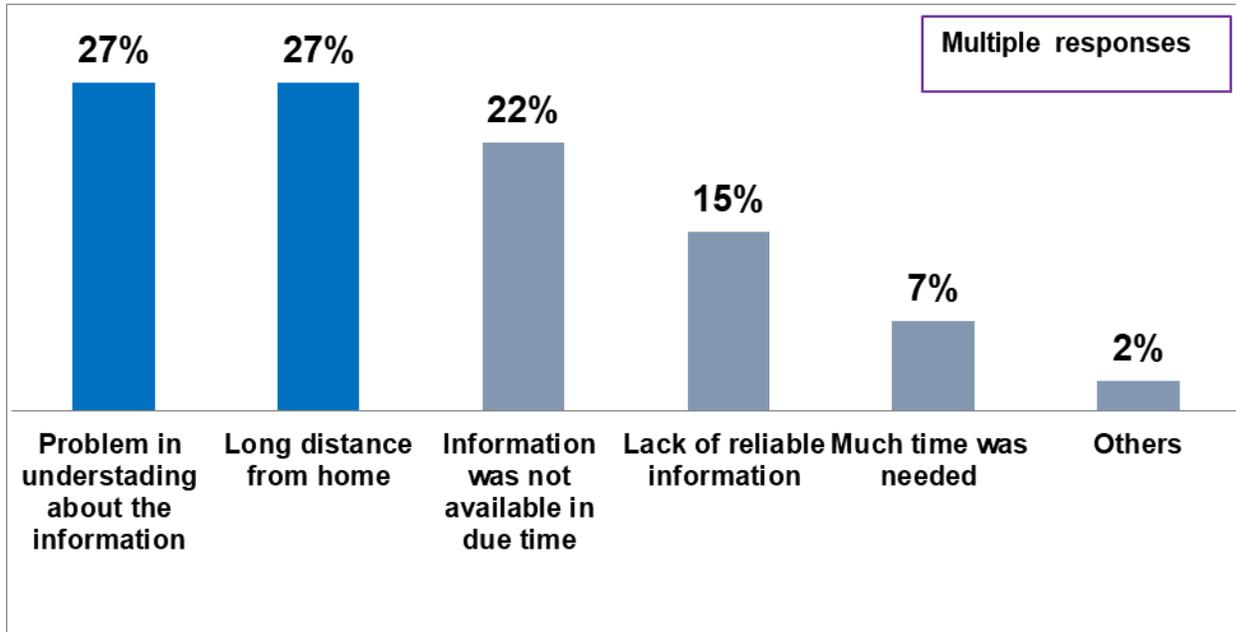
The figure 11 reveals the number of visits that were required to avail the information before initiating the app. Though about 64% of the respondents could avail the information visiting first time but the rest of the respondents had to make 2 or more visits.

**Figure 12: Challenges Faced By the Respondents to Avail the Information**



The figure 12 shows that about half of the respondents (41%) faced challenges while availing the information when there was not a single service like this app.

**Figure 13: Type of Challenges while Availing the INFORMATION**

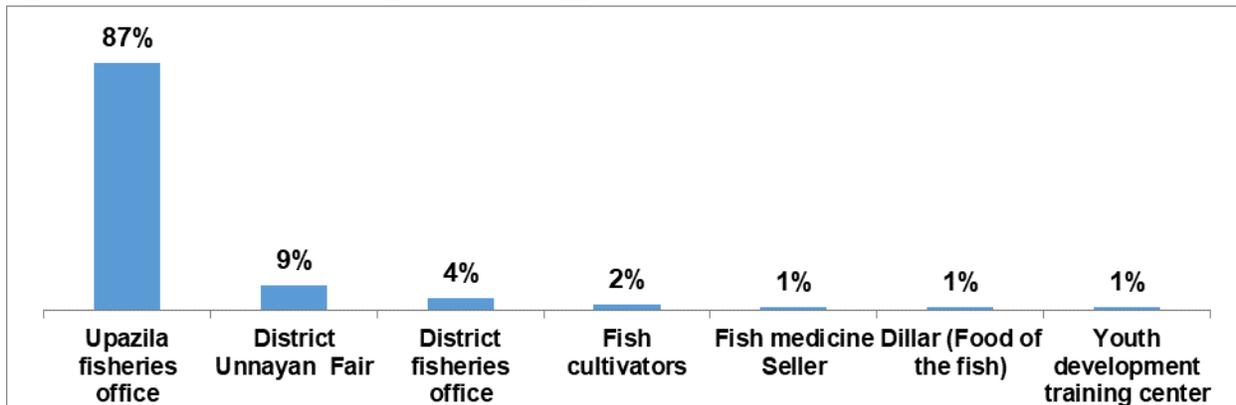


The figure 13 describes details about nature of challenges faced by the respondents while collecting the information before initiating the FA app. About one-fourth (27%) of the respondents have mentioned that the service was far from their home and there was problem in understanding about the information. Beside this there were challenge like lack of reliable information and necessity of much time.

### **2.3 Knowledge regarding FA app:**

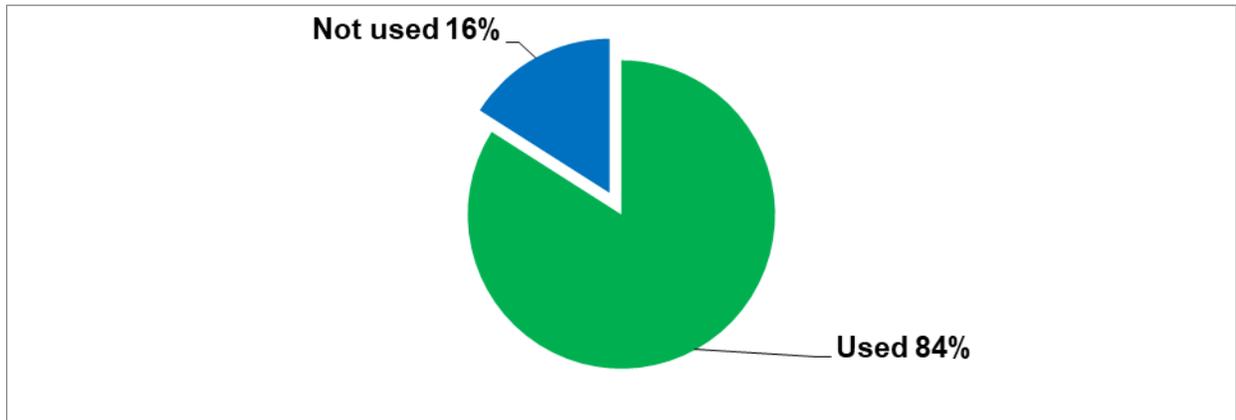
This section highlights the condition regarding the knowledge level of the potential users.

**Figure 14: Sources of Knowing about 'FA App'**



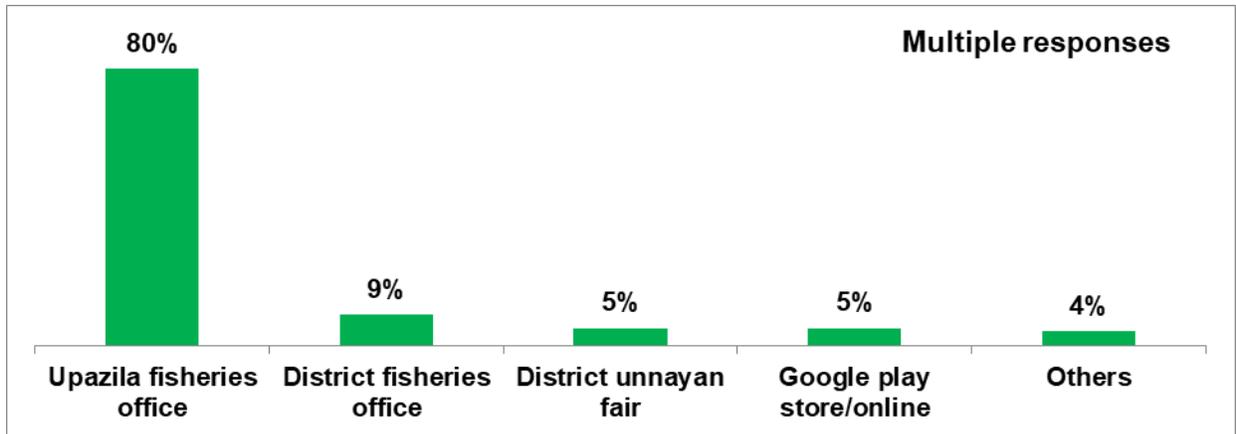
The figure 14 shows that the respondents had known about the FA through different types of sources for the first time. Almost all the respondents (87%) had known about the FA from Upazila fisheries office.

