



Support for Modeling, Planning and Improving Dhaka's Food System
GCP/BGD/066/NET

PROMOTING ROOF TOP GARDENING IN DMA FOR IMPROVED NUTRITION



PROJECT COMPLETION REPORT



Food and Agriculture
Organization of the
United Nations



WAGENINGEN
UNIVERSITY & RESEARCH



Kingdom of the Netherlands

Acronym and Abbreviation

FAO: Food and Agriculture Organization of the United Nations

DAE: Department of Agricultural Extension

BARI: Bangladesh Agricultural Research Institute

DD: Deputy Director

DNCC: Dhaka North City Corporation

DSCC: Dhaka South City Corporation

GCC: Gazipur City Corporation

NCC: Narayanganj City Corporation

AEO: Agriculture Extension Officer

CM: Community Mobilizer

ZM: Zonal Manager

ToT: Training of Trainer

Thana: Administrative unit

Ward: City Corporation's working area

CC: City Corporation

AV.: Average

Demo: Demonstration

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Executive Summary

In Bangladesh rapid urbanization gives birth to numerous problems such as declines green space, increase in heat island effect and loss of biodiversity in urban areas. Impetuous urban growth is making huge demands on urban food system. Roof top gardening is positively affecting peoples mental and physical health by providing greenery and clean air. Apart from these, it also improves the air quality, controls the heat island effect, increase biodiversity and retains storm water. The effect of rooftop gardening can be seen through the availability and accessibility of food, nutritionally adequate diet, which result in food and nutrition security in the practicing family.

Collaboration

Proshika Manobik Unnayan Kendra is one of the largest non-profit national level non-governmental organizations in Bangladesh. The organization implemented the project name “Promoting Rooftop Gardening in DMA for Improved Nutrition” with the collaboration of FAO. Objectives of the project are; to develop a policy guideline for the government for incentive rooftop gardening, to promote better public access to technical understanding and know-how on how to create a rooftop garden and grow safe, nutritious and healthy fruits and vegetables and to promote access to safe, nutritious, and healthy fruits and vegetables, leading to improved public health for large numbers of the population. It was a one-year project. The project started from May 2022 and ended in May 2023. The project was leaded by the Department of Local Government Division under the Ministry of Local Government, Rural Development and Co-operatives, funded by the Netherlands Government and technical support by the FAO and Wageningen University.

Area Coverage

Four city corporation from Dhaka division participated in the project. Name of the city corporations are Dhaka North City Corporation (DNCC), Dhaka South City Corporation (DSCC), Gazipur city Corporation (GCC) and Narayanganj City Corporation (NCC). A total of 95 wards and 44 thanas were selected as project implementing areas. Project implemented with 29 wards and 20 thanas from DNCC, DSCC 23 wards and 13 thanas from DSCC , 29 wards and 09 thanas from GCC and 14 wards and 02 thanas from NCC .

Beneficiary

A total of 1500 beneficiaries participated in the project where 51.35% were women and 48.35% were men.

From DNCC and DSCC 550 beneficiaries were selected from each of the city corporation, and from GCC and NCC 200 beneficiaries were selected from each of the cities. The average age of the selected beneficiaries was 40 yrs. Rooftop owned by the participants was feasible for gardening and the average size was 1214 square feet. 70% beneficiaries were the owner of the rooftop; only 30% tenant was participated from the DSCC.

Demonstration institution

Twenty demonstrations were selected and established for disseminations of the gardening technologies among the larger community in project areas. The participated institutions were Government and no-government primary schools, government high schools, non-government academy and colleges, religious institution and market place. The average size of the demonstration garden was 2381square feet.

Meetings and workshops

Project started with a kick off meeting for lunching the activity officially. After that a total of 06 consultative meetings, 01 policy development workshop, 08 conceptual sharing workshops, one interim workshop and one final workshop were conducted during the project period. The aim of those meeting and workshops were; to share the implemented project activities; to enlighten the challenges, opportunities and possibilities of the project; to get necessary suggestions about the sustainability of the project activities. The suggestions and comments came out from the meetings and workshops were incorporated during the project implementation process and included with police making process.

