

MOTIVATIONS FOR INVOLVEMENT IN URBAN CATFISH FARMING AND SUSTAINABLE FOOD SECURITY IN NIGERIA

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Abstract: Fish farming is known as one of the ways of ensuring food security and alleviating poverty through income generation. It is very common in the urban areas of Nigeria because of great demand for fish. This study determines motivations for involvement in urban catfish farming and sustainable food security in Ilorin, Kwara State, Nigeria. Specifically, the study identifies fish farmers and their socio-demographic characteristics in the study area; it examines motives of fish farming; examines the contributions of fish farming to household food security; and assesses the challenges faced by fish farmers for increased production. Both primary and secondary sources of information were employed and a total of 120 fish farmers were sampled randomly with copies of structured questionnaire. Frequency counts, percentages, tabulations and matrix ranking were employed to analyze the gathered data. The findings revealed that catfish production has actually contributed immensely to sustainable food security by making fish available, accessible and stable within the study area. The main motive for involvement in fish farming by the farmers includes food security (with a mean value of 3.80). This was followed by income supplement ($x = 3.50$), source of employment ($x = 3.42$) and increase in price of meat ($x = 3.37$). It can therefore be concluded that catfish farming in the study area has not only improve practitioners' food security but has also contributed immensely to their income. The paper recommends the need to include fish farming in urban planning and that it should be encouraged in both rural and urban areas so as to have sustainable food security in the country as a whole.

Key words: Food security, Income generation, Fish farmers, Poverty Reduction, Catfish,

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INTRODUCTION

The important roles played by agriculture in economic development of most developing countries are enormous. This sector provides food for everybody within a country and contributes immensely to foreign exchange earnings through export. It generates employment for people and a source of raw materials to some industries. Agriculture can be regarded as an engine of growth because it ensures food security, and is very important for alleviating poverty particularly in sub-Saharan Africa (World Bank, 2007). It is being practiced both in rural and urban areas of any country. Before 1970, in Nigeria, agricultural sector accounted for over half of the Gross Domestic Product (GDP), and employed almost 80 percent of the adult working population (Olawoye, 1989).

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However, the advent of crude oil in the early 1970s made agriculture to suffer a serious decline. This can be attributed to the migration of economic active age group from rural to urban areas in search of paid employment in the oil sector, government offices and other industries. One of the causes of poverty as listed by Tambunan (2004) is heavy migration to urban areas. Most of these migrants on getting to the urban centres are neither able to cope with the high cost of urban living nor are absorbed in the organized economic sector. Invariably, poverty sets in, forcing many city migrants into informal enterprises such as farming (Adedayo, 1994).

Urban agriculture was developed so as to prevent the increasing population from hunger and also to save the insufficient cash that would have gone towards food purchases (Freeman, 1993; Maxwell, 1994). The growing of food crops, fruit trees, and the raising of animals, poultry, fish, bees, and other stock considered edible locally and non food items within the urban and peri-urban areas for home consumption and for sale is what is regarded as urban agriculture (Maxwell and Zziwa, 1992; IDRC, 1994). Urban agriculture in this study therefore includes fish raising within (intra-urban) or periphery (peri-urban) areas for home consumption and or/ for the urban market and related small-scale processing and marketing activities.

Furthermore, going by the fact that the government of Kwara State is supporting agriculture in the area of fish production, and study has shown that healthy consumption of fish promotes healthy brain tissue and reduces the risk of heart disease. According to Olorunisola, the secretary to Ministry of Agriculture and Natural Resources in Kwara State, Nigeria, fish production has increased from 30,000 metric tons per annual in 2003 to about 120,000 metric tons in 2011. It becomes imperative to carry out a research of this nature in order to assess the contribution of fish production to sustainable food security and income of the practitioners in the city, considering the fact that there is virtually no area in Ilorin that one will not come across catfish in bowls and barbecue for sale.

The question now is what could be responsible for this? The aim of this study is therefore to determine the motives for involvement in fish farming by the farmers in Ilorin, Kwara State, Nigeria. Specifically, the study identifies fish farmers and their socio-demographic characteristics in the study area; it examines motives of fish farming; examines the contributions of fish farming to household food security; and assesses the challenges faced by fish farmers for increased production.