**Figure 15: Using the FA App after Knowing**



The figure 15 shows that most of the respondents (84%) become the users of the 'FA application' when they have known about its uses. As most of the respondents have started using this FA it may be said that it will become popular among the people.

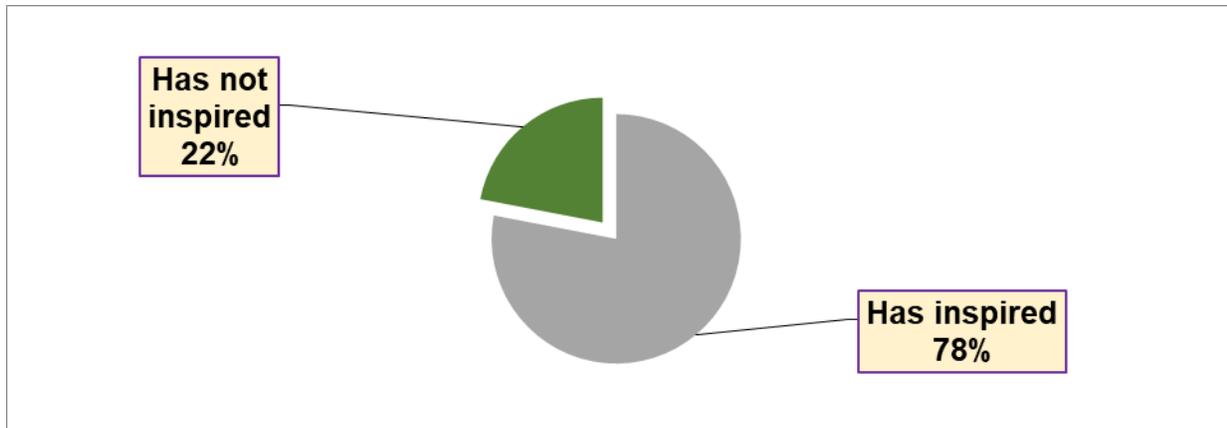
**Figure 16: Sources of Collecting 'FA App'**



The figure 16 shows that the respondents have collected the app from different sources. Almost respondents have collected the app from Upazila fisheries office. The other sources of collecting app by the respondents are District Unnayan fair, Google play store/online and

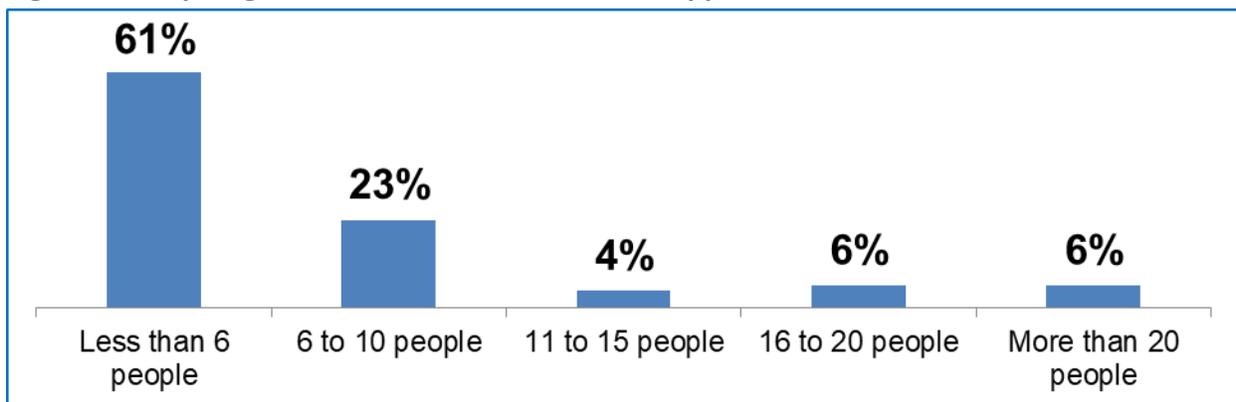
others (youth development training center and Dweller of providing fish food). It indicates that DoF & Fish Farmers are supplementary & complementary to each other for using the App.

**Figure 17: Inspiring Others to Use 'FA App'**



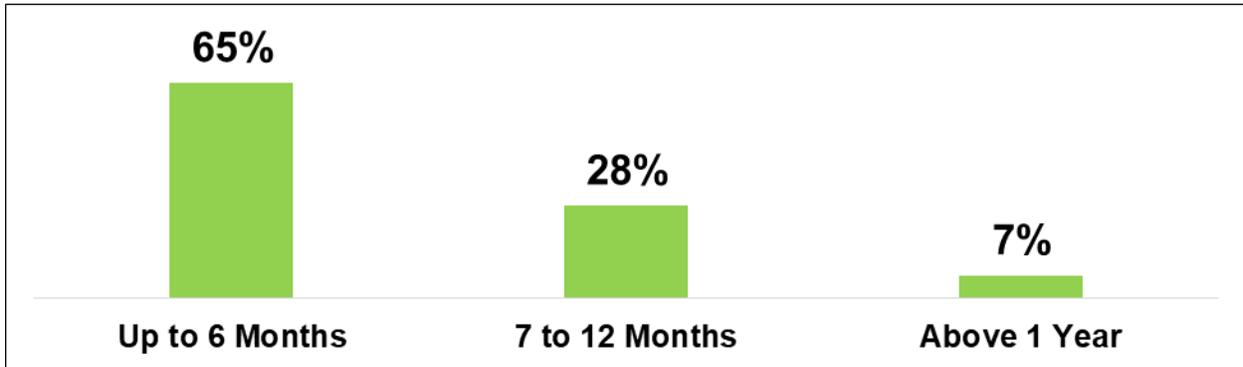
The figure 17 shows that about 78% of the respondents have inspired others to use the 'FA app'. It is inspirable that users are motivating others for getting the benefit of this app.

**Figure 18: Inspiring Number of Persons to Use 'FA App'**



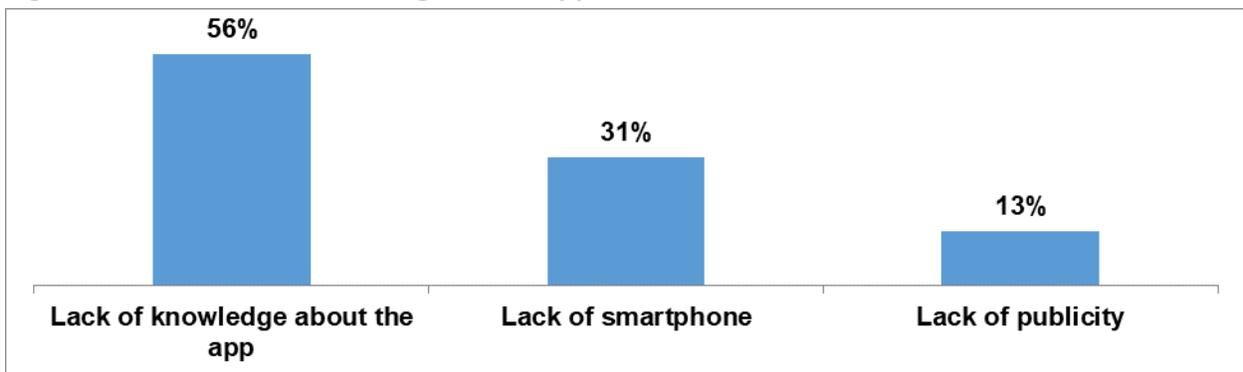
The figure 18 shows that the respondents who are the users of 'FA app' have tried to inspire others for suing this app. About 61% of the respondents have inspired around 6 to use this app. Even more than 20 people were inspired by the users.

**Figure 19: Using the 'FA App'**



The figure 19 demonstrates that about 65% of the respondents have been using the 'FA app' since last 1 to 6 months whether about 29% of the respondents have been using it from 7 months to 1 year. A portion of the respondents have been identified that is using it above year.

**Figure 20: Reasons for not Using the 'FA App'**

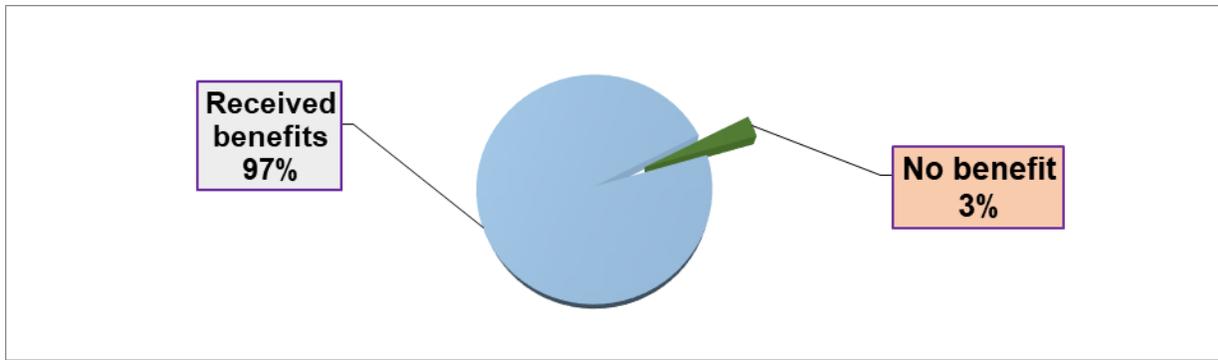


From the figure 15 we know that only 16% of the respondents have not used the 'FA App' in spite of being informed about it. Whereas, the Figure 20 specifies the reasons that they have not become the users of it. About 56% of them have mentioned that they had lack of knowledge about the app. Lack of sufficient publicity seemed one of the reasons on what intervention is needed as the respondents mentioned.