A Policy guideline was developed through a expert workshop. 03 advocacy, communication and policy dialogues workshop were conducted for sharing the developed policy guideline among the city corporation authorities for incentivizing the gardener.

Input (Start-up materials)

Project provided four types of start-up garden establishment materials for each of the beneficiaries and the demonstration institutions. The objective was to help the gardener to put their learning in practice after attending the training. It was found from the field monitoring that every gardener used the input to establish/expand their garden. Every participant and demonstration institution received 20 types of winter and summer vegetables (namely Cabbage, Sweet gourd, Tomato, Broccoli , Capsicum, Gourd, Squash, Radish, Chili, Country bean, Red amaranth, Kangkong, Ladies finger, Cucumber, Yard long bean, Sweet

gourd, Eggplant, Chili, Indian spinach , Bitter gourd), 05 types of fruit sapling (Mango, Indian Jujube, Lemon, Malta and Dragon) 03 types of agriculture tools (Hoe, Spade, Watering Cane), 50 kg vermi compost and 03 chemical (Urea, TSP, MOP) fertilizers. Due to late supply, they could not able to cultivate winter vegetables fully but in summer they utilized all materials properly. They preserved the winter seeds for next season use.

Training

Proshika Manobik Unnayan Kendra imparted training to 1500 project beneficiaries and 20 demonstration institution representatives on roof top gardening, so that, they can establish and manage their garden efficiently and make the garden economically viable and nutritionally enriched. A total of 56 training courses were organized in four city corporation areas. On an average 25-30 beneficiaries were attended every course. It was found from the training evaluation that after attending the training courses every participant made a good progress. During pre-test only 15.38%, 19.23%, 7.69% and 13.04% beneficiaries from DNCC, DSCC, GCC and NCC secured pass mark (out of 15) and the average mark obtained by the participant was 2.97. But at the end of the training all participants made a good incremental score and the average mark obtained participants was 11.63 and the score were 77.54% (Out of 15).

Demonstration establishment

All start-up materials and suggested technologies were used in the demonstration garden. Students and teachers were participated with establishment process. The technologies practiced for demo garden were proper lay-out design, vegetables and fruit selection, growing media preparation, growing container ready with proper drainage systems, re-potting, de-potting and repotting, proper water management, Integrated Pest and Disease management approaches. Pheromone trap and yellow trap were set in every garden. Mint, coriander leaf and marigold were cultivated as a trap crop. On average 5.84 leafy vegetables, 7.42 seasonal vegetables and 6.46 fruit were cultivated with 10 types of growing containers. Each garden produced 40kg leafy vegetables and 33 kg seasonal vegetables and distributed among the teachers and students. Students learn the production technologies and the management practices. It was reported by the institution that on an average 197 students, 69 teachers and 111 potential gardeners visited the demonstration gardens. A garden monitoring committee was form with the participation of student and teacher for continuing the activities in future with all schools. Some schools declared competition among the student on rooftop gardening.

Field day observation

Field days provide the opportunity for 20 or more beneficiaries to visit a demonstration site, learn about what is being demonstrated, to show the easy and proper gardens establishing methods to a larger community a total of 16 field days have been observed in four city corporations under demonstration sites. A total of 602 participants were attended the events including 392 male and 210 female. The participants attended the events were students, teachers, city corporation officials, councilors, federation leaders, NGO representative, Environment activities, District education officer, FAO representative, interested gardener, project beneficiaries, Proshika representative, Agriculture scientist, Journalist and institutions head.

Awareness campaign

According to project, planning eight (08) awareness campaigns organized under four City Corporations. A total of 343 participants attended the events including 227 male and 116 female. Objective of the campaign was to increase enthusiasm, stimulate participants on rooftop gardening for action. The attended participants were interested gardener, teachers, students, agricultural experts, environment activities, agricultural scientist, city corporations' officials, councilors, NGO representative and journalist etc. The participant stated that this is the time to act on that issue for making our city livable for our new generation. Different local and national newspaper published the events and gave emphasis on importance of rooftop gardening.

