Kitchen Gardening Practices through People's Participation: An Action Research Project of three Marginalized *bagdi* Villages in Bangladesh

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Abstract

The purpose of this paper is to assess the role of households and their participatory initiatives toward their enhanced welfare. The paper will analyze how the marginalized and less privileged *bagdi* community actively participated and collaboratively worked to learn kitchen gardening technology through a participatory action research project. The project was undertaken among three *bagdi paras* from different neighboring villages during 2009 and 2010. This action research project was funded by Research Initiatives, Bangladesh (RIB), a donor NGO in Bangladesh. Present study was conducted in 2011 through regular minutes of group discussion of the community people and face to face interview with the villagers using structured survey questionnaire. Hence, this paper has assessed the role of kitchen gardening and found the households of *bagdi* community have significantly increased their vegetables and fruits production, consumption and family income through kitchen gardening.

1. Introduction

People's participation in the development process has been overwhelmingly emphasized in developing countries since last few decades. Government, donors, development facilitators, academicians and policy makers have considered the failure of rural development projects mainly due to the lack of participation, exclusion of community people from the assessment of their own needs and own problem identification. Rural people's perceptions regarding problem and solutions are often overlooked, while their storehouse of information, experiences and analysis is usually neglected (FAO, 2012). Enabling rural people to decide upon and to take action which they believe are considered as an essential prerequisite for success of the project (Okley et al. 1991). Considering 'participation' as a central mechanism of community development, an agro-based participatory action research; kitchen gardening project was undertaken to enhance the family consumption, nutrition and income of the *bagdi* community. It was effectively launched in 2009 and has been continued until 2010 when the community became self-reliant to operate their own project.

The objective of this paper is to analyze how the disadvantaged marginalized *bagdi* community improved their livelihood through their collective action in kitchen gardening. The whole research process has been documented chronologically and showed how people were initiated to understand their own problems, find opportunities, explore potential resources and use them in better ways to improve their livelihood.

1.1 Kitchen Gardening to Enhance Poverty Alleviation

Vegetables and fruits production on small plots surrounding houses have long been practiced not only in developing countries but also in many developed countries. This type of small scale farming is much effective in developing countries, because increasing

numbers of small farmers are being marginalized by ecological, social and demographic forces (Midmore et al. 1991). In addition, kitchen gardening practice might be a viable options to improve family nutritional status and to increase family income. Midmore et. al. (1991) found landless farmers in Bangladesh earned 10% of the total household income from selling of vegetables and the value of the produce retained for family consumption is often higher. In Bangladesh, landless, marginal and small households comprises about 70% of the rural population and out of them 35% have only homestead cultivable land in between 0.1 - 0.5 acre (Ghosh & Maharjan, 2002). On an average a landless farmers in Bangladesh use 80% of their earnings to buy rice and they have very little to spend for other daily essential commodities. Considering the varieties of needs they have a very narrow scope of spending money to buy vegetables and fruits. Nearly 40% of the Bangladeshi population lives below the food consumption-based poverty line, lacking sufficient resources to afford diet of 2,122 kilocalories (kcal) per person per day, along with other basic necessities. Apart from the prevailing deficit in total calories intake, the normal diet of Bangladeshi people is seriously imbalanced with inadequate consumption of protein, fat, oil, fruits and vegetables and with more than 80 percent of calories derived from cereals (Hossain et al. 2005). Women and children are especially vulnerable to their greater nutritional requirements (Ali et al. 2008). Khan (2009) has also argued that in Bangladesh, per capita vegetable consumption is only 28 gm against the daily requirement of 200 gm. However, commercial farming by medium and large farmers has increased significantly since last decade. Comparatively higher profit, developed communication and transportation system encouraged rich farmers to produce vegetable commercially. On the other hand, kitchen gardening practice by poor farmers in Bangladesh have not been developed and still have to depend on old technology and cultivation method. The reasons might be the ignorance of kitchen gardening as the integral part of a whole family, culture and rural farming system by the scientists, extension workers or development agencies. On the other hand, in many cases, experts brought the kitchen gardening "model" with specific measurement of defined plot size, bed sizes, and crop patterns etc., without considering local environment, existing farm practices, land structures and cultural perspective.