### ***2.4 Benefits of 'FA App':***

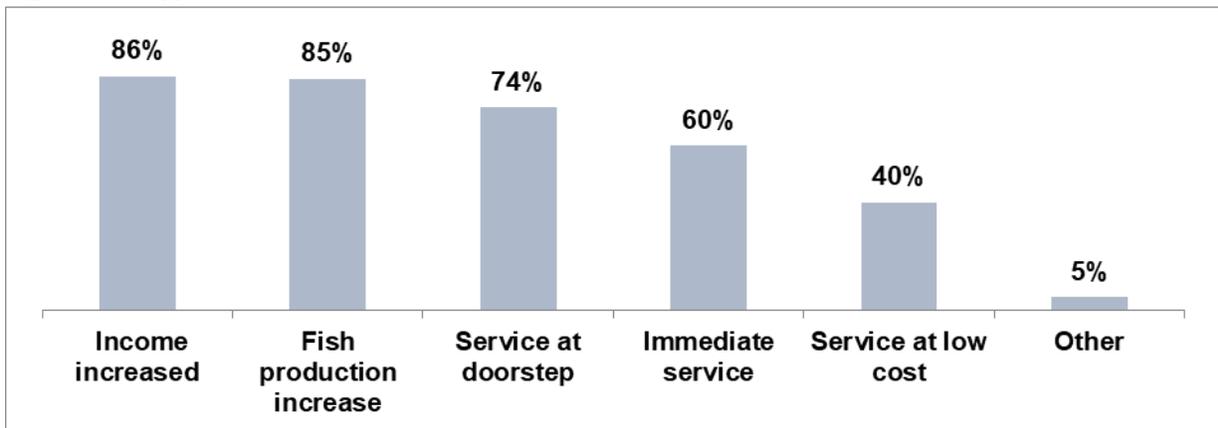
This section will state about the outcome level impact of using the app.

**Figure 21: Benefits Received**



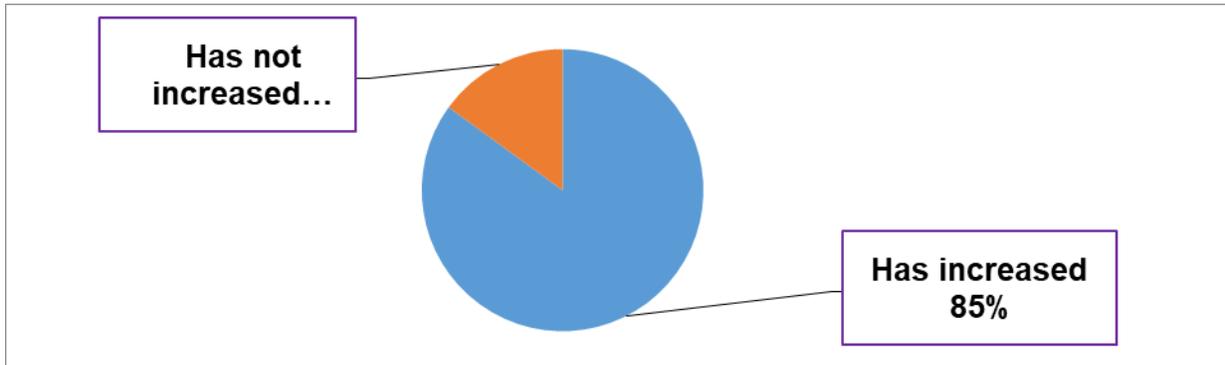
The figure 21 shows that about 97% of the respondents have received benefits from the app. So, it may be mentioned that about entire population have been the beneficiaries of this technological advantage.

**Figure 22: Type of Benefit**



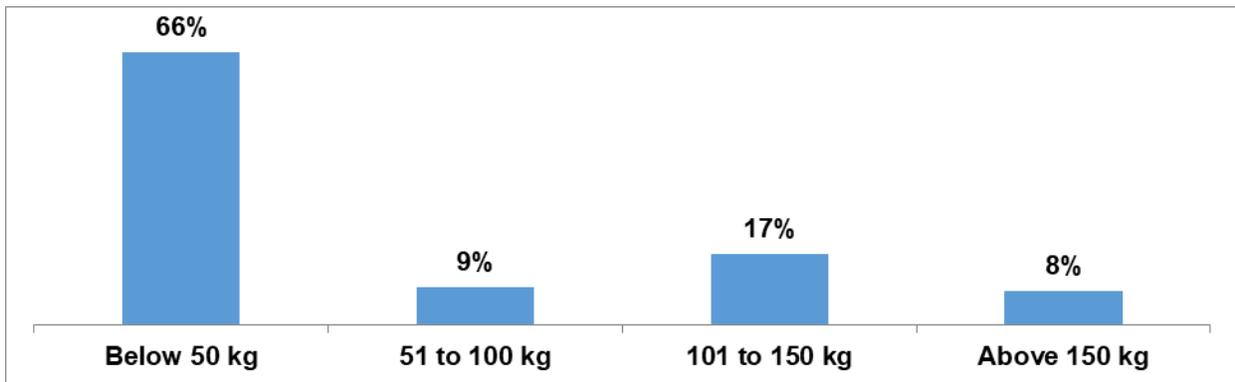
The figure 22 shows the nature of benefit users have been receiving currently. It indicates that the production of fish as well as income are increased and users can avail doorstep service of information & immediate service with low cost by using the app.

**Figure 23: Increased Annual Fish Production**



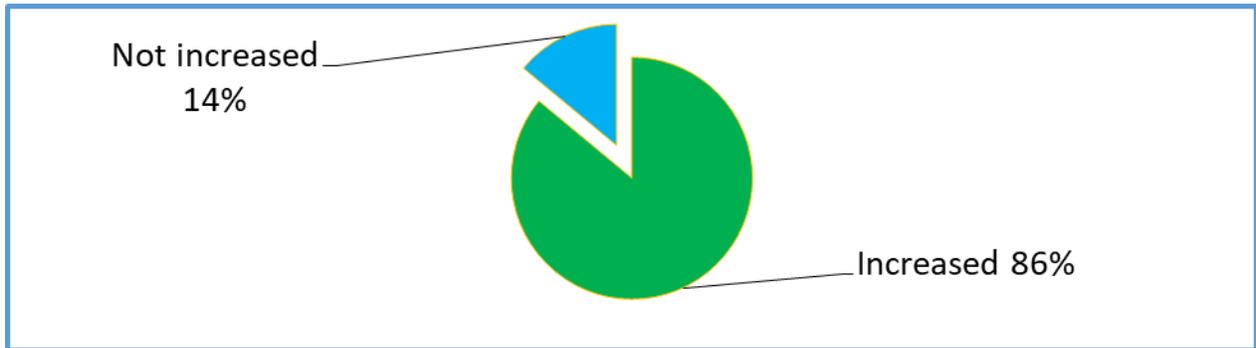
The figure 23 shows that about 85% of the respondents have informed that the annual fish production increased after using the app. So the respondents have been benefitted as the annual fish increased.

**Figure 24: Amount of Increased Fish Production**



The figure 24 shows that about 66% of the respondents have mentioned that the fish increased 50 kg than the previous period. Even above 150 kg fish production increased which is good for country's economy.

**Figure 25: Change in Annual Income**



The figure 25 demonstrates that the annual income of the respondents has also increased while the respondents have started using the 'FA App'. The annual income has increased in the case of about 86% of the respondents.

