A Seminar Paper on

Roof top gardening in Bangladesh- An approach of fruits and vegetable production for family consumption

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Submitted to

Dr. A. K. M. Aminul Islam
Professor
Dr. Md. Mizanur Rahman
Professor
Dr. Dinesh Chandra Shaha
Associate Professor
Dr. Md. Sanaullah Biswas
Associate Professor
BSMRAU, Gazipur

Major Professor
Dr. Md. Azizul Hoque
Professor
Department of Horticulture
BSMRAU, Gazipur

Submitted by

Mozammel Haque
Reg. No.: 15-05-3551
Ms student
Term: Summer 2020
Department of Horticulture
BSMRAU

BANGABANDHU SHEIKH MUJIBUR RAHMAN AGRICULTURAL UNIVERSITY
GAZIPUR-1706

ABSTRACT

Rooftop garden plays an important role in the mental well-being of the gardeners as well as in amelioration of the physical environment. The production of fresh fruits and vegetables of the rooftop garden can increase nutritional status of household members of the urban citizens and it will make a positive contribution to the environment. As part of the project activities, the baseline study was undertaken to assess the current situations and characterize the potential issues of rooftop gardening in Dhaka city. Urban population in the cities of developing countries are growing rapidly which also means the number of low-income consumers is increasing. Because of this, food insecurity in these cities is increasing. Urban agriculture (UA) contributes to food security by increasing the supply of food and by enhancing the quality of perishable foods reaching urban consumers. The exploration of local socio-economic and institutional conditions that might promote and hinder urban agriculture is needed to implement policies that effectively integrate agriculture into the urban environment. This study aims to identify the potential for and barriers to UA with reference to rooftop gardening (RTG) and to explore strategies to promote food security in Dhaka. The study was carried out in 6 (nine) selected metro areas of Dhaka city namely Mohammdpur, Mirpur, Gulshan, Uttara, Kamrangirchar and Tejgoan and 2 areas oh Khulna city namely Nirala and Sonadanga. The study used both primary and secondary data as well as quantitative and qualitative data and information. Purposive and proportionate random sampling technique was adopted for selecting the sample size. Out of 300 targeted beneficiaries (sampling frame), a total of 142 (47.3%) sample households were selected for the study. The sample size was 97 which represent by 64.6% of the total sampling frame. The required data/information was collected through household survey using pre-tested semi-structured questionnaire.

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CHAPTER I

INTRODUCTION

Bangladesh is identified as one of the susceptible international locations as a sufferer of detrimental have an impact on of local weather change. The main improvement challenges of us these days consist of poverty alleviation, sustainable improvement and surroundings administration in the context of swiftly developing population. Urban ecology is the direct sufferer of the diminishing veggies contributing to some extent toward world warming. In Bangladesh, due to migration from rural place to city place populations in the cities are growing swiftly therefore the numbers of low-income customers are additionally growing in cities. Urban agriculture can supply city-dwellers with a supply of sparkling produce, accelerated food plan and essential family budgetary savings. Vegetated surfaces furnish essential sound insulations homes and are frequently employed for their noise discount doable in city settings. Green roofs can supply vital noise discount possibilities for buildings. It may additionally additionally generate employment and financial services thru its backward and ahead linkages. Koc et al.(1999); Mann (2001); Bellows and Hamm (2003); Hamm and Bellows (2003) noted that rooftop backyard can complement the diets of the neighborhood as it components with clean produce and furnish a tangible advantages tie to meals production. With speedy and unplanned urbanization, incidence of city poverty and meals insecurity has been additionally growing alarmingly in Dhaka (Choguill 1995).Islam (2004) seen that Urban agriculture (UA) contributes to meals protection by means of growing the furnish of meals and by means of improving the fantastic of perishable meals attaining city consumers. He additionally counseled that robust political dedication and strong coverage hints are the preconditions for developing supportive surroundings for RTG.

Rooftop gardens guide the social life, as a area to be satisfied outside surroundings with household and friends. It additionally develops a experience of self identification and independence, the place one can in particular acquire self and emotion legislation viewing special flower detached seasons (Rashid and Ahmed 2009) and affords restorative ride from stressful daily things to do in city excessive upward shove residential building.

Rooftop backyard performs an necessary function in the intellectual well-being of the gardeners as nicely as in amelioration of the bodily environment. Roof gardening has additionally a promising plausible as small scale enterprise that can speed up extra household income. Nevertheless, it may additionally generate some employment services via its backward and ahead linkages. The manufacturing of clean fruits and greens of the rooftop backyard can be multiplied dietary fame of family contributors of the city residents and it will make a high quality contribution to the environment. Sajjaduzzaman (2005) said that the important reason of roof gardening are passing amusement time (100%), growing aesthetic values (100%), contributing in environmental amelioration (45%) and economic reap being a very minor subject (4% only) in Dhaka Metropolitan metropolis of Bangladesh. On the different hand, Rumana Rashid et. al., (2010) described the financial and social gain of roof pinnacle gardening along with clean meals furnish for city residents, converts the tough floor into smooth green surface, power saving, etc.). Many researches that display that there are many components of out of doors environments and inexperienced areas that are desirable to people, regardless of age (Ward Thompsoil, 2007).