The Millennium Development Goals (MDGs) has eight international development goals that all United Nations' member states and at least 23 international organizations have agreed to achieve by the year of 2015. The goals are; i) to eradicate extreme poverty and hunger, ii) to achieve universal primary education, iii) to promote gender equality and empower women, iv) to reduce child mortality rates, v) to improve maternal health, vi) to combat HIV/AIDS, malaria, and other diseases, vii) to ensure environmental sustainability and viii) to develop a global partnership for development. Out of the eight goals, first five are directly related to employment opportunity, income generation, awareness building and food availability for the people who are below the poverty line and do not own any land, vulnerable and destitute. To achieve those targets, the government of Bangladesh has a number of ongoing and newly introduced Poverty Alleviation Programs (PAPs). Priority was given to the social sector including social safety net programs. The main objectives of those programs were to reach the poorest of the poor areas and to enhance their livelihood. Few other PAPs are; Food For Work Program (FFWP), Vulnerable Group Development Program (VGDP), Road Maintenance Program (RMP) and Food For Education Program (FFEP). However, most of the programs could not attain the desired success. Farid (2012) argues that the distribution of benefits from public spending at all levels of rural education was rather regressive. The bottom 20 percent of household received 13.8 percent of public spending on rural education. In contrast, the top 20 percent received 28.8 percent of such rural expenditure. On the other hand, the largest public food distribution programs like; FFWP and VGDP are predominantly relief operations and RMP is a mainly employment generation program suffered from a relatively high level of system leakage. Despite all of this, Bangladesh has made reasonably good progress in its effort at reducing poverty and achieved some success in following sectors. The decline in poverty was more rapid in the 1990s than during earlier decades. Between 1991 and 2004, the poverty head-count ratio fell by 58% to 40%. Net enrollment of primary education has also been rapidly increased from 60.5% in 1991 to 91% in 2007. It was also found that the gender equity situation has improved as the ratio of girls and boys in primary education was 0.83 in 1991, but it has increased by 1.03 in 2007. Under five years mortality rate (per 1000 live births) has reduced significantly from 146 in 1991 to only 67 in 2006. Maternal mortality ratio (per 1,00,000 live births) has improved as it was 574 in 1991 and it became 348 by the year of 2008.

This progress of 'poverty reduction' is also a debated and challenged issue as Macleod (2007) argued that the various international MDG monitoring sites have reported that between 1991 and 2000 Bangladesh's $1/day poverty rate rose from 36% to 41%. Different from the claim of Bangladesh's own 2005 national MDG report. National poverty estimate in Bangladesh is on track to achieve MDG 1, but Global Monitoring Agencies says poverty and inequalities are rising. This so called 'progress' might be only due to the people who were just below the poverty line have escalated up, but other majority of the excluded and vulnerable people are below the poverty line. They are the ones who do not own any land and essential capital to invest to make their ends meet. Hence, any opportunity to use their existing homestead for fruits and vegetables cultivation will directly benefit them and contribute in alleviation of their poverty.

1.2 Existing Studies on Kitchen Gardening in Bangladesh

Empirical studies show that the people who do not own cultivable land, but are engaged in kitchen gardening can still increase their income and family nutrition. Rahman et al. (2008) has conducted a study on kitchen gardening and its contribution on food security in Bhaluka, Trishal and Gaforgaon Upazilas of Mymensingh district, Bangladesh. It was found that most of the respondents were middle aged having a small farm size and primary level education. Vegetables production, consumption and caloric uptake of the respondents were increased by 60%. It was shown that nutrient contribution from the produced vegetables through kitchen gardening fulfilled 100% Recommended Dietary Allowance (RDA) requirement of Vitamin A, Vitamin C and iron, including 87% of calcium and 47% of protein. In addition the majority of the respondents (45%) having kitchen garden earned satisfactory annual income.

A similar kind of research on kitchen gardening was conducted by Ali (2008), in different agro ecological regions of Bangladesh. He observed that in most of the months in a year farmers were able to fulfill their daily requirement of vegetables through kitchen gardening. Vitamin A and C were met along with fulfillment of iron and calcium. Moreover, women's employment was created along with cash income. Thus, kitchen gardening helps to improve food security and reduce nutritional deficiency. The author has also suggested that the nutritional education is crucial for mitigating nutritional deficiency and sustainability of vegetable gardening. Similarly, widespread dissemination of the technology among the small farmers of Bangladesh is recommended by creating mass awareness through media, development partners and NGOs.

Another research was conducted by Al-Mamun (2010), on homestead vegetable cultivation, food security and income. A field survey was conducted at the Raichow village under Comilla district to investigate the vegetables production and its impact on family nutrition, income generation and involvement of female members to this activity. On the basis of farm category highest number of farmers are marginal (44%), followed by landless (28%). The production of kitchen garden provides the household with direct access to important nutrients that may not be readily available or within their economic reach. In addition, kitchen gardening increases the diversity of foods, which in turn leads to overall better utilization of nutrients. It has been shown to be a source of additional income for the household. Study suggests that this additional income is generally utilized to purchase additional food items and further increasing the diversification of the diet. Finally, kitchen gardening is especially important in overcoming seasonal availability of foods and promotes household self-sufficiency. Women are the main caretakers of the garden, which empowers them, ensures better utilization of the income from the garden for food and increases family welfare. All these benefits are important contributions towards poverty alleviation.

Hassan and Sultana (2011) have conducted research on almost the similar topic 'Food and Economic Security through Homestead Vegetable Production by Women in Flood Affected "*Char*" Land.' A total of 150 respondents were selected using simple random sampling technique. It was revealed that most of the respondents were illiterate. They had an average vegetable farmland of about 6.71 decimals and spend 3.20 hours/day for cultivating vegetables in their homestead areas. Different type of vegetables like; spinach, bitter gourd, cowpea, pumpkin, okra, water spinach, pointed gourd were being grown in the summer season and red amaranth, brinjal, tomato, bean, radish, pepper in the winter season. All these vegetables provided food security as well as economic security to the respondents who pointed out that March and September were the most food insecure months. A considerable portion of all these vegetables was consumed by the respondents for their own families which provided food security to them. They also earned some money by selling the excess amount of vegetables which provided economic security to them. The respondents of the study area faced some problems regarding kitchen gardening. Among the problems; lack of capital, lack of irrigation water during drier period and lack of good quality seeds were the most prominent.