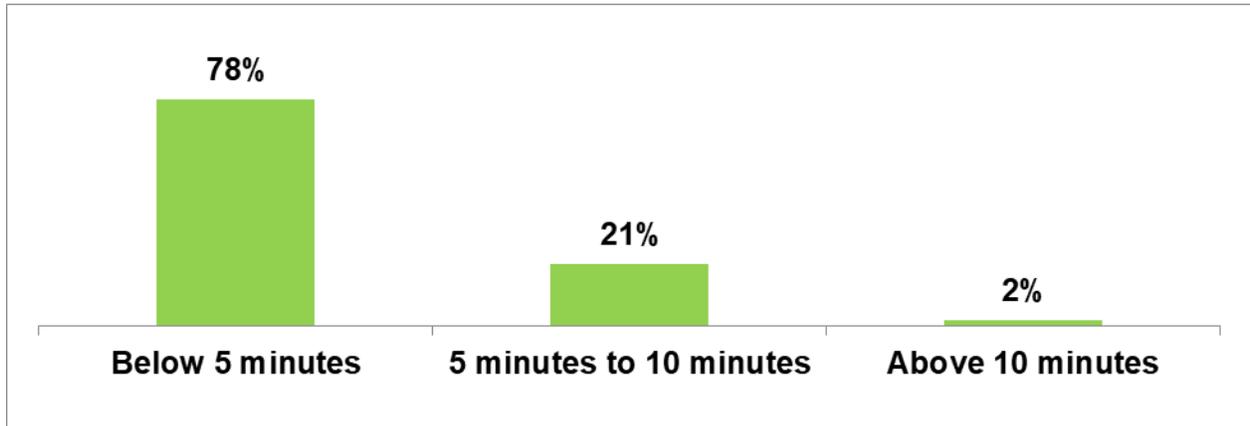
#### **2.4.1 Case Study 1: 'FA' impacted on annual income and fish cultivation**

Sarwar Azom Majumder (48) has been involved with fisheries profession from more than 6 years. He is one of the beneficiaries of FA App has been using this since last 2 years. It is necessary to know about the technique of fish cultivation, to prevent the various types of diseases of fish and to increase the production of fish. Upazila Fisheries Office was the only dependable source for Sarwar to collect information for fish cultivation. But, it needed to cross 4 kilometers, took 15-30 minutes and frequent visits for receiving the services. When he started using the App then time, cost and visit have significantly been reduced and getting the information for fish cultivation become very easy. The use of FA App has positively impacted in the annual earning and fish production of Sarwar. Now, he can utilize surplus time and cost in familial purposes. 2 years earlier, he could accumulate about BDT 500,000 annually by cultivating fishes. Now, it has reached up to BDT 1,000,000 as well as the fish production has increased up to 800 kilograms. Sarwar's satisfaction level is very high regarding the uses of this App and he has also encouraged around 50 fish farmers to use this App and to know about the technological knowhow as well as to take the advantages from the app. His social dignity has increased in recent times. In this relation, Sarwar has encouraged 10 youths to take training for fish cultivation.

#### **2.5 Post-scenario: Time, Cost & Visit required at present time:**

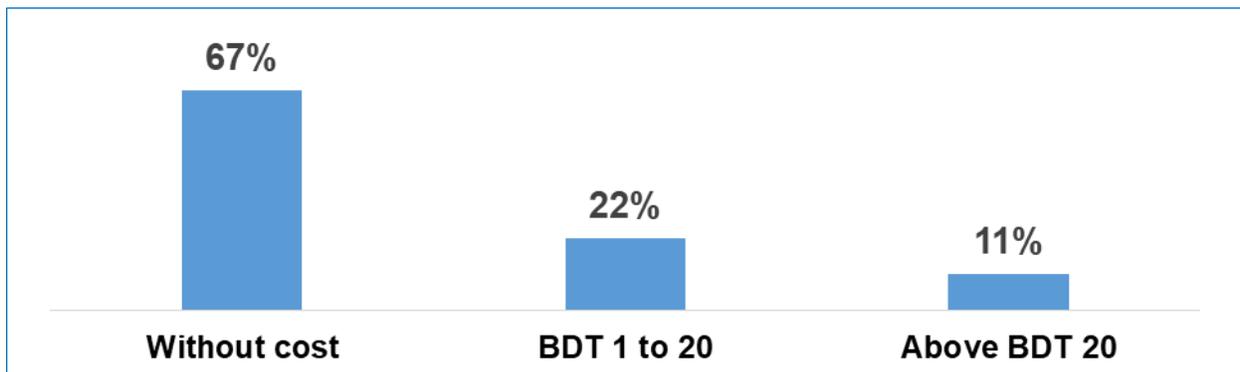
This section briefs respondents' condition after using the app including parameter like Time, Cost & Visit.

**Figure 26: Required Time Currently**



Now, the users can avail the information within very short span of time. Figure 26 shows that about 78% of the respondents need to spend just 5 minutes to avail the necessary fisheries information. On the other hand, a few portion of the respondents need to spend above 10 minutes to avail the service by using the 'FA App'.

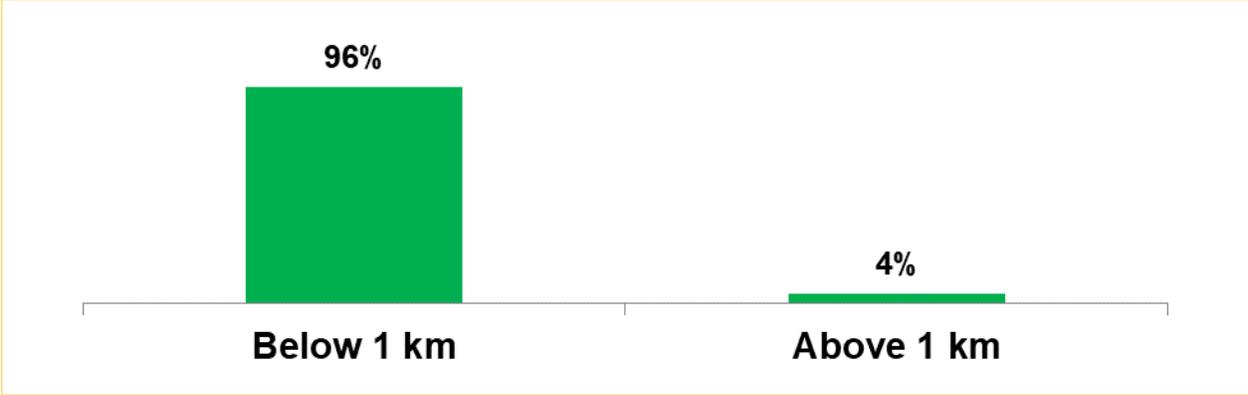
**Figure 27: Required Cost Currently**



In the Figure 10 it was seen that the respondents had to pay BDT 20 to above BDT 80 to avail the information. But, the figure 27 shows that the app has kept a great advantage in getting the service without any cost for the respondents. In this regard, about 67% of the respondents have attained the information without any payment. The cost for attaining the information has

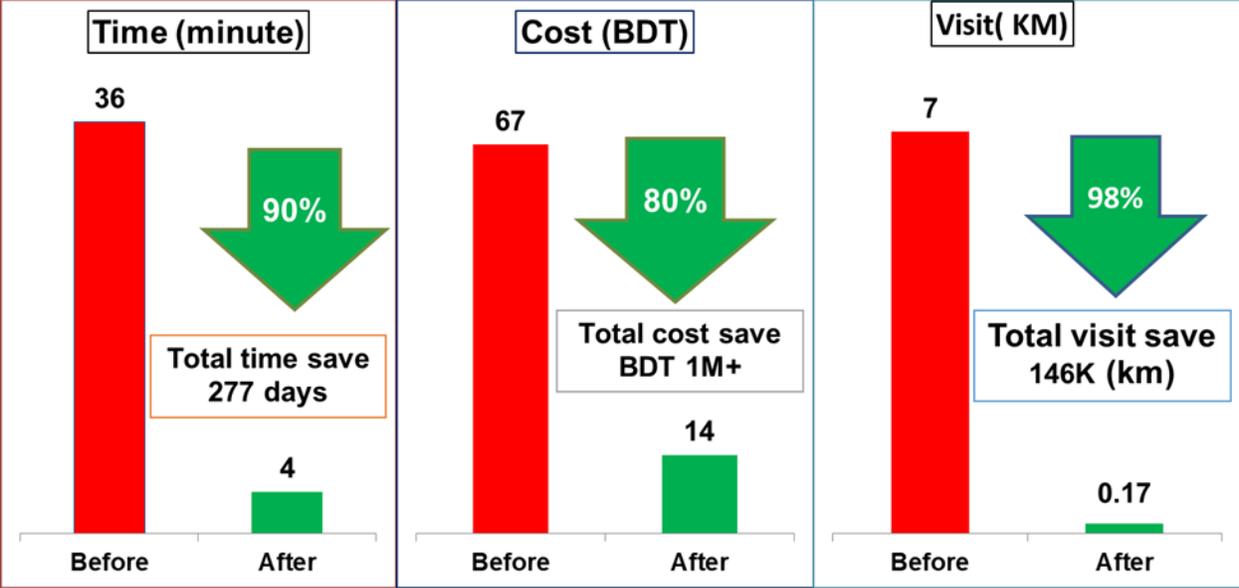
almost been limited within BDT 20. About 22% of the respondents need to pay BDT 1 to 20 for availing the information. Only 11% of the respondents have to pay more than BDT 20.