E-agriculture

The application of Information and Communication Technology (ICT) in rooftop gardening create an opportunity to help the remote gardener. Proshika created a help desk number by following IP PBX system which is useful to provide instant and convenient service delivery. During the project period a total of 127 beneficiaries got instant solution of their gardening problems. Proshika decided to continue the service beyond the project.

For information flow on rooftop gardening for the city dwellers, Proshika developed a mobile App named "Chad Krishi (ছাদ কৃষি) in Bangla and in English it is called "Rooftop Agriculture". People started using the apps and within one month the app was downloaded by 100 interested gardeners.

Service Provider data base

For quality input and technical support for the beneficiaries a service provider data base was prepared and shared with the beneficiaries. A total of 113 service providers' information was included with the data sheet.

The data set included DAE authorized nurseries, government nurseries, research organization, seed company and Department of Forestry enlisted nursery owners. Data base included the address of the service provider, contact person's name and phone number and the types of services. The database was included in the mobile app for larger community.

Gardener performance

Information was collected randomly from 145 gardener to overview their operational activities on rooftop gardening. Among them 50 were selected from DNCC, 50 were from DSCC, 25 were from GCC and 20 were from NCC.

Estimated Water Use

It was found from a study that the rooftop gardeners were using 60% more water than the requirement. They used hose pipe/watering cane for irrigation. The annual irrigation water requirement for 100 sq.meter (1075 sq.ft) rooftop garden is 8519.86 liters. Drip irrigation system is not known to them. The system has proved its superiority over other conventional methods of irrigation. Drip irrigation system need to be popularized among the gardener

Growing container use status

Container is entry materials for developing plant in the rooftop. Ten (10) types of containers were used by the participants. On an average 06 types of containers used by a gardener. Participants preferred low cost recycled containers in their garden. It was found from the monitoring data that 81.75% participants used half-drum, 47.5% participants used earthen pot , 23% participants used plastic pot, 62.5% participants used waste oil cane, 25% participants used sack, 14% participants used tray, 20% participants used waste color pot, 25.5% participants used crates, 31.25% water bucket and 13 % participants used permanent bed . 100% participants included geo-bags in their garden.

Vegetables and fruit cultivation

On average 4 types of leafy vegetables, 6 types of seasonal vegetables and 7 types of fruit were cultivated by the gardener. The preferred leafy vegetables were Indian spinach (100%), kang Kong (94.5%) and red amaranth (81%). For summer vegetables eggplant (86.5%), tomato (76.5%) and chili (63.5%) were mostly cultivated by the participants. Different type's gourds were cultivated by them and the percentage was 56.41%. It is noticeable that different types of nutrition reach vegetables were included in their garden by the participants. 100% project supplied fruits saplings were planted by the beneficiaries. More over the guava (66.75%) and pomegranate (35.75%) were found the next two fruits in their cultivation list. Both of the fruits

are feasible for rooftop garden with their food value. Beneficiaries expanded their garden including wax, sugarcane, hog plum, pomelo, pineapple, star fruit and wood apple.

Technology adaptation

Technology adaptation is important for proper garden establishment and to increase production. It was found that the participants started their learning in practice. All surveyed beneficiaries started preparing lay-out for their garden and arrange the plant accordingly. They prepared growing media with good soil and vermi compost, cow dung and prepared containers with proper drainage system. They started practicing repotting, de-potting and pruning where necessary. For *dengue* prevention they ensure support under containers, kept garden clean and ensure daily visit. It is also mentionable here that the project supplied input help them to improve their garden management

Production and utilization

Participants started harvesting from their garden and the average leafy and seasonal vegetables and fruit production was 17.68 kg, 21.02 kg and 5.56 kg respectively within 5 months. Respondent reported that they did not use their whole produce in family consumption but also shared with friends, relatives and neighbor. The consumption and sharing percentages were 93% and 7 % respectively.

Sustainability

For long run sustainability, different activities have been initiated by the project authority. E-agriculture service established for remote gardener and ensured continuous the information flow among them. Validated Service provider database was prepared and shared with the beneficiaries. Project beneficiary list handover to DAE for technical support and city corporations for monitoring. Proshika is going to start an Urban Agriculture wing for supporting the project beneficiaries and expand the activities at a larger scale. Proshika actively participated with the project initiated a City Working Group (CWG) for future collaboration with the stakeholder in four city corporations.