All the existing researches show that kitchen gardening can provide vegetables and fruits for round the year for family consumption. Moreover, rural farmers including landless can sell their additional product in the market and earn a significant amount of cash income. It is also contributing to enhance family nutrition, especially for women and children who are directly related to major MDG targets of Bangladesh like; poverty alleviation and reduction of under-five mortality and maternal mortality rate. Realizing this fact Rural Development and Cooperative Division under the Ministry of Local Government, Rural Development and Co-operatives, government of Bangladesh has also launched a unique project titled 'Ektee Bari Ektee Khamar (One house one farm) with a target of improving the welfare of rural people. Initially the estimated cost of five year project was Taka (Tk.) 11.97 billion (1 US $ = 78.85 Taka) and it was revised for four years project (2009-2013) with the budget of Tk. 14.93 billion. The implementation phase of the project has already started and it will cover all 483 Upazilas (sub district) of the country (Paul, 2012).

Considering the importance of kitchen gardening, this action research project was undertaken. All researchers under this project believe that when people use their own knowledge and wisdom to work towards a common goal, their efforts will be sustainable. The underlying premises of this interaction were: a) not to impose any instructions to the community people, b) not to put forward any preconceived judgments, c) let them feel free in making their own discussion, d) let them find their own problems, e) let them be free to take initiatives and f) let them evaluate their own action and its outcomes.

1.3 *Bagdi* Villages under the Project

Bangladesh has approximately 50 ethnic communities and numerous others who are marginalized. Like many other communities, *bagdi* is one of them and it is known differently in different places and regions. Somewhere they are called "*munda*," in some places called "*buno*"(living in the forest) and some other places they are known as "*sardar*"(hunter). Recently these marginalized communities have achieved the status of *adibashi* (indigenous disadvantaged) in Bangladesh. Over the years, these communities have become more vulnerable due to social, economic and political deprivation. They are too powerless to defend themselves from discrimination, extortion, and injustice. They are neglected by the mainstream society and often considered as untouchable. As a result they lack access to resources and capital, which limits their decision-making power. Their options are thus limited. The social system is averse to their attainment of self-sufficiency. Traditionally, *bagdi* communities have been engaged in wage laboring and fishing in open water bodies for their livelihood. Few of them also used to engage in agricultural activities through cleaning the lands covered by bushes. Occasionally, they also used to hunt wild animals and used to reside in forest areas. However, in the context of widespread deforestation and decreasing water bodies in the countryside, these people became more vulnerable. Most of the *bagdi* families do not have their own land and often they need to find waged-work for their livelihood. Additionally, too little income earned from wage laboring is not enough to support the whole family. Eventually, they cannot afford even three meals in a day. Parents cannot afford to send their children to school. Even if some children occasionally go to school they are often not allowed to sit in the front bench or to be close to Muslim or Hindu students due to the social prejudice. Considering the overall situation, the specific objectives of project were; i) Presenting a number of modern, high yielding homestead agricultural production technologies from which the *bagdi* members can select the appropriate one to cultivate suitable fruits and vegetables round the year. ii) To enhance intake of vegetables and fruits for ensuring family nutrition for sustainable livelihoods and to increase cash income. iii) Introducing homestead group discussions, the formation of *gono gobeshok* groups (People's Research groups), and practice of *gono gobeshona* (people's research) to cultivate fruits and vegetables at their homestead.

2. Methodology of the Study

In order to understand the nature of people's participation in the kitchen gardening project and its impacts on household income and consumption a detail field study was conducted. Three *bagdi paras* were taken from three neighboring villages named; Johourpur and Telkup under Bagharpara Thana, Jessore district and Chakulia under Kaliganj Thana, Jhenidha district. All *bagdi paras* are between 20 to 25 km. away from the district town Jessore. Generally, the *bagdi* people do not own cultivable land except small homestead. They maintain their livelihood through wage laboring and some low paid works. Most of their earnings were used to buy rice and other essential food items. Sometimes, few households used their homestead to grow local fruits plants and vegetables. Low productivity and poor net return obtained from these species call for adopting well-planned homestead agricultural practice through combing traditional and high yielding technologies. Considering the situation, researchers reviewed literature and survey reports on newly introduced vegetable varieties by Bangladesh Agricultural Research Institute (BARI) and other relevant institutions. Before initiation of the project, researchers visited many marginalized communities in different areas several times and discussed with them for a long time regarding their family, income, land holding and other available resources to them. Finally, three neighboring *bagdi paras* (number of *paras* constitute a village) from three different villages were selected. These *paras* were selected because all these were similar in nature regarding their land holding, occupation, education and they were much interested to practice kitchen gardening. Among the three *bagdi paras* Johourpur consists of 35 families, Chakulia 22 families and Telkup 26 families. All 83 families were taken under this project. The following strategies were undertaken to make the project popular; i) All the *bagdi* families were taken under the project to avoid unwanted jealousy or grouping among the villagers. ii) Selection of vegetables and fruits varieties were done through active participation of members. iii) Information through leaflets and pictures of different vegetables and fruits varieties were supplied. iv) Initial inputs and technical knowledge; training, partial primary seeds, and essential materials required for demonstration were supplied by the research organization.

