

# Bottom-up Approach of System Requirement Specification of Mobile Apps for shrimp farming in Shyamnagar of Bangladesh

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**Abstract-** The rural poor in Bangladesh typically lack access to information vital to their lives and livelihoods. The information could be disseminated via web, mobile app, Internet of Things, and ubiquitous networks, etc. The mobile is widely used in many countries for the fish farming. Though frozen food is one of the most important export products in Bangladesh which contains more than 80% of shrimp. The most shrimp cultivation area is the southern part in Bangladesh. Shrimp farming is pressurized by lack of proper information on diseases identification and its management. Mobile app is considered as information provider. But it is necessary to find out the system requirement specification to provide required information for the farmers. The survey conducted in Shyamnagar, Satkhira district of Bangladesh and total 40 female respondents were involved in interview. The research tried to find out the common problems and requirements that focused mobile-app development. It was found that disease (82.86%) and water quality (17.14%) is common problem. Again, the most common disease was *White Spot Syndrome Virus* and *Yellow Head Virus Disease* followed by *Black Gill disease*. The research found it would be better developing voice-based mobile apps with local language.

**Index Terms-** SRS, Mobile App, Shrimp Cultivation, ICT for Agricultural Development, Common Diseases of Shrimp

## I. INTRODUCTION

The Black Tiger Shrimp (*Penaeus monodon*, locally known as Bagda) is cultivated on the saline coastal floodplains and cultured in captive waterbodies locally called as “Gher”. Borokupot village, Shyamnagar, Satkhira district is one of these areas where livelihood of the most local people depends on shrimp farming. Shrimp is called white gold of Bangladesh as is exported as a second largest frozen food item, which covers about 3% of total export. Bangladesh captured 2.5 % of world shrimp market (Bashir Uddin Md., Taslima Sultana et al. 2013). Aquaculture is

the most promising sector of Bangladesh contributing 3.65% of total Gross Domestic Products (GDP) (Aminur Rahman M, Sang-Go Lee et al,2018). In this Aqua industry, shrimp farming endorses high economic value henceforth it conquers the second largest export position after garments in Bangladesh.

Information is seen as useful to public, government, development agencies, and service providers and farming community for their development. Information and communication activities are a fundamental element of any rural development activity like Bangladesh. Rural areas are often characterized as information-poor and information provision has always been a central component of development. The rural poor typically lack access to information vital to their lives and livelihoods. The information could be disseminated via web, mobile app, Internet of Things, and ubiquitous networks, etc. The mobile is widely used in many countries for the fish farming. Mercy Amrita C. and P. Karthickumar (2016) stated their opinion about mobile phone used by fishermen that “Mobile phones by virtue of their role as carrier and conduct of Information, had reached great heights in Markets. The “AquaHub” developed by Sharihan Fathi, Aizul Nahar Harun et.al. (2018) is a web-based tool that sharing information among aquaculture player timely and efficiently especially on disease outbreak and disaster. The Internet of Things (IoT), Mobile phone, sensors as well as real time data is improving the life of fishermen and increasing their income. Abdul Razaque Chhachhar, Siti Zobidah Omar (2012) stated Mobile phone has added lots of easy issues in the life of fishermen and provides need-based information to the fishermen. In case of Bangladesh, the situation is going forward though still lagging behind. Recently the information focused more on crops and slowly in livestock. Roshidul H, M A Haque et.al (2016) found that farming communities preferred image and voice based app instead of only text. Roshidul H, Md Anamul Haque et.al. (2018) developed crop management and disease identification app for Maize where local language(Bengali) was used in the apps with multimodal function, text, voice with local language, and images. Mobile app is one of the many options, and it is necessary to follow the bottom-up

approach for making the apps sustainable. This is why it is very essential to find out the System Requirement Specification (SRS), a structured collection of information that embodies the requirements of a system, can help taking Mobile app initiatives in case of required decision and reducing the vacuum in information. Focusing on the right point this paper aims to develop a mobile app based on the farmer's requirement in local language and accent in recorded voice.

## II. RESEARCH METHODOLOGY

The research was conducted from July 2018 and ends on December 2019 in Satkhira district in Bangladesh.

### A. Data Collection

The primary data was collected by field survey, focus group discussion (FGD) specially using structured questionnaire of respondents. The FGD was conducted with respondents, Shrimp traders. The Shrimp traders were selected for face to face questionnaire interviews using random sampling method. Interviews were conducted in the village with 40 female farmers. The researchers used both qualitative and quantitative research methods to collect data. The qualitative research methods were focus group interviews and semi-structured interviews with key respondents, and the quantitative research methods were surveys via structured questionnaires. Five different sets of questionnaires were designed and used for the research.

Questionnaire A: Primary information of Principle Respondent

Questionnaire B: Demographic of Economic Information

Questionnaire D: Community Interaction

Questionnaire E: Questionnaire related to Shrimp diseases

Questionnaire F: Questionnaire related to shrimp farming management

### B. Data Analysis

The primary data was rechecked and enter into SPSS. The SPSS were used to analyze the data. Mainly the descriptive statistics and frequencies were considered for analysis. The compare, count and results of analysis were presented in the form of chart and bar diagram.