**Figure 28: Required Visit Currently**



The figure 28 shows that about 96% of the respondents need avail the information visiting only 1 kilometer. Whereas only 4% needs to visit above 1 kilometer.

**Figure 29: Comparative Analysis of Time, Cost & Visit between Before And After**

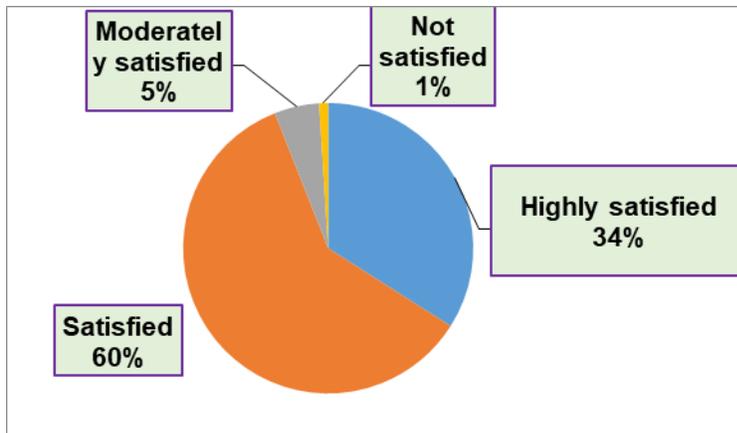


The figure 29 shows the reduced time, cost and visit comparing to the previous time to avail information. The figure demonstrates that a very significant time, cost and visit have reduced. This has been possible for using the 'FA App' by the respondents. About 90%, 80% and 98% of time, cost and visit has reduced after initiating the app. So, this is a tremendous effect of 'FA App' by which the respondents are now getting the information within very short time, with low cost and within very short span of time. Though authority level informed that this app can solve instant difficulties, however, farmers need to meet the fisheries officer at Upazila level if it needs more in-depth solution.

**2.6 Satisfaction of respondents by using the FA App:**

This section illustrates regarding satisfaction level of the users and reasons even reasons if not satisfied and utilization of surplus Time, Cost & Visit saved by using this app.

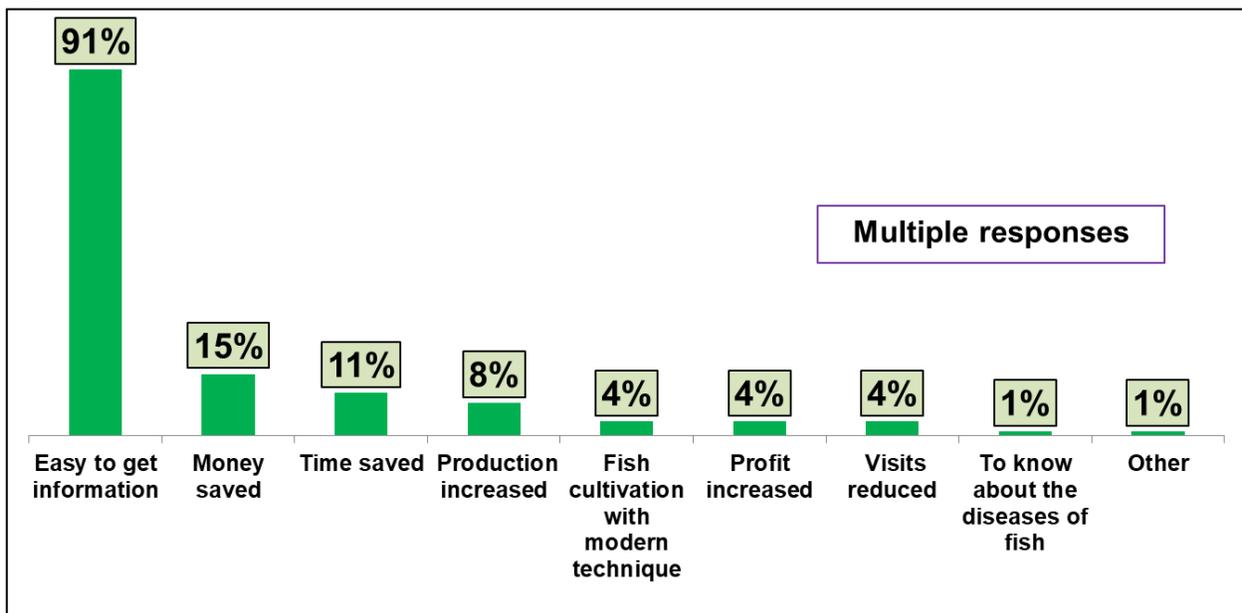
**Figure 30: Level of SATISFACTION**



- ### Reasons of not satisfaction
- No information on facing natural calamity
  - No information on new disease
  - No smooth communication mechanism with Officer
  - No information on advanced method of fish cultivation

The Figure 30 shows that about 34% and 60% of the respondents are highly satisfied and respectively satisfied by getting the information using the app. So, the respondents have been satisfied using the app as they have faced some problems in getting the information centering the fish cultivation.

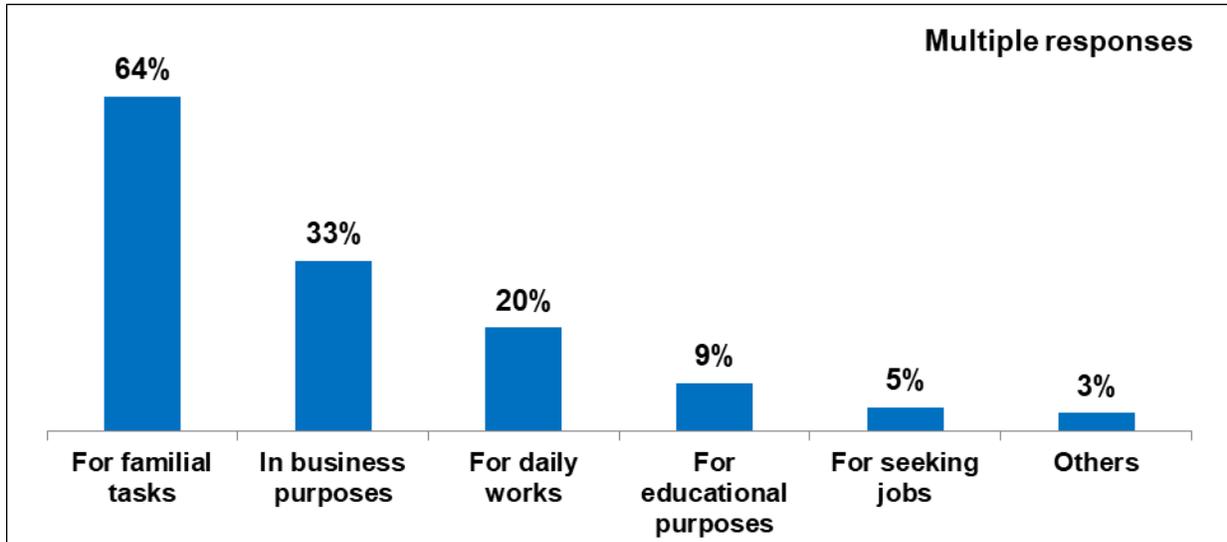
**Figure 31: Reasons of Satisfaction**



The respondents have been satisfied for some specific reasons with getting the information from the present service. The Figure 31 shows that about 58% of the respondents have been satisfied as the information can be availed easily. About 15% and 12% have mentioned that the information can be availed with less cost as well as quickly. On the other hand, about 11% of

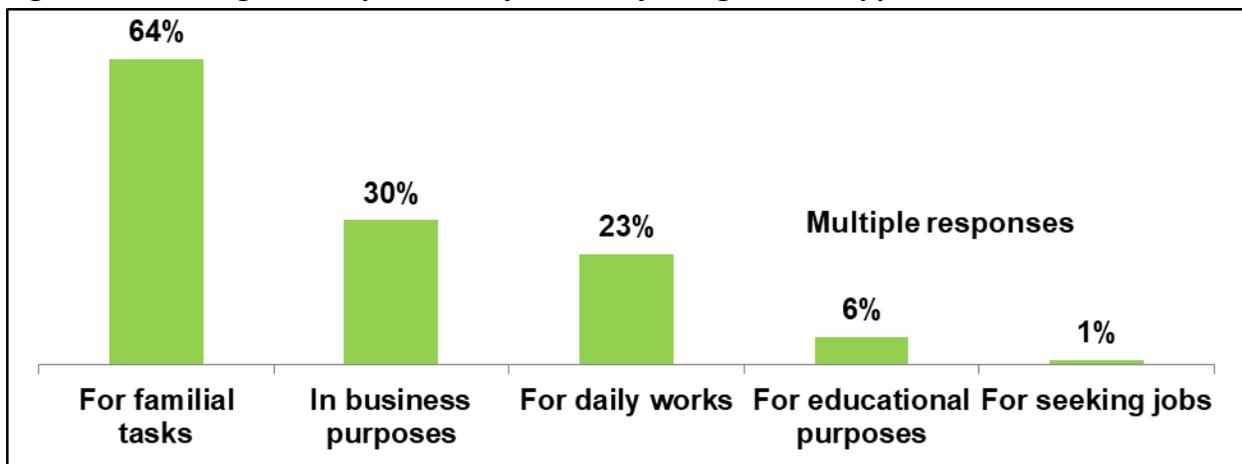
the respondents have identified the less time needed, easy to find necessary information, different problems can be solved and fish production has increased as the reasons of their satisfaction for getting the service.