RTGs ought to grant greater than 12,000 t year−1 veggies to Bologna (Itali), fulfilling seventy seven p.c of the city inhabitants‟ necessities (Orsini et. al., 2014). Beyond the advantages related with meals manufacturing and the herbal environment, neighborhood gardening is claimed to enhance human well-being (Okvat and Zautra2011). Together with the urbanization process, there has been a style in the quest for the inexperienced experience: at some point of history, each gardening and extra passive types of contact with nature (e.g. taking a stroll in a garden) have been identified as having intellectual fitness advantages (Davis 1998). Although restricted scientific reviews are reachable to date on the therapeutic position of neighborhood gardening, the gardening-related advantages in decreasing psychological problems e.g. in opposition to dementia (Simons et al. 2006), enabling stress restoration (Kingsley et al. 2009), or fostering cardiac rehabilitation (Wichrowski et al. 2005) are nicely known.

Dhaka is the biggest and quickest developing metropolis of Bangladesh. Rapid populace increase in Dhaka has created extreme stress on the land of the already overcrowded country. Agricultural lands have given way to housing tendencies and roads in an agriculturally based totally financial system like Bangladesh. With fast and unplanned urbanization, incidence of city poverty and meals insecurity has been additionally growing alarmingly in Dhaka (Choguill 1995).

Rooftop gardening can be a positive approach in ensuring meals furnish and enjoyable dietary desires of the inhabitants (Helen Keller International and Institute of Public Health Nutrition 1985). Rooftop gardening, though is being practiced in the town in many structure for years in the past, there have been infrequently any concerted effort on section of the Government, neighborhood groups and as properly the ordinary residents to combine it to city agriculture. Proper appreciation of the troubles and potentialities related with the adoption of insurance policies will contribute, to a fantastic extent, to elevated meals furnish in the city.

The key goal of the paper is to become aware of and discover the fundamental techniques to stimulate city agricultural increase in the town of Dhaka via analyzing the areas for improvement and re-development of rooftop gardening (RTG). Therefore the precise precedence goals are to inspect the present city agricultural insurance policies and exercise in the town with a precise reference to rooftop gardening; to discover the attainable areas the place coverage interventions are required for advertising rooftop gardening to meet the wants of Dhaka and to propose measures which leads to the components and profitable implementation of the insurance policies with regard to rooftop gardening.

The unique goals are cited below:

1. To study different techniques and other related aspects of roof top gardening.
2. To way out of producing fruits and vegetables for family consumption through roof gardening.

CHAPTER II

MATERIALS AND METHODS

This paper is absolutely a review paper. With a view to preparing this paper, all informations were collected from secondary sources. The topic related findings have been reviewed by internet browsing, studying extensively various articles and research papers published in varied journals, books, proceedings, dissertation available in online. Valuable suggestion and information were received from honorable major professor and course instructors. After collecting information, these were compiled and organized chronologically for preparing this seminar manuscript.

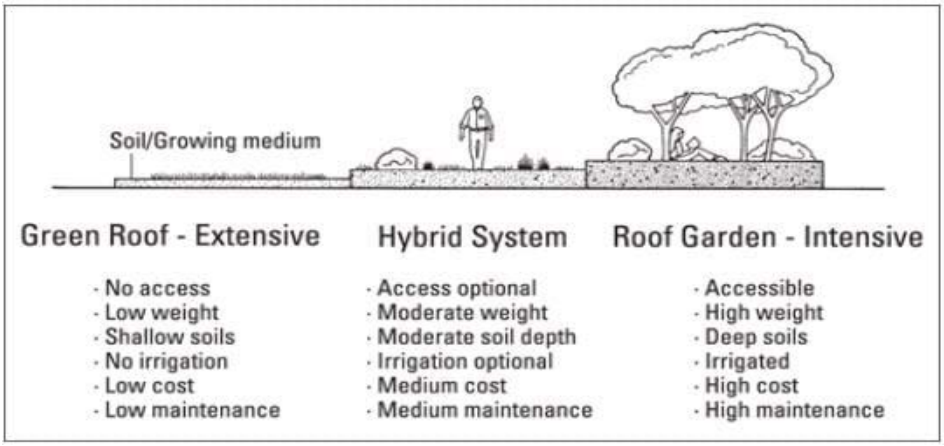
CHAPTER III

REVIEW OF FINDINGS

3.1 Rooftop Gardening

Rooftop gardens are man-made green spaces on the topmost levels of industrial, commercial, and residential structures. They may additionally be designed to develop produce, supply play space, provide color and shelter, or honestly be there as a living, green area.