Conclusion

To combat the project objectives different activities had done to extension of rooftop gardening in four City Corporation. It was found from data that all the beneficiaries involved with rooftop garden establishment and got good result. They produced different kind of fresh and safe fruit and vegetables in their garden. The gardeners are spending quality time in the garden and increase social harmony. Students are motivated to involve with the gardening activities. Through different workshops, meetings, awareness campaign, field days stakeholders learned about the benefit and impact of rooftop gardening for reduction of heat island effect,

fresh and safe vegetable production and increase nutritional status of the gardener. Established E-agriculture service ensured technical support beyond the project. Developed guideline for incentivizing the gardener for tax rebate will be helpful for motivate the gardener. The outcomes achieved by this project will help to implement the activities with other city areas in Bangladesh. Researcher, policy maker and academician can use the outcomes of the project for further expansion.

Introduction

Bangladesh is highly dense and the 8th most populous country in the world. About 37.8 percent of the total population lived in urban areas in 2018. Urban population is expected to grow over 50 percent of the whole population by 2040. Green areas have been shrinking to ensure the accommodation of mass population of the urban areas. As a result, Green House effect has been increasing resulting in climate change in the urban areas and everywhere. Urban agriculture promotes local and sustainable food systems. Agriculture in cities is good for the environment, the ecosystem, and the climate. In urban areas there are few areas where vegetables and fruit can be grown. The main potential areas are; different institutions for community level gardening (educational and religious institutions), offices, industrial areas, park and rooftop etc. According to the Agricultural Information Service of the Ministry of Agriculture, approximately 450,000 roofs, covering 4500 hectares are underutilized. Speedy and unplanned urbanization escalates the incidence of urban poverty and food insecurity across the country. Rooftop is the one open space for urban people. If urban people work on the rooftop for gardening that can ensure safe and fresh food, recreation, more oxygen, less carbon dioxide and ecofriendly green environment

Rapid urbanization gives birth to numerous problems such as declines green space, increase in heat island effect and loss of biodiversity in urban areas. Impetuous urban growth is making huge demands on urban food system. Most of the roof, especially in Dhaka city is suitable for rooftop farming. According to the Agricultural Information Service of the Ministry of Agriculture, approximately 450,000 roofs, covering 4500 hectares are underutilized. Speedy and unplanned urbanization escalates the incidence of urban poverty and food insecurity across the country.

Roof top gardening is positively affecting our mental and physical health by providing greenery and clean air. Apart from these, it also improves the air quality, controls the heat island effect, increase biodiversity and retains storm water. The effectiveness of roof top farming has been proven around the world. The effect of rooftop gardening can be seen through the availability and accessibility of food, nutritionally adequate diet, which result in food and nutrition security in the practicing family.

A roof garden is a garden on the roof of a building producing vegetables and fruits. Due to increase of demand of fresh vegetable in urban area, interest on roof top gardening is increasing among the urban dwellers. Besides the decorative benefit, roof plantings provide food, temperature control, hydrological benefits, architectural enhancement, habitats or corridors for wildlife, recreational opportunities.

The Food and Agriculture Organization of the United Nations (“FAO” or “Organization”) is an intergovernmental organization with more than 196 member nations. Since its inception, FAO has worked to alleviate poverty and hunger by promoting agricultural development, improved nutrition and the pursuit of food security - defined as the access of all people at all times to the food they need for an active and healthy life.

Due to increase of demand of fresh vegetable in urban area, interest on roof top gardening is increasing among the urban dwellers. A roof garden is a garden on the roof of a building producing vegetables and fruits. Besides the decorative benefit, roof plantings provide food, temperature control, hydrological benefits, architectural enhancement, habitats or corridors for wildlife, recreational opportunities, and in large scale, it may even have ecological benefits. Rapid growth of Dhaka without adequate planning has led to a lack of public open spaces, extremely high rates of pollution, limited access to natural amenities, and a tendency for rising temperatures. These phenomena contribute to creating public health threats and lower the livability of the city, which is chronically low by international standards. Rooftop gardening, when done at scale, can contribute to addressing these issues by reducing the temperature of buildings and surrounding area and can help reduce urban heat effects. Rooftop gardens can also absorb carbon emissions and noise, removing unwanted heavy metals and chemicals from the air.