**Figure 32: Utilizing the ‘Surplus Time’ Saved By Using the ‘FA App’**



The Figure 32 shows that about 64% of the respondents have mentioned that they utilized the time for familial tasks whether about 33% of the respondents used the time in business purposes, daily works and for educational purposes. On the other hand, a very few portion of the respondents have used the surplus time for seeking jobs.

**Figure 33: Utilizing the ‘Surplus Money’ Saved By Using the ‘FA App’**



The figure 33 shows that the respondents have also utilized the surplus money for different purposes. About 64% of the respondents have used this surplus money for familial purposes. On the other hand, about 30% and 23% of the respondents have used this surplus money for business and daily works.

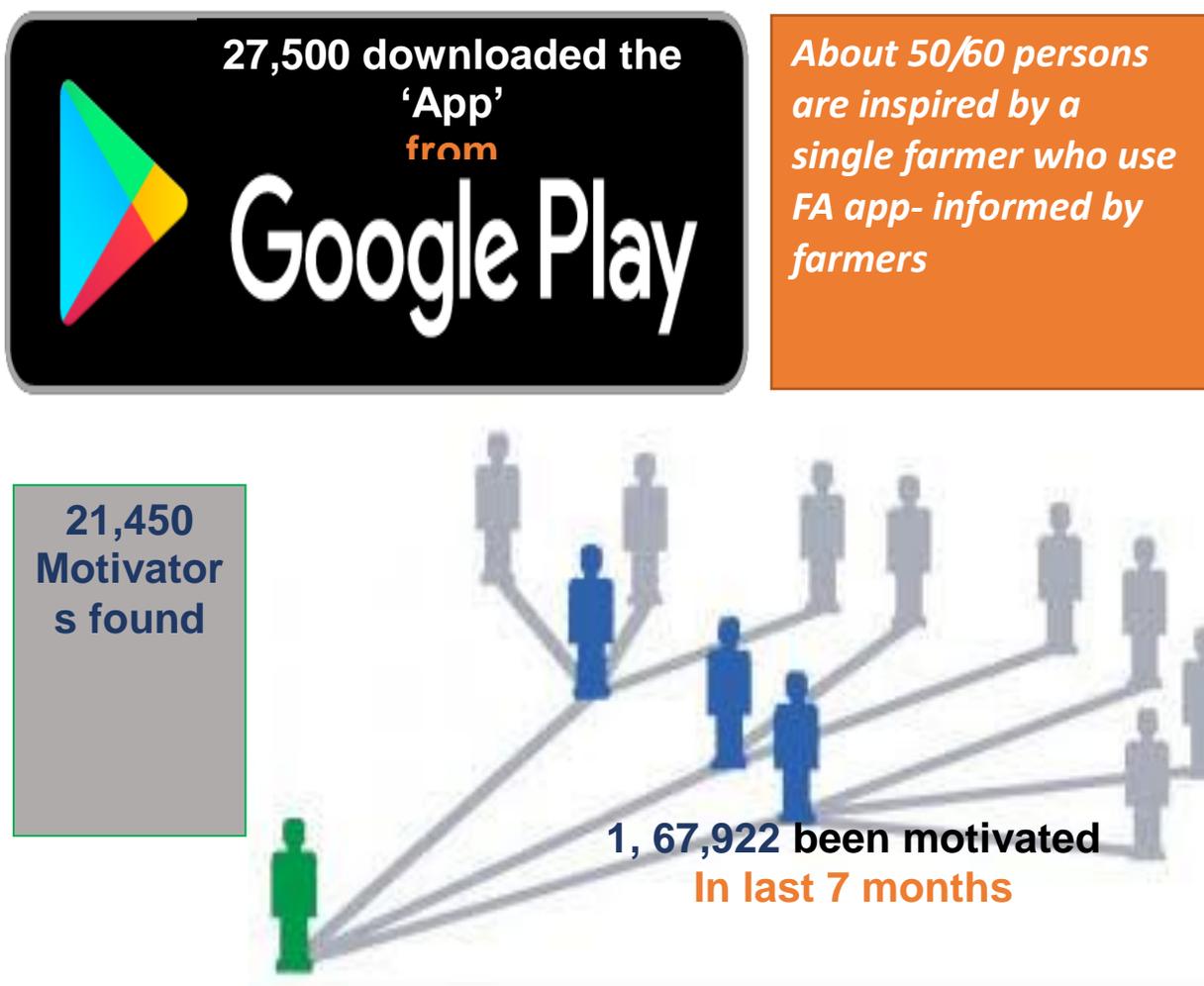
### 3 Coverage of FA App

The following section delivers a projection of using this app that includes motivation of users, total coverage till 2021 and projected saving of Time, Cost & Visit till 2021.

#### 3.1 Status of motivators & users

Figure 34 demonstrates that Google Play is the most reliable source of downloading 'the App' and the number is 27,500 since April 2016 to August 2017. As 78% inspired others for using this app and based on it we may state that 21,450 people played role as motivators in last one year and 1,67,922 (1 Lac 67 Thousand Nine Hundred Twenty Two) people have been motivated in last 7 months. From qualitative method we found that a single farmer motivated 50/60 people in last one year.