Two most important divisions of garden types exist: extensive and intensive. Extensive gardens require minimal upkeep and behave as another from of roofing material. They are no longer intended for heavy foot site visitors nor do they want to meet any extra safety standards. The different extreme consists of intensive gardens created with the intent of lively human use. These gardens require landscaping and ordinary upkeep. In some cases, the roof shape should be bolstered via the addition of decking or extra bracing to accommodate the combined weight of soil, plants, and precipitation. Furthermore, intensive gardens may additionally need to comply with protection rules related to decks and public areas on raised structures. These regulations may additionally require some variety of fencing or barrier to be set up with the intent of preventing humans from slipping over the area of the roofline.



(Source : Bermudez, 2019)

Figure 1 Cross section of different rooftop garden

3.2 Potential areas of rooftop in the chosen family

Potential area on rooftops is an utmost essential for enhancing or organising the backyard in the cities.

In the study, consequences published that per family whole rooftops house used to be recorded as 1916 sq. ft in Dhaka metropolis areas. Of them common 1593 sq. ft used to be regarded as viable area for gardening and 323 sq. ft used to be remained as open however at present the open house are being used in extraordinary functions through the proprietor of the building. Analysis outcomes implied that the variations in the doable rooftop area per family was once determined to be tremendous at 10% stage of chance ($F= 2.002^*$ and $p <.086$) amongst the region in Dhaka areas). But in the case of different areas in Dhaka it used to be determined to be insignificant (Table 1).

3.3 Current uses of residential rooftops in Dhaka metropolis

Presently the rooftops of the residential constructions are being used for a variety of functions such as gardening, drying and washing clothes, playground for children, wonderful guest, passing pleasure time etc. In the study, consequences printed that the easiest percentages of the respondents are being used for gardening (87%), drying cloths (25.8%) and others (11.5%) irrespective of all areas in Dhaka city. Islam (2004) suggested that the rooftops of the residential constructions was once used for drying (88%) and washing (45%) clothes, as playground for youngsters (97%), for enjoyable friends (20%), for cool air in the course of the summer time (64%), to sunbathe in the wintry weather (33%). On most of the roofs, some shape of pleasure backyard exists (78%), every so often there are fruit gardens (12%), and, much less often, vegetable backyard as nicely (8%).

Table 1 Estimation of potential space on rooftop and use of open space in the selected household

Dhaka city areas (n=97)	Size of space on rooftop per household (In sq. feet)			Used of open space as % of each respondents		
	Total space	Open space	Potential space for RTG	For gardening	For drying cloths	Others
Mohammdpur	1500	325	1175	79	36	7
Mirpur	1950	338	1612	76	6	24
Gulshan	1806	256	1550	94	11	11
Uttara	2035	460	1575	90	35	10
Kamrangirchar	2131	356	1775	100	25	
Tejgoan	2075	200	1875	83	42	17
All	1916	323	1593	87	25.8	11.5

(Source: Uddin *et al.*, 2016)

3.4 Vegetables and fruits produced in cutting-edge RTG's in Dhaka metropolis

Different fruits and greens had been determined to be grown by using the respondents. The inexperienced flowers and flowers in the residence have an effect on the feeling of harmony, simplicity and authenticity.

Natural inexperienced has substantial impact on usual lifestyles delight and enhance the occupant‟s health (Rashid et al. 2010).Bangladesh is blessed with many horticultural crops. More than ninety vegetables, 60 fruits and 25 spices are being grown in the country. But, now not all sorts of fruits can be produced on the rooftop. So, species resolution for roof gardening is an vital challenge for each gardeners. The kinds and combine are chosen in the town relying upon character family meals preferences, availability of seeds/sapling kinds that can be grown on the rooftop, local weather and availability of soils. In the study, the following veggies and fruits had been produced in the present rooftop backyard in Dhaka town areas. But the composition of fruits and greens are differed in every family significantly. However, the often produced fruits and vegetables in the cutting-edge RTG in Dhaka cities are proven below:

Fruits produced in current RTG		Vegetables produced in current RTG	
Mango	Sapota	Brinjal	Bitter gourd
Guava	Karanda	Tomato	Sweet gourd
Hog-plum	Custard apple	Cabbage	Snake gourd
Jujubee	Litchi	Cauliflower	Pointed gourd
Lemon	Pummelo	Chilli	Cucumber
Pomegranate	Karambola	Indian Spinach	Red amaranth
Orange	Dragon fruit	Lady‟s finger	Stem amaranth
Malta	Grape	Country bean	Lettuce
Papaya	Strawberry	Yard long bean	Capsicum
Wax apple	*Bilombi*	Bottle gourd	Coriander
		Teasle gourd	Arum
		Ash gourd	Drum stick
			Sugarcane

It used to be found in the learn about that in Dhaka areas, about 25 veggies and 20 fruits have been observed to be grown in the contemporary RTG‟s. But the composition of fruits and greens variousextensively amongst the household. The best 61.6% rooftop gardeners produced tomato accompanied by means of brinjal (61%), Indian spinach (47.8%), Lady‟s finger (46.8%), Chilli (45.3%) and Gourds‟ (25%) irrespective of all chosen metro areas of Dhaka metropolis (Table 2).