Both the primary and secondary data were collected for the present study. Primary data were collected through a structured questionnaire. All the *bagdi* families in different villages, under this kitchen gardening project were interviewed in detail. Key informant interview and focus group discussions were also made. Additional information was collected through the minutes of regular weekly meeting and group discussion held among the *bagdi* people. Secondary information was collected from Union Parishad, concerned research organization, newspaper and other informal sources.

All the collected data through survey questionnaire was tabulated according to the objectives of the study. In this process, the authors have interpreted the data and put them into the perspectives in relation to their first hand survey results and their observation in the fields. Furthermore, the researchers analyzed the findings and showed the implication.

2.1 Research Process

The action research is planned from the conviction that farmers have important knowledge and they act rationally within their own world. Considering this, people's participation in every stage of the project was ensured. Initially, several personal visits were made which involved talking to the people, watching homestead areas and discussing the present status of their left over land at homesteads. During this time people's interest in productive activities was explored. After that several steps were taken which can be summarized as follows;

Stage -1

Before initiating the action research project few local students and volunteers were searched from *bagdi* and neighboring villages. They were explained well regarding the probable projects in their locality. All volunteers worked as a facilitator or an animator. Villagers were introduced with the help of local volunteers. Facilitators helped to get people together in respective villages into groups and try to hold discussions concerning their livelihood and agricultural activities. Gradually, they inculcated the habit of gathering by themselves. Later on, they fixed up a specific day in a week to get together and discuss their livelihood improvement strategies. At the beginning, the authors wanted to make several groups in each village, however villagers suggested not to do that. They showed the reason as they are only about 30 households which can sit together in one group. In the process, people found their unused resources, like homestead as a potential resource for vegetables and fruits cultivation. During this time, information like modern vegetable varieties introduced by the Bangladesh Agricultural Research Institutes (BARI) was provided. They were also showed few pictures of some vegetable varieties like tomato, beans and leafy vegetables which can be produced round the year.

Stage -2

At this stage, farmers discussed about their existing kitchen garden and its contribution in family food supply. During this time, a discussion session regarding 'food values of different vegetables and its role in human body' was discussed informally. After that session, farmers have assessed their existing homestead vegetable production to be very seasonal and can provide only one to three months of family demand. They also found that the majority of the household do not produce vegetables. Continuing such discussion, they became more interested in vegetables and fruits production by their own at their homestead. During this time the villagers were shown different types of existing homestead vegetable producing models like; Kolikapur model, Lebukhali model, Kolapara model, Tangail model, Att Kopalia model, Rangpur model, Borendra model and Faridpur model, etc. However, villagers felt difficulties in understanding such systematic models. Most of the existing vegetable producing models, such as Kolikapur model suggested that kitchen garden field should be 6 × 6 meters and selected space should be the high land with all sides open. Similarly, Kolapara model suggested field size of 5 × 5 meters with 5 vegetables beds and mentioned the name of varieties should be cultivated in different seasons. Considering little space at homestead, villagers have expressed their views differently as; i) they have very little space for vegetable production and is not suitable to follow the model, ii) shape and sizes of their space is not suitable for those models, iii) few people do not like to produce a couple of vegetable varieties which were mentioned. Under such a situation, they were given free choice to adapt a number of vegetables and fruits varieties which are grown locally as well as newly introduced varieties from different research organizations in Bangladesh. The farmers were indirectly encouraged to combine a numbers of vegetables and fruits varieties so that they can receive year round production.

Stage -3

Under this process, villagers have gradually allocated homestead land, made fence, selected different types of vegetables and fruits varieties and combined them in such a way so that this can be produced round the year. During this stage, a demonstration field was introduced in the Johourpur village in which new technology like high breed tomato, *bati sakh, gima kolmi* and other new varieties were cultivated with the assistance of experts. Farmers easily learned the technology and implemented this to their own homestead. Simultaneously, farmers have also been continued their traditional practices of producing pumpkin, bottle-gourd and similar varieties on their house roof. They combined both the traditional and new varieties of vegetables and fruits at their homestead. Within a couple of months it was found that vegetable gardens in every household, with tomatoes, *lal sakh*, and beans are bursting from each plant and other vegetable plants are looking very healthy and promising (Picture 1). The concerned people hoped that their confidence had gone into their heads and that the practice would sustain.