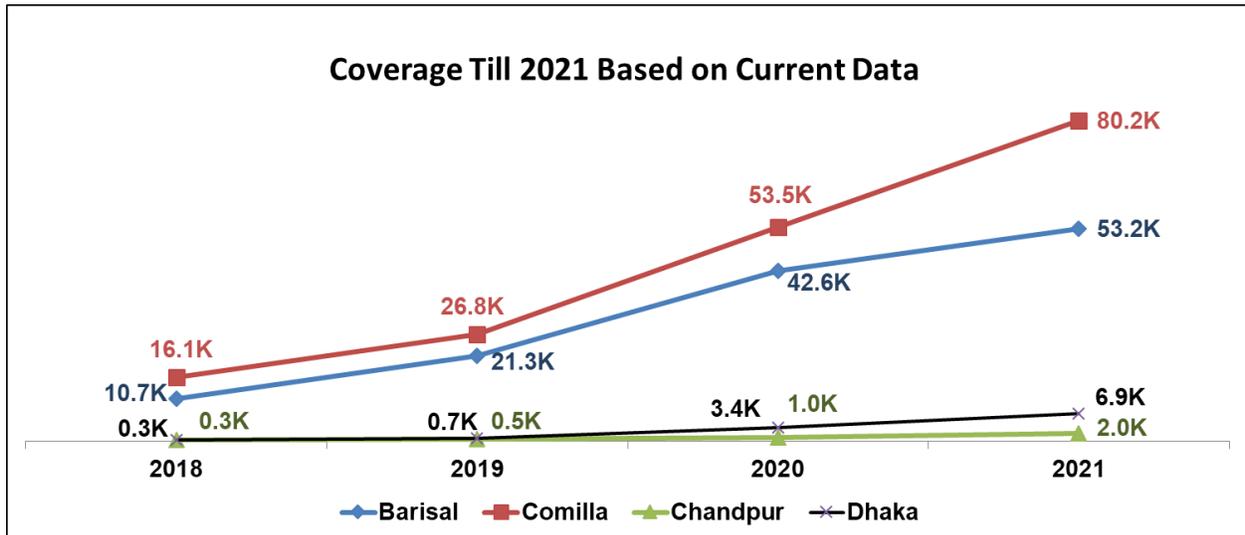
Figure 34: 'FA App' Expansion Status



### 3.2 Outcome of the App-Future Aspect

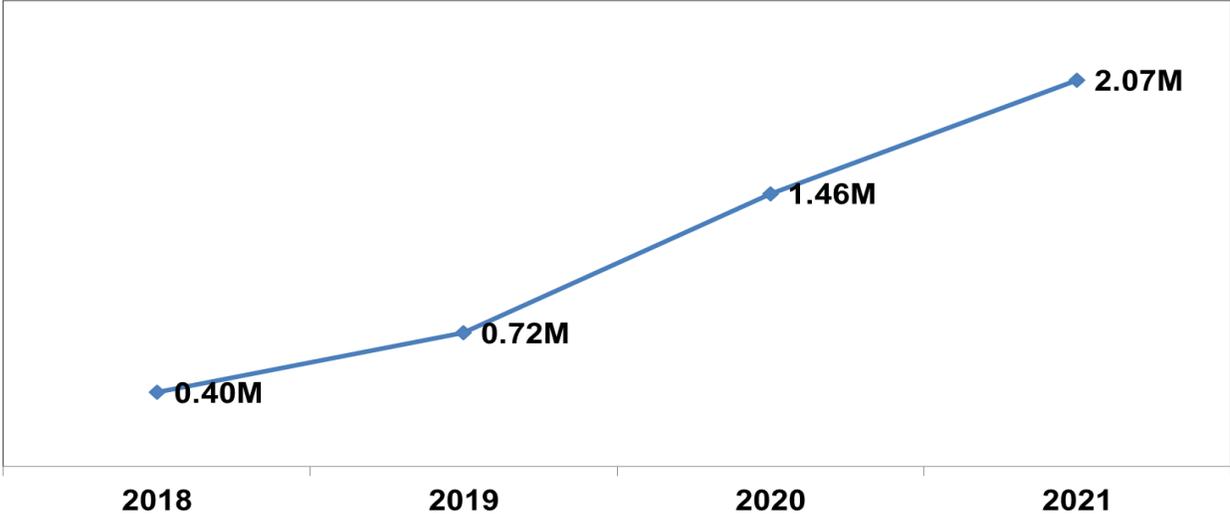
Figure 35 states that a large portion of people will be motivated through authority by 2021. The number seems highest in Comilla and Barisal as projected data shows that the coverage will be 80.2K and 53.2K respectively. Chandpur District is a bit in backward position in this aspect.

Figure 35: Bringing Respondents under 'FA App COVERAGE' – A Projection



\* K= Thousand

Figure 36: 'FA App' User Status- A Projection



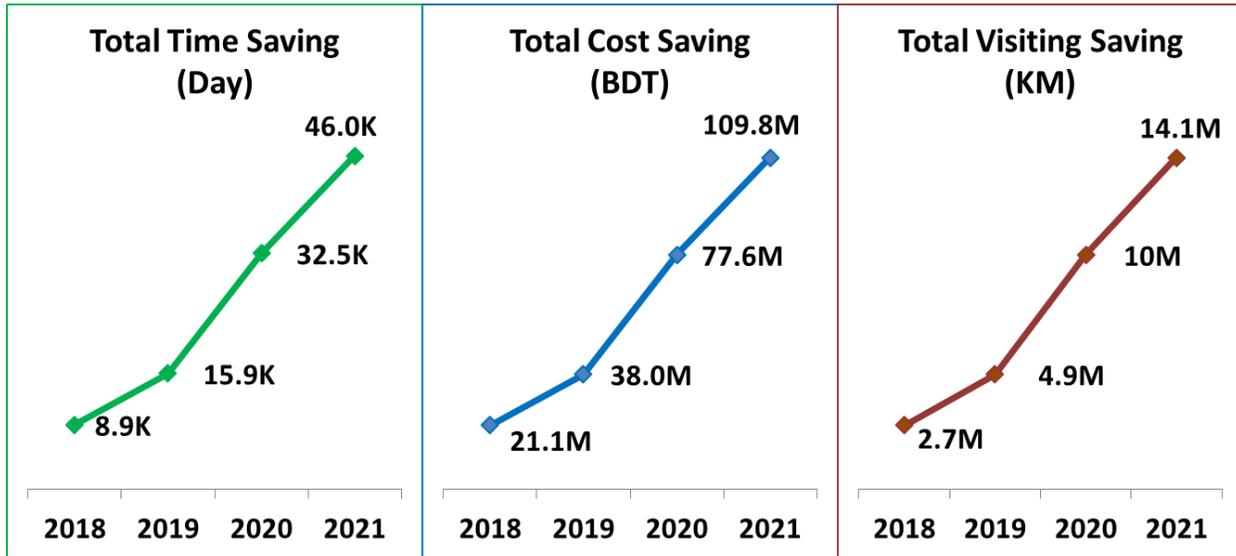
\* M= Million

Figure 36 shows upward trend of increasing rate of FA App users, for instance, in 2021 the user number will be 2.07 million which is very inspiring.

### 3.3 Status of Time, Cost & Visit

Figure 37 demonstrates that depending on the findings it can be projected that from 2018 to 2021 users can save their time from 8.9K days to 46.0K days, in case of cost, they can save BDT 21.1M to 109.8M and for visiting this will be 0.21M KM to 1.10M KM. So gradually by 2021 the users can save time, cost & visit by using this app which is significantly positive.

Figure 37: Projection of Time, Cost & Visit Save



\* K= Thousand \* M= Million

## 4 Discussion, Recommendations and Concluding remarks

### 4.1 Discussion

As most of the respondents are engaged in the fisheries usually live in the rural areas comparing urban. The fisheries practice is more sustainable in urban areas than the rural areas has been revealed in the study. Engagement of female in the profession indicates the women economic empowerment and it is clear that App is helpful for them to practice fisheries and overcome the challenges centering this profession. Because farmers informed that their family members including mother, daughter, sister & other family members accompany them for this job, therefore, more female are indirectly involved.

The involvement of young mostly with this profession points to technological contribution to dynamic aspect of fisheries. Despite this impressive growth, the characteristics of aquaculture in Bangladesh (technical, economic, and in terms of environmental performance and producer behavior) remain low understood. This is due in part to the rapidity of change and development in the sector, and to the diversity of specialized production technologies that have emerged in response to local comparative advantages in different regions of the country. Research on the technical characteristics of aquaculture production, the socio-economic characteristics of

aquaculture producers, and the broader impacts of the activity on communities and the environment in Bangladesh have focused on a limited number of technologies. However, these production systems now account for only a small fraction of Bangladesh's total aquaculture output.<sup>6</sup> As the practice of fisheries is dependent on different types of information so the respondents needs to be touched with getting these information.

In this regard, the respondents had the necessity of information regarding fish to know about the technique of fish cultivation, to know the way of preventing diseases, to increase the production, to know about food and to know about the medicine for removing fish diseases for cultivation. But the respondents had to spend significant time, cost and visit to receive the fisheries information. Beside this, the respondents used to face different types of challenges to avail the information from Upazila fisheries office which was the only source of collecting the information. The major challenges were problem in understanding about the service and crossing long distance. Beside these, unavailability of information in due time, lack of reliable information and necessity of much time were also the other problems.

A technical support for availing the information was very much needed for the respondents and the respondents started knowing about the app from Upazila fisheries office, district fisheries office, District Unnayan fair, fish farmers, fish medicine seller, Dweller and youth development training center. Most of the respondents have collected the app from Upazila fisheries office. The respondents have also collected the app from district fisheries office, district Unnayan fair, Google play store/online, youth development training center and Dweller of providing fish food. In last one year, the tendency to use the FA App has increased significantly and the respondents have also been able to encourage the other fish farmers to use the app for getting the easy information by using the app. Furthermore, a very positive trend is visible from the projection analysis that indicates that users will be benefitted and demand for this app in future will be dramatically increased.

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<sup>6</sup>Aquaculture technologies in Bangladesh: An assessment of technical and economic performance and producer behavior; (2015) <http://pubs.iclarm.net/resource.centre/2015-52.pdf> ; (accessed on 4 August, 2017).

## **Case study 2: Encouraging the fish farmers to utilize technological knowhow**

“Sahedul Rahman a presidential award winner for fish cultivation has been engaged in this sector last 14 years. He is one of the beneficiaries of FA App and can save a lot of time by using it. Before being initiated with the App he used to go to ‘Upazila Fisheries Office’ for taking necessary advices for fish cultivation. The ‘Upazila fisheries office’ was 15 kilometers far from his home.. It took about 40 minutes and cost above BDT 100 to reach at ‘Upazila fisheries office’ for collecting the information. The necessity information was not available as well as other challenges prevailed. Now, the problems have been solved by using the App. He needs no travel and cost but can avail the information within 3 to 5 minutes. He can use the saved time to invest in business purpose, fish, production, making fish food, and to communicate with client to export or import his production. The use of App has impacted the annual fish cultivation and increased his income also”.

As the fish farmers have started using the app and become benefitted; they are trying to encourage the others to be beneficiary from this app. It has become regular for the people to have the intention to convert the natural pond into commercial pond through cultivating the fishes. The number of fish farmers have been increasing day by day and fisheries is being taken as the second profession by the people of the selected areas. The time, cost and visit from both side (from fish farmers and the official of DoF) has reduced than the previous time. In the earlier period, the fish farmers used to face the case of loses but some of them have capable to recover the financial loss. The social dignity of the fish farmer has amplified as the income centering the fish cultivation has amplified than the previous time. In the recent time, it has seen that the female entrepreneurs have increased as they have received centering the app.