FISH FARMING

Aquaculture and fish farming contribute significantly to household income, nutrition, poverty alleviation and food security. Fish farming contributes over 60% of the world supply of protein, especially in the developing countries (FAO, 2007). According to World Fish Center (2008), fish provides essential nutrition for 3 billion people and at least 50% of animal protein and minerals to 400 million people from the poorest countries. In Nigeria, it contributed 12% share of Agricultural GDP between 2000 and 2004 (FAO, 2007; Akinwumi, 2014). Annual demand of fish in the country is about 2.7 million tonnes, and a paltry domestic production of about 780,000 tonnes, hence there is a wide gap between demand and supply (Nwiro, 2012). Nwankwo (2005) reported that The Federal Government of Nigeria imports over 50billion of fish annually in order to meet the demand for fish in the country. According to Ejiola and Yinka (2012) the least exploited sub-sector in Nigeria with the vast brackish water fishing grounds almost unexploited is fish sub sector.

According to Adefalu et al., (2013), aquaculture can be operated on a small or medium scale. This means it can act as income supplements for both the poor and the rich to improve their standard of living. Fisheries Society of Nigeria reported that small scale fisheries provide more than 82 percent of the domestic fish supply, giving livelihoods to one million fishermen and up to 5.8 million fisher folks in the secondary sector comprising processing, preservation, marketing and distribution. Fish is about the cheapest animal protein available for human consumption. There are different species of fish worldwide however; catfish species (figure 1) is the most widely raised and commonly demanded and consumed in Nigeria. This may be attributed to its great taste, low caloric value, low in fat, low carbohydrate content, high in protein, above all, it is quick and easy to prepare.



Figure 1. Catfish specie
Source: Author's fieldwork, 2016

Furthermore, the culture of Catfish in Nigeria is important because of its low bone content, fine flavour, high growth rate and its ability to feed on virtually anything. Also it is hardy and can survive where most other cultivable species cannot (Taiwo, 2009). Hence, this specie can easily be raised by an individual at the backyard of his house or carried out by small scale operators in fresh water ponds (figure 2) near drainage basins which are the focus of this study. Farm-raised catfish is available all-year round at a price unaffected by external environmental conditions and consistently high in quality.



Figure 2. Urban fresh water fish ponds at New Yidi road, Ilorin
Source: Author's fieldwork, 2016

SUSTAINABLE FOOD SECURITY

Food security has originally been a response to high population growth rates and changes in food production technology in many countries (Lutz et al., 2007). Several definitions of food security abound in literature. Food security is when human beings do not need to live with hunger

or fear starvation (Webster, 2008). The World Health Organization defines food security as “*The implication that all people at all times have both physical and economic access to enough food for an active healthy life*”. Access to adequate food is a necessity but does not guarantee a healthy life. This is because other determinants should be considered and these include health and household or public capacity to care for the vulnerable (Adegboye, 2004).

Sustainable food security is when people at all times have access to enough food for an active healthy life at present plus the ability to provide enough for future generation. The idea of achieving sustainable food security in Nigeria was brought into limelight in 2009 during the World food summit in Rome. At this summit, the UN Secretary General Ban ki Moon warned that six million children die of hunger every year and 17,000 die of starvation every day and by 2050 the world will need to feed two million more mouths. Based on this report, it became very important to embark on sustainable food security in the country. Sustainable food security according to FAO, et al., (2013) is access to the food needed by all people to enable them live a healthy life at all times. Abdullahi (2008) opined that sustainable food security is when people have physical and economic access to sufficient food to meet their dietary needs for a productive healthy life at present as well as in the near future.

Food security only exists when everybody at all times (present and future) have physical and economic access to enough safe nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle (World Food Summit, 1996). It was however emphasized further that one can only be food secure when food is available, affordable and utilized. World Bank (1986) defined sustainable food security as an access to enough food for active, healthy life at present as well as ability to provide enough in the future.

To Nugent and Egal (2000), food security does not mean just mere availability of food but rather accessibility to food. In this situation, it considers the need for a healthy diet, complete with necessary vitamins and proteins, rather than simply sufficient calories. All households at local, national and global level must have both physical and economic access to a sufficient quantity, quality and variety of food year round.