Picture 1. A small mixed vegetable plot in *Bagdi* village

Stage -4

At the end of the year most of the farmers found present practices of vegetable cultivation has increased their family vegetable production and consumption. The majority of the households produced year round vegetable and remaining households produced vegetables for at least six to nine months (Picture 2).

Picture 2. A small plot with tomato and brinjal

Now the people of the *Bagdi* community are well aware about the agricultural technology and nutritional values of different vegetable and fruit varieties. Still they found problems in the existing production system; i) Few seeds (*lal sakh*) supplied by the research organization did not germinated properly, ii) During rainy season most of the vegetable varieties damaged by heavy rain and water logging. However, farmers themselves solve the problems through group discussion and using their practical experiences. As they saw some vegetable varieties, like lady finger, *gima kolmi*, arum, green banana and papaya can survive during rainy season. Hence, they decided to cultivate them especially during rainy season. Moreover, if *gima kolmi* and papaya green are cultivated they can be harvested for two years and leafy arum stayed for a whole decades. They also found local seeds of lady finger is much rain tolerable than the hybrid one. Hence, the farmers planned their future gardening incorporating their practical knowledge and experiences.

Stage -5

During this stage, farmers made several varieties of seeds by themselves for the next year. They have produced seeds like; spinach, pumpkin, beans, bottle-gourd, brinjal, and *lal sakh*. Few others vegetable seeds were collected and bought locally by themselves. Many of the farmers, mainly women promised to distribute their excess seeds to others without any returns. This process of technology transfer was not confined within the *bagdi* communities only. Many neighboring people from Hindu and Muslim communities also learned kitchen gardening technology. This technology of kitchen gardening was also disseminated to the neighboring *rishi* (cobbler) and fishermen communities and found the same results.

3. Result and Discussion

3.1 Socio-economic Characteristics of the *bagdi* Households

Bangladesh is an agrarian country and the majority of the people depend directly or indirectly on the agricultural sector for their livelihood. So, land is one of the most valuable assets in rural Bangladesh. Among other criteria, education and occupation status are also determining factors of socio-economic status in rural population.

3.1.1 Land Holding and Family Size of *bagdi paras* and Bangladesh

Patterns of land distribution in different villages indicated that the majority of the *bagdi* households is landless. Table 1 shows the land holding pattern of the *bagdi para* and Bangladesh. Data reveals that about 89%, 83% and 81% of the *bagdi* households in Johourpur, Chakulia and Telkup, respectively are landless compared to the national level is only about 39%. Similarly, less percentage of *bagdi* household's fall under small farm category as they were 9% in Johourpur, 17% in Chakulia and 19% for Telkup compared to the national level (50%). None of the medium and large category farmers were found in Chakulia and Telkuop except about 3% medium farm in Jhourpur. However, about 10% and 1% of the medium and large farms were found in national level, respectively. Data implies an asset less situation of *bagdi* families and the necessity for alternative income generation or supplementary earning options available for them.

Table 1. Farm categories in different *bagdi pars* and national level

Villages	No. of household	Farm categories			
		Landless	Small	Medium	Large
Johourpur	35	88.57	8.57	2.86	0
Chakulia	22	82.60	17.39	0	0
Telkup	26	80.77	19.23	0	0
National Level	**All households**	**38.62**	**49.86**	**10.34**	**1.17**

Source: Field survey, 2011 and Statistical Pocket Book Bangladesh 2008

Note: Landless farm is with 0.0 - 0.49 acres of land, small is with 0.50 - 2.49 acres of land, medium is with 2.50 - 7.49 acres and large farm with 7.50 acres and above acres of land.

3.1.2 Education Level

In general, the literacy rate is very low in Bangladesh and it is much lower among the ethnic and marginalize communities. Table 2 shows the education level in different *bagdi paras*. Data shows that a significant percentage of the population aged over 20 can only sign their name. This type of population was 30% in Johourpur, 21% in Chakulia and 22 % in Telkup. Similarly, a very less percentage of the population has attained class V-IX as it was 16%, 13% and 10% for Johourpur, Chakulia and Telkup, respectively. Data shows that only 2% of the household members in Johourpur have graduated, but none was graduated in Chakulia and Telkup. Even considering the person who can sign only as educated, still only 55%, 36% and 39% of the population are educated in Johourpur, Chakulia and Telkup, respectively.

Table 2. Level of education among the population of *bagdi paras*

Villages	Level of education (above 20 years of old)				Total %
	Only Signature	V -IX	X - XII	Above XII	
Johourpur	29.60	16.32	7.14	2.04	55.10
Chakulia	20.60	13.07	2.11	0.00	35.78
Telkup	22.35	10.37	5.77	0.00	38.49

Source: Field survey, 2011

Education plays an important role in the family as well as country's development. Literacy status also determines jobs patterns. Educated people from rural areas can easily get job in city areas and move upward in economic status. Due to widespread illiteracy and landlessness, the majority of the *bagdi* population tries to find their job in rural areas and are mostly engaged in low paid jobs. Under such a situation, the kitchen gardening was found as a supplementary family income and nutritional sources for them.