Table 2 Vegetable crops planted in the current RTG in the selected areas of Dhaka

Dhaka city areas (n=97)	Vegetables									
	Chilli	Brinjal	Indian spinach	Gourds(All)	Okra	Tomato	Red amaranth	Bean	Cabbage	Cauliflower
	In % of respondents who produced the vegetables in RTG									
Mohammdpur	50	57	43	21	29	36		29		
Mirpur	53	65	59	12	35	63		19	12	
Gulshan	44	56	39	22	56	67	17	17	6	6
Uttara	60	60	50	25	50	68	25	20	15	
Kamrangirchar	50	63	63	38	69	69	50	19		
Tejgoan	15	67	33	33	42	67	17	18		
All	45.3	61.3	47.8	25.1	46.8	61.6	18.1	20.3	5.5	6

(Source: Uddin *et al.,* 2016)

In the case of fruits, the best possible 75% respondents have grown mango observed via lemon (72.8%), Guava (72.8%), Pomegranate (38.5%), Hog-plum (26.5%), Jujubee (24.5%), Papaya (24%), Wax apple (13%), Malta (12.8%) and Sapota (10.5%) irrespective of all chosen metro areas in Dhaka town (Table 3).

Islam (2004) determined that in the rooftop backyard the following fruits and greens are many times grown; Guava, Lemon, Papaya, Grapes, Green Chili, Pumpkin, Squash, Onion, Garlic, Coriander leaves, Tomato, Mushroom, Leafy veggies (e.g., Callaloo, Jute Leaf and Red Amaranthus), and different (e.g., Cucumber, Flat bean, Bitter ground, Ribbed ground, Ladies finger, Amaranthus, Dhudi, Cowpea and Brinjal).

Some households additionally domesticate spices and flora used for medicinal purposes.

Table 3 Fruit crops planted in the current RTG in the selected areas of Dhaka

Dhaka city areas (n=97)	Fruit plants									
	Mango	Lemon	Guava	Hogplum	Pomegranate	Jujubee	Malta	Papaya	Wax apple	Sapota

	In % of respondents who produced the fruits in RTG									
Mohammdpur	57	64	57	7	29		7	29		7
Mirpur	76	59	71	24	29	41	12	29		6
Gulshan	83	78	78	44	33	33	11	22	44	22
Uttara	85	84	85	29	65	40	20	20	15	15
Kamrangirchar	75	69	81	34	50	25	19	19	13	13
Tejgoan	75	83	75	17	25	8	8	25	8	
All	75.2	72.8	74.5	26.5	38.5	24.5	12.8	24.5	13.5	10.5

(Source: Uddin *et al*., 2016)

3.5 Intercultural Operation

Results on Table 5 point out that 100% of the rooftop gardeners used to exercise the intercultural operations of irrigation and weeding alongside with training/pruning (81.7%), control of insects-pests (75%), decoration (70%) and thinning (51.7%). But, most of the intercultural operations had beenconducted as per demand and in that case the respondents did now notobserve any normal frequency.

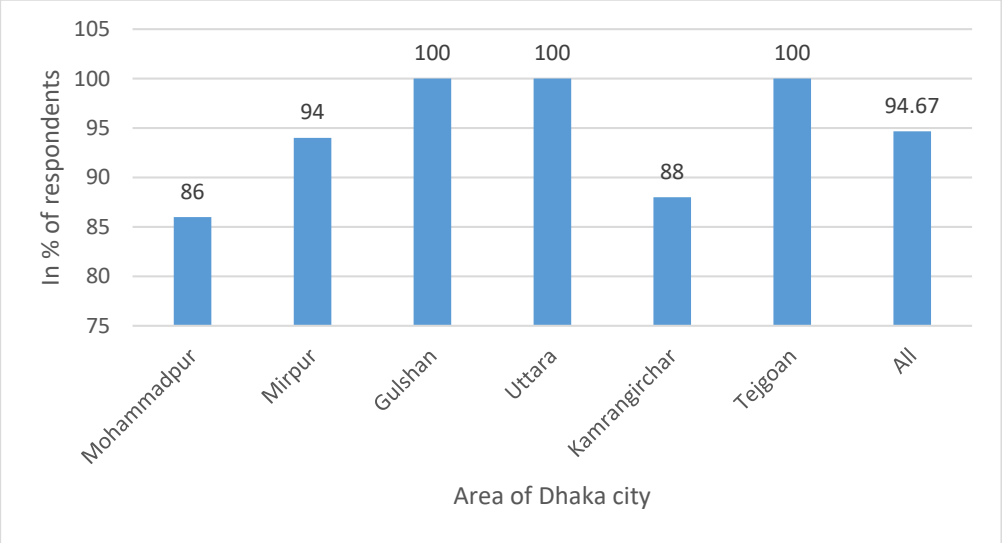
Table 4. Distribution of the respondents based on the practiced intercultural operations

Intercultural operations	Respondents (N = 60)		Rank
	Frequency	Percent	
Irrigation pattern	60	100	1
Weeding	60	100	1
Training/Pruning	49	81.7	2
Insect & disease control	45	75.0	3
Decoration	42	70.0	4
Thinning	31	51.7	5
Shading	6	10.0	6
Others	5	8.3	7
Drainage system	3	5.0	8

(Source: Sheel *et al*., 2019)

3.6 Knowledge of compost and fertilizer software of the respondents

In the study, greater than 94% of the respondents in Dhaka metropolis areas had been having know-how on the feature of compost and fertilizer utility in the contemporary RTG‟s. (Fig. 2).