A triad of concepts was used by Chung, Haddad, Ramakrishma and Riely (1997) in the definition of food security to include: Food availability, food access and food utilization. Food availability means food production and supply while food access relates to food affordability and food utilization is associated with getting the right nutrients like calories, fat, protein and vitamin intakes the body need. Similarly FAO, et.al (2013) opined that the core determinants of food security are availability, accessibility, utilization and stability. Food availability means having satisfactory access to food, food accessibility means having both physical (availability) and economic access (income), food utilization (nutrition level and quality of food, health and hygiene) and stability (exposure to short-term risks). This definition is similar to an indication by Von-Braun, Bouls, Kumar and Pandya-Lorch (1992) that the determinants of food security include availability of food, access to food and risks related to either availability or access.

Hence, several aspects of food security by Honfora and Van den Boom (2003) include availability of food stuffs, the quality of the diet, the spatio-temporal stability of supplies, and the access to food produced at home or purchased. In this study therefore, sustainable food security is having equal access to enough food for an active healthy life at present and the ability to safeguard the future generations. Hence, this study focuses on how urban fish farmers make catfish available, accessible and stable now and for the future generation.

THE STUDY AREA

Ilorin is the study area for the research. Ilorin was chosen because it happens to be the largest urban centre in Kwara State. It is located on latitude 8°30' and 8°50' N and longitude 4°20' and 4°35' E of the equator (figure 3). Generally, Ilorin is situated in the transitional zone between Northern and Southern Nigeria, with land area of about 100 sqkm, expanding along its major arteries. Ilorin has twenty (20) political wards and it is made up of three local government areas

which include Ilorin East, Ilorin South and West. Ilorin serves as gateway city between Southern and Northern parts of Nigeria and shares boundaries with Oyo State in the South and in the West by Ifelodun local government area and at the East by Moro local government of Kwara State. She has been described as a socio-cultural and religious, political meet of Nigeria Oyebanji (1994). The climate is tropical and is under the influence of the two trade winds prevailing over the country. The rainy season is between March and November with average rainfall of about 1000 mm -150 mm and September is the wettest month while the dry season is between November and March. The daily average temperatures are in January with 25°C, May 27.5°C and September 22.5°C. The mean monthly temperature is generally high throughout the year (Ajibade, 2002). The relief of Ilorin metropolis is mainly a plain land with the only prominent landform, Sobi Hill (1300 ft) is high. It is drained mainly by Asa River whose direction of flow is directly related to the scope of the land (a consequent stream). It originates from Oyo State and passes through Ilorin city in a south, easterly manner. Rivers like Amule, Odotu, Aluko, Loma drain into Asa River at acute angle which gives rise to a dendritic drainage pattern (Kwara State Diary, 1997).

Although, Ilorin is an administrative centre, however, natural increase, economic and social activities have greatly influenced her growth in recent times leading to urbanization. The 1991, census showed that she had a total population of 532,088 (NPC, 1991) while the population figure for 2006 census was 781,934. The major tribes comprising its inhabitants are the Hausa, Yoruba, Ibo, Fulani and Nupe.