To make the capital a greener city, the city corporation has taken a number of environmentally friendly initiatives. Of the many projects regarding massive plantation, one of the lucrative projects for its citizens is encouraging more people to practice rooftop gardening.

A rooftop garden can be the primary way of our urban agriculture. Keeping the environment calm and cool, it can be a great source of our local food system, employment, and daily engagement with nature. Even with a small space, one can start the garden of his/her dreams. DFS project of FAO of the UN will develop two different guidelines, a set of policy guidelines and also technical guidelines on rooftop gardening, and seek to promote the popular adoption of rooftop gardening practices. Rooftop gardens, also called living roofs or green roofs, have many advantages, including providing more space for the production of vegetables and fruits, adding beauty to the cityscape and increasing air quality.

Roof top gardening is an enjoyable activity. One can grow his/her own fruits and vegetables on the rooftops without using any harmful chemicals and pesticides. From rooftop, garden safe, fresh, nutritious vegetables and fruits can be grown easily first for family consumption and can earn extra income by selling after consumption. City corporations are also showing eagerness on roof top gardening and declared to tax rebate

for roof top gardeners. This is really good news for the city dwellers, the building owners they can grow vegetables and fruits and can get this opportunity of tax rebate.

Rooftop gardens offer many benefits to an urban area; the urban community can produce safe, pesticide free, fresh and nutritious vegetables and fruits on the rooftop for their consumption and can bring their income by selling. Rooftop gardening is a concept of producing safe and nutritious food (Vegetables and fruits) on the rooftop by the city peoples. Urban community people have been cultivating vegetables and fruits on the rooftop from their rural experience as most of them have come from the villages. Some urban farmers are getting safe food from their own urban garden. Others farmers are also utilizing their rooftop by the cultivating vegetables and fruits and consuming the fresh own food. This way rooftop gardening is becoming popular among the city dwellers.

PROSHIKA - FAO collaboration

Proshika Manobik Unnayan Kendra is one of the largest non-profit national level non-governmental organizations in Bangladesh. PROSHIKA believes in collaborative and partnership work with different development agencies like GOs, NGOs (National & International), Private Organization, Research Institutes and local and national power structure for poverty eradication and sustainable development from the very beginning. PROSHIKA has the vast experiences in implementation of different collaborative and partnership projects with different agencies and institutes. PROSHIKA has collaborative projects implemented with government agencies like BARC and Ministry of Agriculture, DAE, SRDI, BARI, BRRI, BAU, DLS, BFRI, DoF, Ministry of health and family planning, Bangladesh Silk Foundation, Ministry of Environment and Forest, Ministry of Fisheries and Livestock, Directorate of Non-formal primary education under different projects. PROSHIKA has already been implemented many collaborative projects and some are ongoing. So PROSHIKA is always interested to participate and work under collaborative agreement with the Local and International agencies & local power structure etc.

FAO has worked to alleviate poverty and hunger by promoting agricultural development, improved nutrition and the pursuit of food security - defined as the access of all people at all times to the food they need for an active and healthy life.

Proshika has been implementing Rooftop Gardening in Dhaka city since 2010. Under this program, it has provided technical and input support to 200 rooftop owners. FAO has invited the Technical Support Services "Promoting roof top gardening in DMA for improved nutrition" from non-profit, intergovernmental, and governmental organizations under the Project: Support for Modeling, Planning and Improving Dhaka's Food

System GCP/BGD/066/NET. Based on the experiences Proshika attended the invitation and secured the position as an implementing Partner.