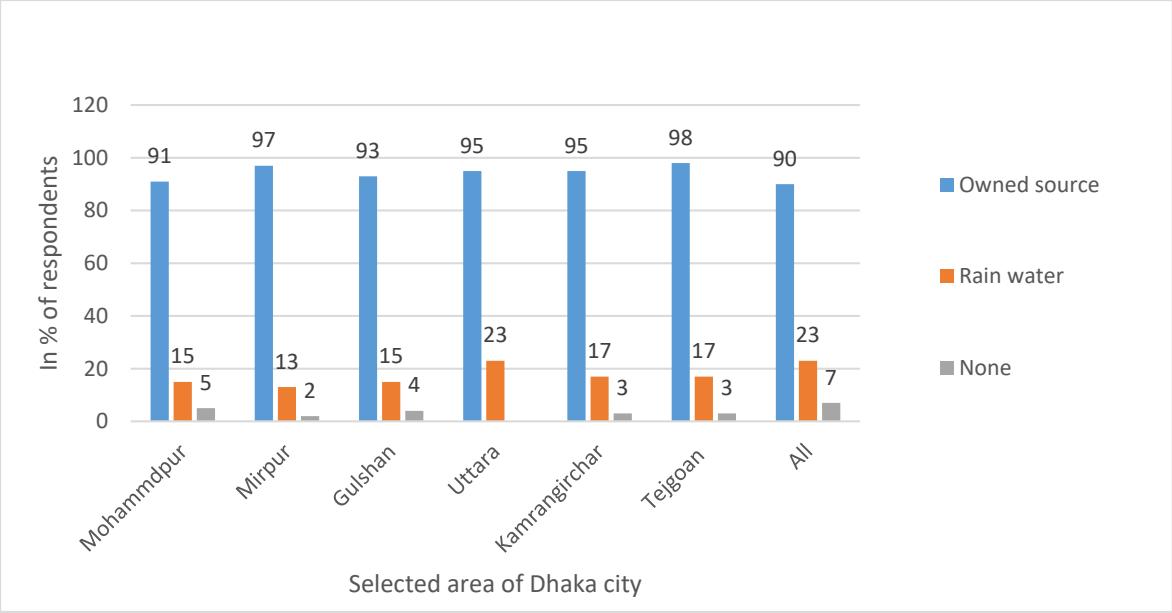


(Source: Uddin *et al*., 2016)

Figure 2 Knowledge of the respondents on the function of compost and fertilizer in Dhaka.

3.7 Water supply used for contemporary RTG's in Dhaka

Water supply is indispensable for imparting irrigation to the RTG‟s plant. Irrigation can make a contribution to produce greater yield of plant. In the study, two fundamental water sources (owned and rain water harvest) have been observed. In the chosen areas of Dhaka city, greater than 90% respondents used owned supply (owned furnish water) for irrigation to the RTG‟s plants. About 23 percent respondent didn‟t supply irrigation however solely 7 per cent used the conserved rain water for irrigation motive (Fig. 3).



(Source: Uddin *et al*., 2016)

Figure 3 Water source used for RTGs by the respondents of Dhaka city.

3.8 Container used in the contemporary RTG's in Dhaka metropolis

Container is one of the necessary enter substances for developing plant in the rooftop. Selection of appropriate containers is vital thing for elevating the flora well. Bienz (1980) said that appropriate developing medium should be organized making sure ample water and mineral elements. The a number sorts of containers had been used by way of the rooftop gardeners. The desire of containers was once established on availability, preferences and nature of the developing plants. It used to be discovered that in the chosen areas of Dhaka city, the easiest 72% respondents used half of plastic drum, 62.5% plastic pot, 59% earthen pot, 53% half-drum made through GI sheet, 51% plastic bucket, concrete made bed/drum and 41.6% plastic tray (Table 3.8).Rahman et al (2013) discovered that for rooftop gardening 77% used earthen containers, 8% cemented bed, 7% drums, 5% brass made pots and 3% others are in use.