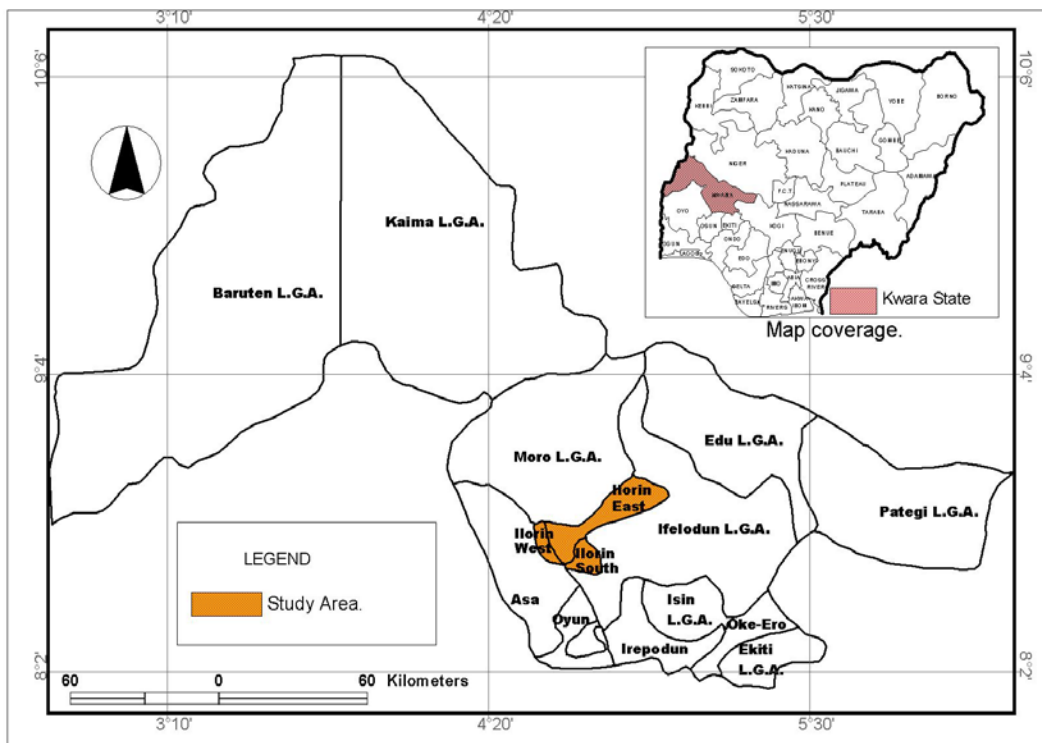


Figure 3. Map of Kwara State showing the Study Area

Ilorin indigenes are predominantly farmers, keeping poultry, raising fish, planting such crops as yams, cassava, sweet potatoes, guinea corn and host of others. The modern part of Ilorin is occupied by immigrants who are viably engage in trading, industrial and administrative activities Olorunfemi (2001). A large number of the population work as civil servants, bankers, teachers etc.

MATERIALS AND METHODS

Both primary and secondary sources of data were used for the study. The study purposively employed the use of 120 copies of structured questionnaire to explore the minds of the practitioners on reasons for involvement in fish farming. The questionnaires were administered on only the fish farmers in the study area. Frequency counts, mean, tabulations, percentages and matrix ranking were employed to analyze the gathered data.

RESULTS AND DISCUSSION

Socio-demographic Characteristics of the fish farmers

In this section, some variables of socio-demographic characteristics of the respondents (fish farmers) were identified; these include age, sex, marital status, primary occupation, levels of education and household numbers. Age and sex of people determines their involvement in raising fish and of course the motives behind involvement in fish production. Nature of work may also determine the amount of time available to fish farming. Level of education of respondents affects adoption of new innovations and management of the ponds. Household number determines the number of labour available on the farm as well as the reason for involvement in fish production. The marital status of fish farmers determines their commitment to fish production and possibility of increasing production.

The survey shows that 25 (20.8%) are aged between 25-34 years while 35 (29.2%) fall between the age group of 35-44 years. Also, 40 and 20 fish farmers respectively are within the age groups of 45-54 years and 55 years and above. It is therefore important to note that this distribution shows that all respondents are in the working or economic active age group. The sex distribution of these farmers shows that 80 (66.7%) are females (figure 4) while the remaining 40 (33.3%) are males.



Figure 4. A fish farmer feeding fish at her backyard in Offa Garage area, Ilorin

Source: Author's fieldwork, 2016

The reason for this difference could be because women are in charge of food and so are aware of the importance of nutrition and food security at household, local, state and nation's level. The occupational characteristics of the sampled fish farmers show that more than 90% have primary occupation within the economy. The remaining 10% are full-time fish farmers. The breakdown of this figure shows that 38.2% are civil servants, 22.8% are traders, 18.9% are

Artisans (Barbers, hair dressers, fashion designers, mechanic, welders etc) and 10.1 % of the respondents are in other informal sector activities (paper vendors, food vendors, barbers, hawkers, etc). Note that $n = 120$. The remaining 12 (10%) respondents are unemployed and retired. This figures show a fairly balanced distribution of respondents across major occupations and informal sector activities.