## III. RESULT AND DISCUSSION

The research was focused to find out system requirement specification for developing mobile apps for the shrimp farming communities. During the research period, respondents were targeted those were directly involved in shrimp farming. The respondents were in different age group and all respondents were female farmers. It was urged to follow the bottom-up approach to develop mobile app so that end-users could adopt and sustain the research outcomes longer. The survey and FGD was conducted to find out common problems and how the farmers cultivating Shrimp as well as what problem they are facing during cultivation and how they can mitigate those issues.

### B. The Objective of This Research Was:

- To find out the common diseases persist in shrimp farming and traditional methods and mitigation.
- To assess and find out the solution for identified problems
- To finalize the system requirement specification (SRS) for developing mobile app.

During the research it was found the culture practice, expenditure, yield, profit, problems, management practices of the shrimp farmers and Information & Communication Technologies used in their day life. Most of the respondents were between 20 years to 30 years age group (89%), no respondents were found more than 50 years old. There were 6% of 30-40 years age group respondents and 3% of 40-50 years age group as well as 3% of less than 20 years age group.

Most of the respondents completed Higher Secondary Certificate (HSC) and none of them were found illiterate, 37% of total had education level of Secondary School Certification (SCC) -HSC, 31% were in between Primary-SSC, 23% have education above HSC. Moreover, 9% of them could read and write in Bengali (shown in Figure 1)

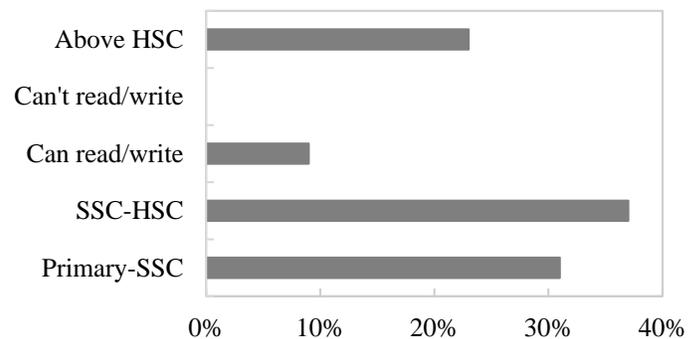


Figure 1: Education Level of the respondents

The research found, the most popular aquaculture system was Integrated Culture System (66%) where several seasonal crops, vegetables are cultivated on the embankment of shrimp gher. Besides, polyculture with different white fish species like Rui, Tilapia and other shrimp species like Harina, Crab fattening found another common practice (26%) in that area. In fig. 2 represented the farm size of shrimp farming in the study area based on the responses of the respondents. It was found that 26% of the respondents cultivated Shrimp in less than 0.5 acre of land, 26% of respondents were having land from 0.5 to 1 acre. The highest no of respondents was 31% cultivated shrimp in 1-3 acre of land. The rest 17% were getting shrimp production from more than 3 acre of gher.

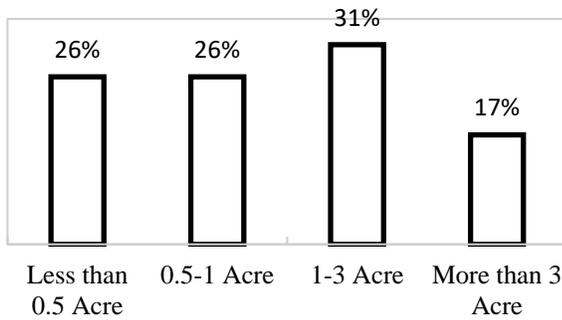


Figure 2: Land size of the respondents cultivating shrimp

The research was trying to find out the usability and adoptability of information and communication technologies, specially smartphone. It was found very positive response from the study. All the respondents were having smartphone and highest no of respondents (60%) used their smartphone for getting information online and using online and offline mobile apps. The next responses were social media (34.29%) while 5.71% of them used smartphone in reading newspaper. The Figure 3 depicted the assistance received when farmers were having any farming related problem, 57.50% directly call to Winmiyaki, an NGO call center by PROTIC-Oxfam in Bangladesh. Many of them (25%) tried to solve the existing problem themselves, 15% among them consulted with Upazila Fisheries Officer (UFO) and only 2.50% were getting assistance from the neighbor.