Objectives

Promoting roof top gardening in DMA for improved nutrition project developed three objectives for promotion of rooftop gardening in city areas for fresh, safe and nutritious vegetables and fruit production. The main objectives were;

- To develop a set of policy guidelines for the Government that allows the City Corporation to implement a policy to incentivize rooftop gardening
- To promote better public access to technical understanding and know-how on how to create a rooftop garden and grow safe, nutritious and healthy fruits and vegetables
- To promote access to safe, nutritious, and healthy fruits and vegetables, leading to improved public health for large numbers of the population.

Methodologies used to conduct the LOA activities

Proshika is a Bangladeshi, national, non-profit, development organization whose mission is to conduct an extensive, intensive and participatory process of sustainable development through empowering of the poor. Since its very modest inception in 1976, Proshika's effort has been to engender a participatory process of development and it's succeeded in pioneering an approach that puts human development at the center.

To implement the project Proshika followed the bottom-up and top-down approaches at each level. The methodologies adapted are shown below;

- Potential area visits and meeting with local community people
- Consultation with city corporations
- Key informant interview
- Explore existing technologies and activities with different organizations and individual
- Need based training organization
- Workshop
- Field days
- Awareness campaign
- Policy guideline development
- Monitoring and evaluation

Project Duration: 24 May 2022 - 5 May 2023

Activities;

To achieve the objectives project designed different activities through the implementation period.

Depending on the field situation different activities were re-arranged with time line are shown below;

Activities

24 May 2022 - 5 May 2023

SI no	Activities	Months											
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
1	Kick off meeting (KOM)		Orange										
2	Consultative meeting at city level			Blue	Blue								
3	Beneficiary Selection and training conduction		Green	Green	Green	Green	Green	Green	Green	Green			
4	Distribution of agricultural input to 1520 beneficiaries after training						Yellow	Yellow	Yellow				
5	Set-up 20 demonstration plots						Red	Red	Red				
6	Policy guideline development and sharing meeting							Red	Red	Red	Red		
7	Monthly progress report with valid supporting documents		Green	Green	Green	Green	Green	Green	Green	Green			
8	Conceptual sharing meeting							Red	Red	Red	Red		
9	Field day organization										Orange		
10	Help desk and e-agriculture								Blue	Blue	Blue	Blue	
11	Awareness campaign										Red		
12	Interim workshop										Light Blue		
13	Final workshop											Red	Red
14	Monitoring				Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey
15	Final project completion report and presentation											Yellow	Yellow

Kick off meeting (KOM)

To officially launch the project, PROSHIKA organized a half day long kick off meeting on 14 June 2022 at NGO Affairs Bureau Auditorium Shere-e-Bangla Nagar, Agargaon Dhaka, Bangladesh. The participants attended the workshops were from; Department of agricultural Extension , City corporation representatives, Shere-e-Bangla Agricultural University, Bangladesh



Agricultural Research institute, Town federation representatives, Nursery Association representatives, GIS experts, Forest experts , Successful roof top gardeners, on line roof top garden association representative, Developer Association representative, NGO representative, FAO representative, Proshika representative and Media representatives.

Outcome of the workshop;

- Should explore different organization experiences on Rooftop gardening at Dhaka cities.
- Need a good training module focusing on year-round production plan, Modern variety introduction, Integrated Pest Management, soil management, roof safety, introduction to smart agriculture and proper water management , vertical gardening and Nutrition.
- Demonstration should be established in public institution and in visible place with easy access. Introduction of good variety for individual gardener and demonstration so that gardener can increase productivity from a small area.
- Select the beneficiary who has his/her own roof top and have motivation and previous experiences on roof gardening. Involve young generation with urban agricultural.
- Need strong knowledgeable trainer for technology dissemination.
- Garden should be good productive otherwise people become dishearten.
- You-tube channel, face-book face may help gardener to solve their problem.
- Quality input is must, linkages between service provider and gardener need to be established
- To learn about the Rajuk's 40% greenery zones and include those area for roof garden
- Awareness campaign, Mass media campaign is necessary for motivation
- Emphasis needs to be given on proper water and waste management

- Ensure proper on time problem focused technical support. Otherwise, gardener will lose their eagerness
- Follow-up monitoring is very important

Proshika included the suggestions with their implementation plan and started the field activities.