The educational attainments of fish farmers were categorized into three, only 5 (4.2) had no formal education, others include 11 (9.2%) obtained primary education, 60 (50.0%), attained the secondary or technical education while 44 fish farmers (36.6%) possessed tertiary education certificates. The marital status reveals that about 108 (90%) of the fish farmers are married, 6 (5%) are widows while only 6 (5%) are single. None was divorced. This indicates that married people are more committed to fish farming because they have more mouths to feed. Household number of the fish farmers dictates that majority (92%) falls between household size of 5 and above, the rest 8% have less than 5 number of household.

Motives for involvement in fish farming

Fish farmers were asked the motives for involvement in fish farming. Their responses were however discussed as follows. As shown in Table 1, 80% of the respondents indicated that they are involved in fish farming in order to sustain their family on food security ($x=3.8$). Food security in the sense that they have access to nutritious food all the time and do not have to purchase automatically saving the money that was supposed to go into fish purchases for other things. The second important motive as revealed by the respondents is for income supplement ($x = 3.5$). Another important motive is as a result of employment generation ($x = 3.42$). This agrees with Mireri, (2013)'s findings that urban agriculture contributes to employment, income and food security in Kenya.

Table 1. Motives for involvement in Fish Production

Source: Author's field work, 2016

Motives	Strongly Agree	Agree	Disagree	Strongly disagree	Undecided	Mean	Rank
Food security	96 (80.0%)	17 (14.2%)	7 (5.8%)	0	0	3.80	1 st
Income supplement	75 (62.5%)	30 (25.0%)	15 (12.5%)	0	0	3.50	2 nd
Source of Employment	80 (66.7%)	20 (16.7%)	10 (8.3%)	10 (8.3%)	0	3.42	3 rd
Increase in price of meat	60 (50.0%)	45 (37.5%)	15 (12.5%)	0	0	3.37	4 th
Preparing for retirement	25 (20.8%)	32 (26.7%)	50 (41.7%)	13 (10.8%)	0	2.53	5 th
Accessibility to land	20 (16.7%)	15 (12.5%)	55 (45.8%)	30 (25.0%)	0	2.22	6 th
Availability of feed	3 (2.5%)	7 (5.8%)	30 (25.0%)	80 (66.7%)	0	1.39	7 th
Leisure	1 (0.8%)	2 (1.7%)	45 (37.5%)	72 (60.0%)	0	0.93	8 th

Note: Strongly Agree=4; Agree=3; Disagree= 2; Strongly disagree=1; Undecided=0

Other reasons include increase in the price of meat ($x = 3.37$), preparation for retirement ($x = 2.53$), availability of land ($x = 2.22$), availability of feed (1.39) and leisure ($x = 0.93$).

Contributions of fish farming to food security

Fish contributes significantly to urban food security by increasing purchasing power at individual or household level. From the study it was gathered that catfish production contributes highly to food security in the sense that fish is made available, accessible and stable to the

households of the practitioners all the time and at the exact quantity. When interviewed, it was gathered that the main reason for most of the farmers' involvement in raising fish is to ensure food security at household level. Apart from this, they make catfish available to consumers in the market. Consumption of fresh fish is supplementary to the diet of urban households and has impacted on their health and nutritional status. Sampled fish farmers indicated that despite their involvement in other businesses, fishery is very lucrative. According to them, they realize profit of an average of N3, 000.00 per day and at the same time have fresh fish for the household. This means children in the households of farmers keeping fish have access to nutritious food.

Challenges faced by fish farmers for increased Production

Respondents were asked to rank the problems limiting their increased and effective production in the study area. Table 2 shows that inadequate capital (53) was ranked as the most pressing problem confronting their increased production. This is similar to Adefalu et.al (2013) findings that inadequate capital is the most perceived problem militating fish farmers increased production. This could be linked with the fact that majority of the people involved in fish production are middle and low income earners who do not have enough capital to expand their production. The next challenge being faced by fish farmers is high cost of fish feed (41). This is in supports of Olaoye et.al (2013) findings that high cost of feed is the most pressing problem confronting fish farmers in Oyo State, Nigeria. The third challenge confronting fish farmers in the study area is problem of water. From the study, it was discovered that fish farmers make use of well water which is not sufficient for keeping fish especially during dry season and since they lack enough financial capacity, it becomes difficult to dig a borehole. Fish farmers who own fresh water ponds also face water problem during dry season because most of the drainage basins attached to, usually dry up during this period.