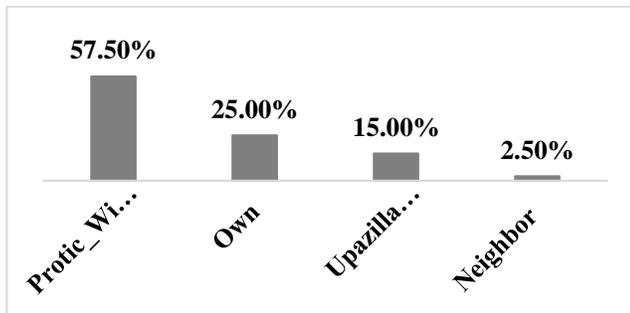


Figure 3: Respondents were getting assistance from different sources

In fig. 4. shown the stocking density and it was varied according to the gher size. Total of 15% of total stock less than 1000 shrimp post larvae, the other 18% of them stock more than 6 thousand. The fig.4. was also showing 21% of the respondents kept in ponds 2000-4000 while 4000-6000 shrimp post larvae are stocked by 21% farmers. But highest no of respondents (26%) maintained 1000-2000 stocking density.

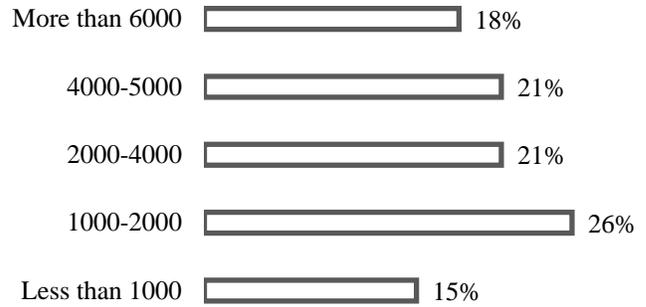


Figure 4: Stocking density of the shrimp

The respondents were asked about five problems usually related to shrimp farming. Remarkably, it was found that the disease (82.86%) as the most vulnerable problem persist in shrimp farming. The Water Quality management (17.14%) had taken the rest of the space of the existing problems. This was found strong correlation and important feedback for SRS.

Viral disease was very common in shrimp farming regions of Bangladesh represented in Figure 5. The respondents were asked about the most harmful disease they usually find in the gher during the whole farming period. All the respondents claimed that the White Spot Syndrome Virus disease (WSSV) was common disease followed by Yellow Head Disease comprises 55% and Black Gill Disease (25%). Only single respondent replied “no disease occurrence” and it was found after the FGD, the farmer just had started the Shrimp farming.

In Figure 6 Found the existing management practice by the respondents where the small-scale shrimp farmers (80.00%) shown using Lime as a solution in case of Viral and Bacterial diseases. Total of 2.50% were used medicine at first place while 5.00% tried to exchange the water with clean ground water. Only 2.50% used probiotics knowingly or unknowingly with supplemented feed.

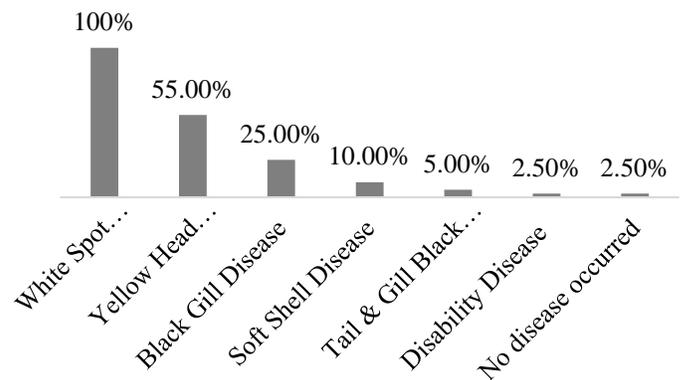


Figure 5: Common disease of shrimp farming

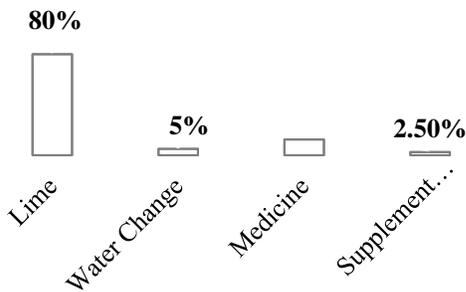


Figure 6: Found the existing management practice.

The research found through survey and FGD that the total of 80% shrimp gherms were affected by white spot disease and it became a limiting factor for the small-scale Baghda farming and most of the farmers lost their production and it remained same for the long.

#### IV. CONCLUSION

This research found that the water quality and disease management were the main problems at Shyamnagar area, Shatkhira which is hindering the profit and all labor served in every culture period by the farmers at that particular area. The major finding was disease, the main obstacle in shrimp farming. Having little knowledge of shrimp farmers on water quality management was increasing disease and disease decreasing shrimp production. White Spot Syndrome Virus disease caused by White Spot Syndrome Virus and was the most common and severe problem for Baghda farming in Bangladesh. It was found that all the respondents were good in using mobile phone applications I.E. browsing, chatting, audio, video, gamification, social networking and even education learning, offline mobile phone app etc. It was identical that farmers were ready to accept the mobile app but it was necessary to find the appropriate and need-based information for the farmers. The SRS suggested to focused on, i) Three main diseases identification (a. *White Spot Syndrome Virus*, b. *Yellow Head Virus Disease* and c. *Black Gill disease*); ii) Disease management, iii) Gher Preparation and iv) Mobile app should be in local language and voice based.

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