3.1.3 Occupational Pattern

Due to the unavailability of job and low level of incomes, rural people try to find different types of alternative income sources by employing their available family labor. Although most of the *bagdi* families are landless, still agriculture is the predominant occupation for them. Land poor *bagdi* families try to mitigate the land shortage problem through sharecropping and lease or mortgage in land from neighboring rich farmers. Table 3 shows the occupational structure of the *bagdi* households in different villages. Data indicates that 51 % of the households have taken farming as their major occupation in Jhourpur village. A significant portion (17%) of families is engaged in wage laboring. Only about 9 % of the households are engaged in the service sector. Again a significant number of the families (14%) have taken the *van* pulling as their main income source. A small proportion (3%) of the families is engaged in shop-keeping and 6% of the population has engaged in other different jobs.

Table 3. Occupational structure of the different *bagdi paras*

Occupational category	Johourpur	Chakulia	Telkup
Farmer **	51.43	34.38	48.57
Labor	17.14	28.72	24.72
Services/business	8.57	3.58	9.35
Van pulling	14.29	22.20	9.23
Shop keepers	2.86	3.58	5.07
Others	5.71	7.54	3.06
Total	100.00	100.00	100.00

Source: Field survey, 2011

**** Note:** Although majority of the *bagdi* families are landless, but many of them are considered as a farmer through leasing or mortgaging in land from neighboring land owner farmers.

Similarly, about 34% of the population found farming as their main occupation followed by 29% in day laboring and service, van pulling, shop-keeping and other job engagements were about 4%, 22%, 4% and 8%, respectively in Chakulia. Similar pattern of job engagement was found in Telkup. The highest number (49%) of the population has taken farming as their main occupation followed by (25%) day laboring. About 9% of the household were doing service/business and same (9%) percentage of the population was engaged in van pulling. Few people (5%) were also engaged in shop keeping and others (3%) were in different occupations. Rural job market in Bangladesh is extremely competitive due to over population. Under such a situation, people are often engaged in low remunerative irregular occupations like small business, van pulling, day laboring and lease in or sharecrop land even by paying a higher share or rent. Moreover, female family members are almost unemployed. Considering the situation, *bagdi* families found kitchen gardening as a regular income source and nutrition enhancing activities.

3.1.4 Annual Income of National Rural Households and *bagdi* Households

The annual monthly income of the *bagdi* community is much lower compared to the national rural income level. Table 4 shows national rural and *bagdi paras* monthly income distribution. Data reveals that a higher proportion (49%) of the population from *bagdi* families fall into the lower income group (up to the Tk. 2,499), which is much higher (9.71%) than the national level. Comparatively, a higher number of *bagdi* families (46%) fall under the income level of Tk. 2,500 - 4,999 which is also significantly higher (27%) than the national rural income level.

Table 4. National rural and *bagdi paras* monthly income distribution in Taka (Tk.)*

Income Group	National Population (%)	Population in *bagdi para* (%)
Up to 2,499	9.71	49.00
2,500 – 4,999	26.77	45.71
5,000 – 7,999	24.22	3.43
8,000 – 12,499	18.60	1.86
12,500 +	20.70	0.00
Total	100.00	100.00

Sources: 1. Field survey 2011.
2. Report of the Household Income and Expenditure Survey, 2010 (Pp.202). (Income range is modified considering the purpose of study)

***Note:** 1 US $ = 78.85 Taka (Tk.).

If we consider the middle-income group (5,000–7,999),we can see that the proportion is significantly less (3%) for *bagdi* compared to the national level income as 24%. Again, only about 2% percent of the *bagdi* families fall under the higher income group (8,000 -12,499) compared to the national level of 19%. None of the *bagdi* families were found in the higher income level (12,500 and above), but nearly21 % of national rural families are under this income group. The result shows the economic status and vulnerability of the *bagdi paras*. The majority of the *bagdi* families falls below the poverty line. Under such situation, additional income and nutrition sources like kitchen gardening positively affect their family wellbeing.

3.2.1 Homestead Farm Activities under the Project

Large scale vegetable production in the field was very rare among *bagdi* community. Recently villagers have introduced kitchen gardening and produced a significant amount of vegetables and fruits. After meeting their family consumption they have sold out part of their product to the market and have added it to their family earnings. Chart 1. shows different vegetable and fruit varieties and the duration of such vegetables. *Bagdi* households from Jhourpur, Chakulia and Telkup have tried their best to combine as much vegetable varieties as possible in such a way that can provide vegetables and fruits round the year. Due to limited space in homestead few farmers could not achieve year round production. However, they have given best effort to increase the duration of vegetables and fruits availability.