Table 5 Container used in the current RTG‟s in Dhaka

Dhaka city areas (n=97)	In % of respondents who used the following types of container in the RTG							
	Half plastic drum	Half drum made by GI sheet	Plastic pot	Earthen pot	Concrete made drum	Plastic tray	Plastic bucket	Concrete made bed
Mohammdpur	86	64	79	57	71	71	71	50
Mirpur	76	47	76	59	53	53	47	41
Gulshan	72	44	56	67	56	39	44	56
Uttara	65	40	50	55	40	45	45	45
Kamrangirchar	50	50	56	50	44	25	50	44
Tejgoan	83	75	58	67	43	17	50	75
All	72	53.33	62.50	59.17	51	41.47	51.17	51.83

(Source: Uddin *et al*., 2016)

3.9 Average yield of vegetables and fruits per RTG's in Dhaka town

Around 60 fruit and vegetable varieties are manufactured in Bangladesh. It is not possible to produce all styles on the rooftop. Depending on man or woman family food preferences, availability of seed sorts that can be grown on the rooftop, weather, and soil quality, the types and mixes are chosen in the region. Guava, Lemon, Papaya, Grapes, Green Chili, Pumpkin, Squash, Onion, Garlic, Coriander leaves, Tomato, Mushroom, Leafy greens(e.g., Callaloo, Jute Leaf and Red Amaranthus) and others (e.g., Cucumber, Flat Bean, Bitter ground, Ribbed ground, Ladies foot, Amaranthus, Dhudi, Cowpea, and Brinjal) are usually grown in the food garden. Some households also domesticate spices and flora used for medicinal purposes, Islam, S (2002). A baseline survey used to be performed from January to June 2016 with a sample of about ninety seven the usage of a pre-tested semi-structured questionnaire for required data/information on rooftop gardening in Dhaka determined that the common yield was once higher for quite a fewunique veggies and fruits (Fig.4).

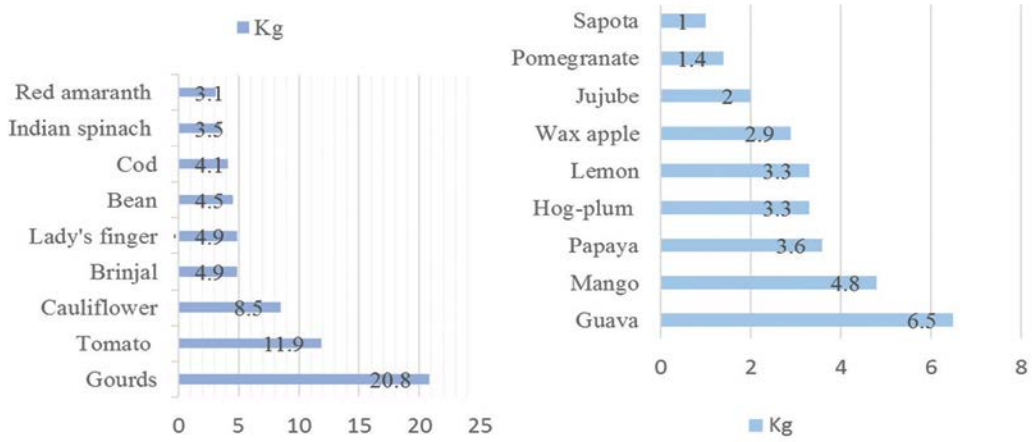


Figure 4 Average yield of vegetables fruits on rooftops in Dhaka

(Source: Chowdhury *et al*., 2020)

3.10 Occurrences of pest and diseases in present day RTG's

Ant (65%), mealy worm (36.7%) and green leaf hopper (13.3%) weresuggested as the primary bugs by means of the rooftop gardeners (Table 6). There had been also some minor insects named with the aid of whitefly, lemon butterfly, crimson pumpkin beetle, aphid, termite, fruit borer etc. On the other hand, majority (23.3%) of the rooftop gardeners cited about die back; whereas viral diseases, leaf curling, leaf hot and fungal diseases constituted 21.7%, 18.3%, 15% and 13.3%, respectively (Table 6).

As Table 6 indicated, there had been 21.7% respondents who did no longer face any insect problem; whilst 35% respondents stated that there is no disorder infestation in their rooftop garden. To defend plant life from different insects-pests and diseases, rooftop farmers carried out a wide variety of control measures. Most often times used practices in opposition to insects-pests had been finish, elimination of infested part, hand killing of insects, washing with water, wheel powder + water, Ripcord, neem + mehagani juice, tobacco + water, kerosene, Nitro, Green tonic, Sevin etc. On the different hand, the most commonprotection strategies towards diseases was once removal of the contaminated part compared to Tilt, Malathion, Vertimex, Noin powder, Aora, Mancozeb, Flora, Uromil etc. There were a variety of respondents who did not take any motion in opposition to insects-pests and illnessesinfestation rather facing the issues in exclusive extent. Insect hassle used to be determined as a 12 months round problem; whereas iciness season was

once revealed as the most important disease infestation time. Table 6 evident the important fertilizers viz. cow dung (51.7%), compost (43.3%), urea (36.7%), MoP (25%), sesame cake (23.3%) and TSP (21.7%) used viathe rooftop gardeners. Besides, there have been some minor fertilizers such as DAP, vermi-compost, birds litter, bio-salary, egg shell etc. Almost all of the rooftop gardener did now not comply with any regular sample in case of insects-pests control, diseases manage and in fertilizer application dose and stage.