Consultative meeting at city level

To share the project activities and the involvement of different stakeholder in implementing process a total of 05 consultative meetings were organized in four City Corporation from August to September 2022. In those meeting city councilors, City Corporation officials, FAO representatives, DAE representative, nursery owners, social worker, school teacher, federation leaders, Proshika officials and Proshika project team were attended the meetings. A total of 144 participants attended the meeting where 104 were man and 40 were women



Key outcomes of the meetings;

- Involvement of DAE at implementation process is essential
- City Corporation has a mandate to give a beautiful life to the urban people. Rooftop garden will help to ensure safe, fresh and nutritious food for the city dwellers. The project belongs to the city corporation, so it is their responsibility to work closely with the implementing partner. Counselors ensure their cooperation and support in the project implementation process. this project..
- Nursery owners explained their services and ready to help the gardener with input support.
- The school teachers mentioned that it is very important for new generation to involve with this type of activities and participate in implementation process.

Coordination meeting with DAE-DD Offices in Dhaka, Gazipur and Narayanganj

In the month of July'2022, 03 coordination meetings were held with DD-DAE officials in GCC, NCC and Dhaka. On 20th July a non-formal meeting was held with DD-DAE, Dhaka. Proshika project team and Dhaka metropolitan areas working agriculture and sub-assistant agriculture officers were attended the meeting. The meeting was chaired by the Deputy Director. A total of 37 participants (Female 14, Male-



23) were attended the meeting. The meeting was organized to orient the project among the participants, to learn about the DAE experiences on urban agriculture activities and to build linkage between DAE officials and project team for better cooperation during the implementation process.

Suggestions and comments from the meetings;

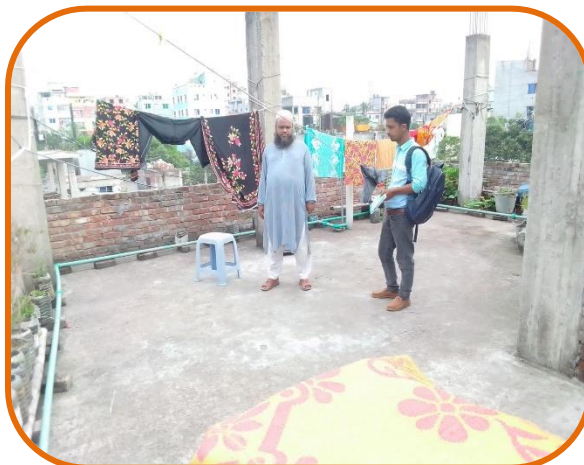
- DAE suggested to involve DAE experts in ToT for their skill development in rooftop gardening and training facilitation
- Ensure involvement of DAE field staff in input distribution
- Shared beneficiary list with DAE for continuous monitoring support

More over to explore the experiences on rooftop garden activities a visit was took place in Bangladesh Agricultural Research Institute, Joydebpur, Gazipur and Bangladesh Shere-e-Bangla University. Proshika project team had a short meeting with the relevant personnel and visited their practiced technologies.

Beneficiary Selection:

Within the strict time frame, target beneficiary selection was a great challenging job; therefore, first the project team selected some criteria for the potential beneficiary selection. Mainly interested house owner with the potential gardening facilities got the priorities as project beneficiaries. The criteria are;

- Willingness and interest to involve in Roof top garden activities
- Having potential available spaces and ownership on rooftop to involve/improve or establish rooftop garden. Potential space on rooftops is an utmost important for improving or establishing the garden in the cities.
- Amateur or potential under used garden will be get priority
- Willingness of implementation of rooftop gardening after receiving training from the project.
- Previous experience in roof top & urban gardening will be given preference
- Access to water supply in the rooftop
- Availability of labor/manpower for day-to-day care & maintenance



Project team talked with city councilors, local house owner Association, flat owner associations, different social activist groups, DAE, Schools, local elites for selecting the beneficiaries. In different areas they search for key informant and communicated with them. The team went door-door to for potential beneficiary selection following the selection criteria. After making a primary list, the team started to visit every door to door with Proshika official identity card. Beneficiaries are selected in a cluster basis e.g., 25-30 or 50 persons from an area so that they can attend in the training session easily and get required input and technical support closely and timely.