Chart 1. Combination of different vegetable and fruit varieties which farmers practiced

SN	Verities	Jan.	Feb	Mar.	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	Tomato (*lycopersicon esculentum*)	■	■	■	■								■
2	Bitter Gourd (*Momordica charantia*)	■	■	■									■
3	Pumpkin (*Cucurbita maxima*)				■	■	■	■	■	■	■		
4	Gima Kolmi (*Ipomoea reptants*)	■	■	■	■	■	■	■	■	■	■	■	■
5	String Beans (*Vigna sesquipdalis*)	■	■	■									■
6	Lal Sakh (*Amaranthus gangeticus*)	■	■					■	■	■		■	■
7	Data Sakh (*Amaranthus lividus*)	■	■	■									
8	Spinach (*Spinacia oleracea*)	■	■	■								■	■
9	Data (*Amaranthus*)			■	■	■	■	■					
10	Bottle Gourd (*Lagenaria siceraria*)	■								■	■	■	■
11	Pui Sakh (*Basella alba*)				■	■	■	■	■	■			
12	Okra (*Ablmoschus esculentus*)						■	■	■	■	■		
13	Brinjal (*Solanum melongene*)	■	■	■	■	■	■	■	■	■	■	■	■
14	Leafy Arum (*Xanthosoma*)	■	■	■	■	■	■	■	■	■	■	■	■
15	Radish (*Raphanus sativus*)	■	■	■								■	■
16	Jhinga (*luffa acutagula*)				■	■	■	■	■				
17	Bitter Gourd (*Momordica charantia*)				■	■	■	■	■				
18	Guava (*Psidium guajava L.*)	■	■	■	■	■	■	■	■	■	■	■	■
19	Green Banana (*Musa paradisca*)	■	■	■	■	■	■	■	■	■	■	■	■
20	Papaya Green (*Caricaq papaya*)	■	■	■	■	■	■	■	■	■	■	■	■
21	Banana (*Musa acuminata*)	■	■	■	■	■	■	■	■	■	■	■	■

Source: Field survey, 2011

3.2.2 Changes in Vegetables and Fruits production

Few farmers in *bagdi* communities have been practicing kitchen gardening since long time. However, the production was low and they have never combined vegetable varieties for year round production nor they have taken it as their sources of income. Table 5 shows before initiating the project only very few farmers use to cultivate vegetables and fruits in their homestead. Only 11 families use to cultivate vegetables and fruits in Johourpur compared to 8 and 9 families in Chakulia and Telkup, respectively.

Table 5. Number of vegetables and fruits producing households (H.H.) and their average production before and after implementation of the project.

Villages	No. of H.H.	No. of vegetable and fruit growers and their production (kg.)			
		Before Project		After Project	
		No of H.H.	Production	No. of H.H.	Production
Johourpur	35	11	139	32	390
Chakulia	22	8	109	19	267
Telkup	26	9	116	23	225
Total	83	28	121 (average)	74	294 (average)

Source: Field survey, 2011

However, after initiating the project almost all farmers have started kitchen gardening. As data shows the number of vegetables and fruits cultivating farmers have increased 11 to 32 in Johourpur, 8 to 19 in Chakulia and 9 to 23 in Telkup. Similarly, after initiating the project vegetables production per farm has also increased from 139kg. to 390kg. in Johourpur, 109kg. to 267kg. in Chakulia and 116kg. to 225kg. in Telkup.

3.2.3 Vegetable Production and Consumption

After implementation of the project *bagdi* families in different *paras* have earned a significant amount of income through the sell of vegetables and fruits. They have planted trees like banana, papaya, and guava (Chart 1) which can be produced within one year and continuously provide fruits for couple of years. Table 6 shows in an average a farmer from Johourpur village produces 390kg. of vegetables and fruits in which 210kg. was used for family consumption and the rest 180kg. was sold to the market. Similarly, the farmer in Chakulia produces 267kg. from which 143kg is used for family consumption and the rest 124kg. was sold. A farmer from Telkup produces 225kg. of fruits and vegetables out of the total, 121kg. was for consumption and the rest (104kg.) for the market. It was also found that farmers in different villages earned different amount cash income for instance it was Tk.7,800 in Johourpur, Tk. 5,340 in Chakulia and Tk. 4,500 for Telkup.

Table 6. Yearly vegetables and fruits production (kg) and gross return.

Villages	Vegetable production	Family Consumption	Marketed Vegetable	Gross Return (Tk.)
Johourpur	390	210	180	7,800
Chakulia	267	143	124	5,340
Telkup	225	121	104	4,500
Average	294	158	136	5,880

Source: Field survey 2011

Note: Vegetable price fixation: Since many of the vegetable varieties were sold by not considering the quantity like; kg. or Pound. Most of the leafy vegetables were sold as a bunch and other vegetable like papaya green, green banana, pumpkin, bottle gourd etc. were sold considering the sizes and number of the commodity. Considering other issues like price fluctuation in different seasons and varieties, villagers themselves have reasonably calculated the average price of vegetable is Tk. 20 per kg.

3.2.4 Share of Income from Vegetables and Fruits Production

All *bagdi* families under this project have earned a significant share of family income through vegetables and fruits production. Table 7 shows that a farmer in Johourpur village has earned about 14% share of the annual family income through kitchen gardening. Similarly, a farmer from Chakulia and Telkup earns 12% of total income from kitchen garden. The total annual income was highest for Johourpur (Tk. 48,390) followed by Chakulia (Tk. 44,475) and Telkup (Tk. 38,700).