Table 6. Distribution of respondents based on insect infestation, disease infestation and fertilizer use

Items	Major findings	Respondents (N=60)		Rank
		Frequency	Percent	
Insects name	Ant	39	65.0	1
	Mealy bug	22	36.7	2
	Not at al	13	21.7	3
	Green Leaf Hopper (GLH)	8	13.3	4
	Whitefly	5	8.3	5
Diseases name	Not at al	21	35.0	1
	Die back	14	23.3	2
	Viral disease	13	21.7	3
	Leaf curling	11	18.3	4
	Leaf scorching	9	15.0	5
	Fungal disease	8	13.3	6
Fertilizer name	Cow dung	31	51.7	1
	Compost	26	43.3	2
	Urea	22	36.7	3
	Muriate of potash (MoP)	15	25.0	4
	Sesame cake	14	23.3	5
	Triple super phosphate (TSP)	13	21.7	6

(Source: Sheel *et al*., 2019)

3.12 Per capita consumption of vegetables and fruits of the sample households

Per capita vegetables consumption used to be recorded at 56.7 gm per capita per day for the pattern family in Dhaka, respectively, which was once decrease than countrywide common of one hundred fifty fivegm/capita/day would possibly be due to unaware about the dietary cost of veggies however the consumption of potato used to be determined tonsgreater than that of countrywide common in each cities. (Table 7).

In the case of fruits consumption per capita per day used to be observed to be 67.9 gm an irrespective of all chosen family in Dhaka city. This would possibly be due to all respondents had been richer and they have been a whole lot extra succesful to buy fruits from the market. But they opined that they had been no longer blissful to buy fruits from market due to meals security reasons. Results printed that fruit consumption specificallymango, candy orange and apple amongst the surveyed family differentextensively however the consumption of different fruits variousinsignificantly among the respondents and locations. (Table 8)

Table 7 Per capita consumption of vegetables in the surveyed household

Dhaka city areas (n=97)	Quantity (gm) of vegetables consumed per capita per day										
	Potato	Brinjal	Teasle gourd	Tomato	Chili	Indian spinach	Ladys finger	Bean	Cucumber	Red amaranth	All
Mohammdpur	47	72	82	85	27	78	85	98	86	139	79.9
Mirpur	83	46	51	40	32	64	52	32	34	53	51.7
Gulshan	65	48	29	73	31	61	48	22	32	60	46.9

Uttara	56	68	20	59	23	81	25	47	64	53	49.6
Kamrangirchar	91	53	33	52	45	78	56	52	74	65	59.9
Tejgoan	71	60	25	112	43	45	47	24	33	64	52.4
All	68.8	57.8	40.0	70.2	33.5	67.8	52.2	45.8	58.8	72.3	56.7

(Source: Uddin *et al*., 2016)

Table 8 Per capita consumption of fruits in the surveyed household

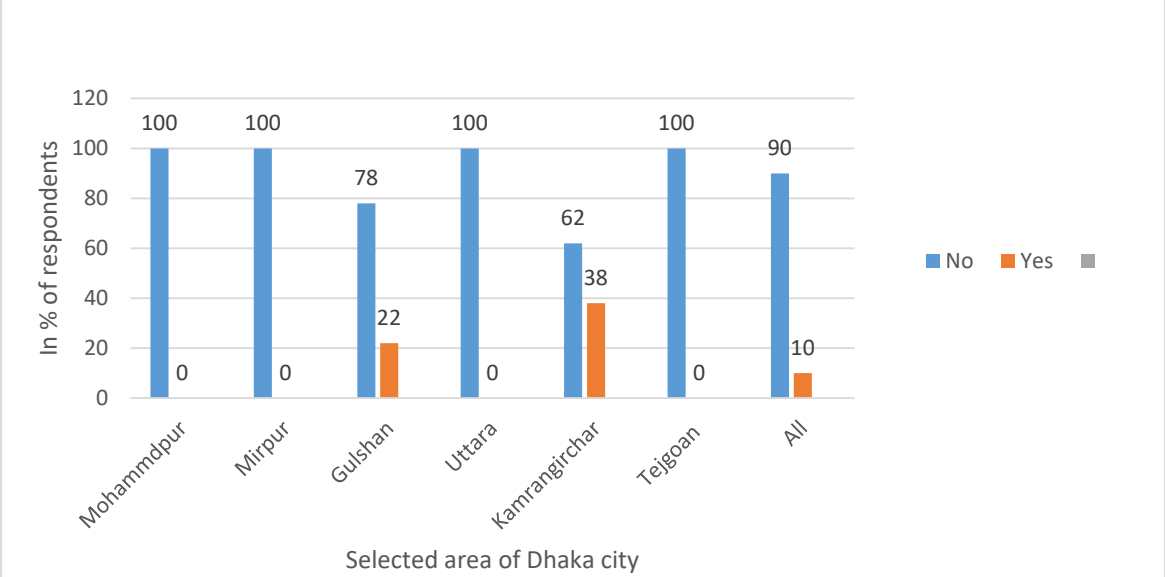
Dhaka city areas (n=97)	Quantity (gm) of fruits consumed per capita per day										
	Mango	Guava	Grape	Apple	Lemon	Juckfruit	Sweet orange	Papaya	Wax apple	Sapot	All
Mohammdpur	202	75	23	21	14	33	23	37	_	_	54
Mirpur	143	83	22	35	31	40	32	50	20	17	47
Gulshan	274	145	41	76	27	_	56	68	4	10	78
Uttara	264	169	69	85	35	41	56	41	_	_	95
Kamrangirchar	260	55	25	42	78	20	_	37	_	_	74