### **4.2 Recommendations**

Some recommendations have been accumulated from the study. The accumulated recommendations would be very useful for the Government, private-sector entrepreneurs, investors and zone level entrepreneurs to solve the problems centering the fisheries sector by using the ‘FA app’ as well as to make the app popular. If the recommendations are taken into consideration then the people related with fisheries sector, including fish farmers and service providers of DoF and FA app users will be immensely benefitted. The recommendations are described as follows:

1. Publicity, motivational activities, training, meetings and seminars on the app can be increased so that entire citizen can receive the benefit from this app, disseminating information by SMS and advertisement on TV channels can be effective for the fish farmers;
2. Picture of different diseases of fishes could be attached in the app so that the fish farmers can identify the diseases easily;
3. More advanced and modern technique containing necessary information and keeping feedback options will be helpful to increase fish cultivation;
4. A 'FA' online monitoring platform can be introduced in which the mobile number of the users, name of the frequent used content, location of the users will be saved in central data base for future analytics;
5. A free helpline for phone calling may be introduced for users for instant service';
6. Adequate printed materials for disseminating knowledge of fisheries, enough manpower and sufficient logistics can be ensured for providing service to the people could be ensured by DoF;
7. UDCs could be linked with the using of the app, bill-board & posters can be hanged in the different important places;
8. Desktop or laptop version and audio & video option can be added into it;
9. Feed Conversion Ratio (FCR) can be added in the app so that the fish farmers can measure the assessment of providing actual feeding to the fishes

### **4.3 Conclusion**

Bangladeshi fish farmers have ample scope of development to strengthen the national economy. In this regard, the Govt. departments, development partners and researchers have been working to implement the different formulated strategies to ensure the participatory approach for bringing the positive outputs. The fish farmers of Bangladesh represent a remarkable natural resource, with an intimate connection with the life and well-being of the country and its people. The newly introduced mobile application 'FA' has been endowed with scientific suggestions and guidelines. DoF has initiated this app for reducing the hassle of the

people and to get the information of fisheries in a smooth way. The FA has reduced the earlier required time, cost and visit as well removed the different challenges in fish cultivation. The study has suggested some significant recommendations which should be taken into consideration for making the app more popular and effective for the mass people. If this happens then more fish farmers might be benefited and the publicity of the app would be more stretched. Finally, it can be concluded that the FA app has the better utility to be used in a greater level and the concerned stakeholders have the equal opportunity to ensure the better uses of this app in meeting the needs of the millions of people for whom fish farming are an essential livelihood issue. As the FA has partially reduced the hassle of cultivation fishing by using it. But the fish farmers have to go at 'Upazila or District fisheries office' if they want to get the in-depth service in this regard.

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## Annex 1: Questionnaire of Study

### 'Fish Advice' Application: An Outcome Level Study

(The collected information will be used only for research purpose and the personal information of the respondents will be kept confidential)

Number of question	Type of data collection	District code	Division code
	1=Manual 2=Tab		
	Type of data collection	Mobile no	Date
Name of data collector	1=Manual 2=Tab		
Name of data enterer			
Section A : Primary Information about Respondents			
A1	Name of Respondents		
A2	Age ( Year)		
A3	Gender	1 = Male	2= Female 3= Others (mention please)
A4	Ethnicity	1= Bengali	2= Others (mention please)
A5	Religion	1= Islam	2=Hindu 3=Buddhist 4 = Christian 99 = Others (mention please)
A6	Phone Number		
A7	Educational qualification	1 = No institutional education 2 = Primary education (1-5 class)	7 = Post-graduation/ equivalent 8=PhD

		3 = Secondary education (6-9 class) 4 = S.S.C/ equivalent 5= H.S.C/ equivalent 6 = Graduation/ equivalent 7 = Post-graduation/ equivalent	9 = Diploma (S.S.C) 10 = Diploma (H.S.C) 11 = Others (mention please)
A8	Union		
A9	Upazila		
A10	District		
A11	Type of the area	1 = Urban	2 = Rural
<b>Section B: Questions on Fisheries Advice &amp; TCV</b>			
B1	How many days have you been involved in fisheries?	1 = 1 Year 2 = 2 Years 3 = 3 Years 4 = 4 Years	5 = 5 Years 6 = 6 Years 7 = More than 6 years (mention please)
B2	Do you need any information or advice of fisheries?	1 = Yes	2 = No
B3	In this case which information or advices are necessary for you? (Multiple responses)	1 = To prevent the diseases of fish 2 = To increase the production 3 = To know the technique of fishing	4 = To know about the food of fish 5 = To know about the medicine of fish 6 = Others (please specify)....
B4	Before using the 'FA app' from where you used to collect the information of fisheries?	1 = District fisheries office 2 = Upazila fisheries office 4= Seller of the fish medicine	5 = Dweller (provides food of the fish) 6 = Other fish farmers 7 = Others (mention please)
B5	How much distance was needed to travel from your home to collect the fisheries information?	Kilometer:	

B6	How much time was needed to collect the information	Minutes:	hours:
B7	How many times you visited to avail the service on average?	1 = 1 time 2 = 2 times 3 = 3 times	4 = 4 times 5 = 5 times 6 = Above 5 times
B8	How much average duration you needed to receive the information?	1 = Less than 15 minutes 2 = 15-30 minutes 3 = 31-60 minutes	4 = 1-1.30 hours 5 = 1.30-2.00 hours 6 = More than 2 hours
B9	How much cost was required for availing the information?	Sector of cost	BDT
		Transport cost	
		Middleman	
		Others	
		Total	
B10	Have you faced any challenges for availing the information?	1 = Yes	2 = No
B11	If yes, what types of challenges have you faced? (multiple responses)	1 = problem in understanding 2 = old technique 3 = lack of accurate information	4 = long distance home 5 = information is not available in due time 6 = others
B12	Do you know about mobile app 'FA'?	1 = Yes	2 = No
B13	Has the visit reduced by using the 'FA' app?	1 = Yes	2 = No

B14	How far away do you need to go to avail the information?	Kilometer:	
B15	How much time is needed for you to avail the information?	Minutes: Hour:	
B16	In this case, what amount of money is required to avail the information?	BDT-----	
B17	How do you utilize the 'surplus time' saved by using the 'FA app'? (multiple answers are applicable)	1 = familial purposes 2 = for business purposes 3 = health purposes 4 = for professional purposes	5 = for regular tasks 6 = for educational purposes 7 = in recreation 8 = others (mention please)
B18	How do you utilize the 'surplus money' saved by using the 'FA app'? (multiple answers are applicable)	1 = familial purposes 2 = for business purposes 3 = health purposes 4 = for professional purposes	5 = for regular tasks 6 = for educational purposes 7 = in recreation 8 = others (mention please)
Section C : Information about Using of Mobile App 'FA'			
C1	From where you firstly knew about mobile app 'FA'? (multiple answers are applicable)	1 = District fisheries office 2 = Upazila fisheries office 3 = Seller of the fish medicine	4 = Dweller (provides food of the fish) 6 = Other fish farmers 7 = Others
C2	From where you firstly collected the mobile app 'FA'? (multiple answers are applicable)	1 = Online / Google play store 2 = District fisheries office 3 = Upazila fisheries office	4 = Seller of the fish medicine 5 = Dweller (Food of the fish) 6 = Other farmers 7 = Others
C3	Have you inspired others to use mobile app (FA)?	1 = Yes	2 = No
C4	If yes, how many numbers of people have been inspired by you?		
C5	From how many days are you using	Months: ..... Year:	

	of this mobile app (FA)?			
C6	Have you received any benefits by using the mobile app (FA)?	1 = Yes	2 = No	
C7	If yes, what types of benefits have you received (multiple answers are applicable)	1 = Fish production has increased 2 = service at doorstep 3 = no cost	4 = immediate service 5 = income has increased 6 = others	
C8	Do you think that the production of fish has increased after using the mobile app (FA)?	1 = Yes	2 = No	
C9	If yes, how much amount of production has increased?	.....(Kg/every month)		
C10	Do you think that annual income has increased after using the mobile app (FA)?	1 = Yes	2 = No	
C11	If yes, how much annual income has increased?	Previous profit	Current profit	Increase/decrease
C12	Are you satisfied by using this app (FA)?	1= Highly satisfied 2 = Satisfied 3 = Moderately satisfied		4 = Dissatisfied 5= Highly dissatisfied
C13	If satisfied, then specify the reasons			
C14	If dissatisfied, then specify the reasons			
C15	Give your suggestions for ensuring the better uses FA app?			