Table 2. Respondents Ranking of Fish Farming Problems
Source: Author's field work, 2016

Problems	Respondents/Ranks												
	53 (1)	25 (2)	12 (3)	8 (4)	18 (5)	4 (6)	-	-	-	-	-	-	-
Inadequate Capital	53 (1)	25 (2)	12 (3)	8 (4)	18 (5)	4 (6)	-	-	-	-	-	-	-
High cost of fish feed	41 (1)	39 (2)	22 (3)	14 (4)	-	-	-	4 (8)	-	-	-	-	-
Problem of water	22 (1)	16 (2)	33 (3)	27 (4)	10 (5)	8 (6)	4 (7)	-	-	-	-	-	-
Size of fish pond	4 (1)	-	12 (3)	-	16 (5)	24 (6)	44 (7)	8 (8)	4 (9)	-	-	-	8 (13)
Inadequate fingerling availability	-	4 (2)	7 (3)	41 (4)	16 (5)	30 (6)	18 (7)	-	-	-	4 (11)	-	-
Marketing problem	-	-	4 (3)	-	-	8 (6)	-	27 (8)	8 (9)	16 (10)	4 (11)	15 (12)	38 (13)
Poor extension services/information	-	18 (2)	-	4 (4)	16 (5)	16 (6)	8 (7)	8 (8)	33 (9)	7 (10)	4 (11)	3 (12)	3 (13)
Lack of technical skill/information	-	12 (2)	30 (3)	22 (4)	25 (5)	-	-	8 (8)	19 (9)	4 (10)	-	-	-
Poor preservative techniques	-	-	-	4 (4)	-	-	8 (7)	4 (8)	-	35 (10)	24 (11)	41 (12)	4 (13)
Incidence of disease	-	-	-	-	4 (5)	-	-	-	12 (9)	21 (10)	44 (11)	31 (12)	8 (13)
Storage problem	-	-	-	-	-	-	-	6 (7)	6 (8)	25 (9)	28 (10)	16 (11)	39 (13)
Post harvesting problem	-	-	-	-	15 (5)	8 (6)	16 (7)	43 (8)	14 (9)	12 (10)	8 (11)	4 (12)	-
Government policies	-	6 (2)	-	-	-	22 (6)	22 (7)	12 (8)	24 (9)	-	4 (11)	10 (12)	20 (13)

Note: Ranks are in Parentheses

Size of fish pond was ranked as the most pressing problem by only 4 respondents, indicating the need for expansion of fish ponds to enhance increased production. The problem of size of fish pond is more associated with land tenure system in which land is available but not accessible. Most farmers also used containers (figure 4) which are small in size.

Problems identified by fish farmers but not most pressing include inadequate fingerling availability (this was ranked as 2nd and 3rd most pressing by only 4 and 7 fish farmers respectively), marketing problem relating to middlemen was ranked as 3rd most pressing problem by only 4 fish farmers, poor extension services to provide them with adequate information needed for increased production was ranked 2nd most pressing problem by 18 fish farmers, lack of technical skill on new innovations was ranked 2nd and 3rd most pressing problems by 12 and 30 fish farmers respectively. Other problems include poor preservative technique, incidence of diseases, storage problem, post harvesting problem and government policies.

CONCLUSION AND RECOMMENDATIONS

From the study, it was discovered that the main reason for farmers' involvement in urban fish farming was for food security. This means urban catfish farming makes food available, accessible and utilized in a healthy manner. Urban catfish farming in the study area also improves practitioners' income. In spite of this contribution, fish farming is however confronted with some challenges which impede increased production for greater potentials. It can therefore be concluded that catfish farming has great potentials in the study area and so should be replicated in other urban areas of the country for sustainable food security.

Recommendations made on how to improve and increase production include: Fish farmers should be provided with loans through financial institutions at subsidized interest rates with adequate monitoring. This will enhance increase in farmers' production levels and profitability. Fish farming should be included in urban planning and should be encouraged in both rural and urban areas so as to have sustainable food security in the country as a whole. Urban fish farmers should be encouraged by providing them with incentives to increase their production. Policies that will create enabling environment for more fish farmers should equally be formulated.

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Submitted:
May 02, 2017

Revised:
August 29, 2017

Accepted and published online
October 17, 2017