Table 7. Share of income from vegetable cultivation in kitchen gardening

Villages	Annual income	Share of income from vegetable cultivation (%)
Johourpur	48,390	13.85
Chakulia	44,475	12.01
Telkup	38,700	11.63
Average	43,855	12.50

Source: Field survey, 2011

3.2.5 Changes of Vegetables and Fruits Consumption

It is usual that when farmers have available vegetables and fruits at their homestead they will consume more. Table 8 shows that farmers in all *bagdi paras* are consuming more vegetables and fruits after implementing the kitchen gardening project. Before the project, per capita daily vegetable consumption in Johourpur was only 62gm which has increased to 111 gm after implementing the project. Similarly, per capita vegetable intake has increased from 41 gm to 77gm in Chakulia and 34 gm to 68 gm in Telkup.

Table 8. Vegetables and fruits consumption before and after implementation of the project

Villages	Vegetable and fruit consumption	
	Before the project (gm)	After the project (gm)
Johourpur	62.22	111.28
Chakulia	40.67	76.82
Telkup	34.22	67.65
Average	45.70	85.25

Source: Field survey, 2011

4. Conclusion and Recommendation

Active participation of community people has played as a propelling factor to attain desired success in kitchen gardening among *bagdi* villages. In all the stages of project planning, acting, observing and reflecting, people's participations were ensured. Farmers identified their own problems and found a solution by themselves. Majority of *bagdi* families in studied villages are under landless category and have little space in homestead. Their land holding status is much more vulnerable compared to the national average. It refers that options of income sources are limited for them. Under such situations, kitchen gardening became one of the viable options to enhance their livelihood. Other existing empirical research also have found the similar results as kitchen gardening practices providing employment opportunities and cash income with family food security. These opportunities and benefits provided by kitchen gardening have brought wellbeing not only for the large farmers but also for landless and marginal farmers.

The literacy rate is also very low among *bagdi* families. Only about 20% of *bagdi* population aged above 20 years can read and write. It refers that neither they have better job opportunities in urban area nor they have land in rural areas to employ themselves in agriculture. In such a situation, kitchen gardening practices have become an attractive option among *bagdi* families. Most (about 45%) of the *bagdi* families are still engaged in farming, but majority of them are landless. It implies that farming occupation with a small amount of land cannot meet the family food requirement. Another 50% of the households are engaged in low paid occupations like wage laboring, van pulling, shopkeepers, construction worker etc.

Bagdi population has found a number of traditional and modern vegetable and fruit varieties and combined them to get available products over the year. They have also identified and tried to cultivate few vegetables and fruits varietie like *gima kolmi*, papaya, green banana, guava which can provide food round the year. It was also found that farmers identified the problems regarding kitchen gardening and tried to get way out by themselves. This indicates that local people are the best researchers in their own world. It suggests that development plans of the government should be formulated through consultation with the local people.

Finding shows that the project itself encourages *bagdi* community to practice kitchen gardening. Many new families adapted modern gardening method in all the studied villages. It was possible because community people actively participated. Still some families could not cultivate vegetables and fruits due to lack of space at their homestead. *Bagdi* families produce different type of fruits and vegetables, but the quantity is not much.

Despite an unavailability of land in the homestead area, they are producing a significant amount of vegetables and fruits, because they have introduced better farm practices in their homestead area. Farmers consume about half of the vegetables and fruits they produce and the rests are sold out to the market. It implies that kitchen gardening is not only enhancing the nutritional status but also contributing a significant share of family income.

Vegetables and fruits consumptions also have increased among *bagdi* communities which have direct impacts on family health, especially for the women and children who are chronically deficient in vitamin A and C. This is directly related to the MDGs of Bangladesh government as it was targeted; eradication of extreme poverty and hunger, reducing child mortality rates, and improving maternal health. Findings also show that after adapting the kitchen gardening per capita vegetable and fruit consumption became doubled (85gm) among all the *bagdi* families and it is much more than the national average of 28gm.

Bagdi families are not only land poor but also are socially and economically vulnerable. It was found that the majority of the *bagdi* households fall under the lower income category compared to the national income level. It also implies that traditional land based government support (subsidy on fertilizers, diesel for irrigation etc.) and social safety net programs for poverty alleviation does not work effectively to improve the livelihood of millions of landless and marginalized people. Due to lack of physical assets, power and capital, these people have been suffering for a long time. These types of marginal communities have constituted more than 10% of the total population. Considering this, government should undertake location specific special development programs for

marginalized people to enhance their livelihood so that a significant portion of the hardcore poor can escalate the poverty line.

Bagdi is one of the marginalized communities in Bangladesh and recently they have achieved *adibashi* status. Occasionally government provides them special support like in constructing *adibashi* community centers, providing funds to buy a cow or including a few of them under social safety net programs. However, this type of donation does not work effectively. But, collectively they became successful in kitchen gardening project at their homestead. Now people of the *bagdi* community are well aware about the kitchen gardening technology and nutritional values of different vegetables and fruits. They have acquired knowledge and skills of kitchen gardening that have ultimately enhanced their family income and nutritional status.

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