Tejgoan	133	90	49	60	74	32	34	60	_	4	60
All	43.2	212.7	33.2	102	80.2	38.2	67.9	53.2	48.8	12.0	10.3

(Source: Uddin *et al*., 2016)

3.13 Responses to raise the inputs on the rooftop

Carry the enter (soil, compost, fertilizer, container, seedling, sapling etc.) on the rooftop is essential for efficaciously gardening. In the study, in Dhaka town areas about 90% of the respondents said that they had no trouble for carrying the enter on their rooftop and different 10% respondents opined that it would be a trouble if no longer cautiously elevate the enter to the rooftop.



(Source: Uddin *et al*., 2016)

Figure 5 Responses to carry the inputs on the rooftop in Dhaka city areas.

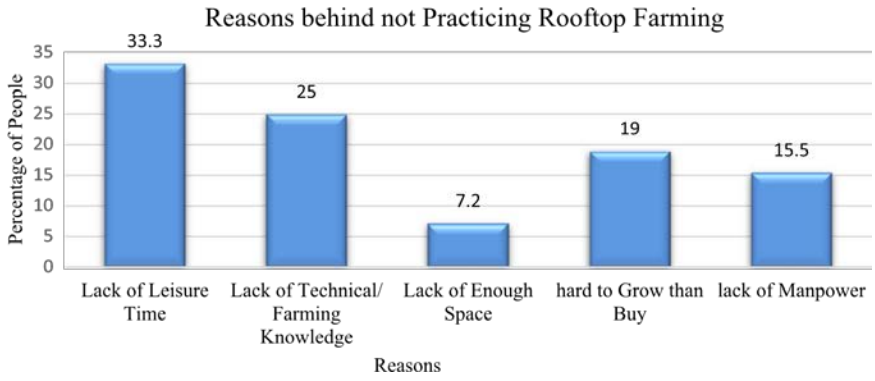
3.14 Marketing of rooftop gardening merchandise

There was once no geared up advertising gadget of rooftop gardens merchandise in the learn about area. This may be due to confined manufacturing of the rooftop backyard and that of ate up by using the contributors of household. From this find out about it was once determined that

rooftop backyard production, earnings and self-use will increase with the growing size, funding and what functions proprietor managed his garden. After making sure on hand manufacturing of the gardens, the advertising device can be developed for sale their product.

3.15 Threats to rooftop farming in Dhaka

During non-practitioners survey it had been explored why human beings were now not training rooftop farming. Most of them answered that they did now not have sufficient entertainment or free time to put in force and appear after the garden. 33.3% human beings told that they are busy with their private and reliable works and do now not have sufficient time to spend on gardening or farming. Lack of technological information is additionally a constraint for not practicing. There is very few opportunities for acquire technological and farming knowledge. There is no government or non-public initiative to train humans and serve desirable farming facilities. So 25% people stated that they are no longer inclined to exerciseas they do no longer have suitable farming knowledge.



(Source: Safayet *et al.*, 2017)

Figure 6 Reasons behind not willing to Practice Rooftop Farming.

There is additionally a tendency to buy meals objects from near market places as a substitute than developing them. 19% people assume that it

is easier to buy vital products from nearby market or kutcha bazar than developing on their rooftop as it requires time, labor and money. So they suppose they can have what they want by using spending some money. Lack of manpower is additionally a limitation.

If people desire to implement farming on their rooftop, they need some help but in presentcircumstance there is lack of experienced and competent labor for taking care of farming. 15.5% human beings suppose that it is a hassle to them of having no manpower. Only 7.2% humans answered that they do now nothave enough area due to the fact their roof is used by way of other purposes(Safayet *et al*., 2017).

CHAPTER IV

CONCLUSIONS

Urban agriculture (UA) specifically rooftop gardening contributes to introduction of wholesome surroundings and meals security. It will increase grant of clean meals and by means of bettering the fantastic of perishable meals attaining city consumers. The Government of Bangladesh does now not have any unique coverage provision or law that promotes city agriculture in accepted or rooftop backyard in particular. There is no precise metropolis coverage that promotes city agriculture in Dhaka. This is vital as has been proven in many nations like Switzerland and Germany and there is big conceivable for roof gardening. Government training and encouragement is urgently wanted to amplify the RTG. Bangali Nature intends to proceed its work in greening roofs, assisting to refine our perception of the position they can play in the conservation of biodiversity in cities and cities. In order to realise the workable that RTG can offer, primary shifts in wondering of the coverage makers is required. The most radical one would be on phase of the town officers to combine Urban Agriculture (UA) in frequent and RTG in precise with city planning. In order to do this, some necessary lookup and experimentation/demonstration is required. This mission should be profitable with required political dedication and concerted action, underpinned by using scientific research, technical information and appropriate design.

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