A total of 1500 beneficiaries are selected from four city corporations. General information on project participants/beneficiaries are shown below;

Table-1: Selected beneficiaries with Gender

City corporation	Number (% in parenthesis)		
	Female	Male	Total
Dhaka North City Corporation	266 (48.36%)	284 (51.63%)	550
Dhaka South City Corporation	339 (61.63%)	211 (38.36%)	550
Gazipur City Corporation	96 (48%)	104 (52%)	200
Narayanganj City Corporation	72 (36%)	128 (64%)	200
Total	773 (51.53%)	727 (48.46%)	1500

Source: Field data (2022)

It is shown in the above table that 51.53% female and 48.46% male were selected from four City Corporation. Highest percentages (61.63%) of women were participated from the Dhaka South City Corporation. Among four City Corporation less percentage (36%) of women were involved from Narayanganj City Corporation.

Age

Different age groups people were participated with the project activities. It was noted from the below table that that mixed group city dwellers involved with project activities. The oldest groups average age is 75 and the youngest groups average group is 19.5 year. Below table shows that young dynamic city dwellers preferably younger than 50 years participated in the project.

Table-2: Average age of the participants

City corporation	Age of participants		
	Average age	Youngest	Oldest
Dhaka North City Corporation (n=550)	41	21	84
Dhaka South City Corporation (n=550)	42	17	70
Gazipur City Corporation (n=200)	45	22	73
Narayanganj City Corporation (n=200)	32	18	74
Total (n=1500)	40	19.5	75

Source: Field data (2022)

Rooftop size:

The below table shown that selected gardener has feasible area in their roof for gardening. The average rooftop size is 1214 square feet. The lowest rooftop owner beneficiaries belong to DNCC as there are some slum areas included in the project activities. It is mentionable here that only 10% tenants were listed as project beneficiaries from DSCC.

Table-3: Average Rooftop size

City corporation	Rooftop areas (Square feet)		
	Average	Highest	Lowest
Dhaka North City Corporation (n=550)	993	3000	450
Dhaka South City Corporation (n=550)	990	3000	600
Gazipur City Corporation (n=200)	1803	4800	1000
Narayanganj City Corporation (n=200)	1070	3000	600
Total (=1500)	1214	3450	662.5

Source: Field data (2022)

Area selection

Depending on project opportunities and time constraint areas were selected with the consultation of city corporation personnel, councilors, Proshika regional staffs, federation leaders and DAE field staffs. Within the short period of time, it was not possible for the project team to cover all areas of the cities. During the consultative meetings city councilors are suggested the potential areas. The project areas under four City Corporation are shown below;

Table-4: City corporations wise area coverage

City Corporation	Selected wards	Selected Thana
DNCC	07,06, 19, 08, 02, 05, 14, 12, 51, 52, 49, 01, 53, 50, 47, 45, 17, 49, 48, 20,,22, 28, 21, 37, 34, 33, 13, 06, 09= 29	Badda, Banani, Pallabi, Mirpur, Rupnagar, Turag, Uttara, Uttarkhan, Dhakhin Khan, Rampura, Khilgaon, Mohammadpur, Mohakhali, Banosree, Tejgaon, Bhatara, Adabar, Agargaon, Khafrul, Darus salam= 20
DSCC	39, 63, 65, 68, 69, 22, 48, 49, 50, 55, 56, 57, 16, 63,72, 25, 19, 2, 4, 5, 73, 11 39= 23	Demra, Hazaribagh, Jatrabari, Kamrangirchar, Kolabagan, Sabujbagh, Basabo, Shahjahanpur, Matuail,Wari, Mughda, Posta, Ramna= 13
GCC	26, 28, 30, 48, 29, 26, 18, 35, 36, 17, 25, 16, 50, 54, 48, 39, 47, 53, 54, 57, 46, 62, 49, 45, 56, 40, 46, 40, 44= 29	Joydebpur, Tongi, Bason, Gacha, Salna, Tongi, West, Tongi East, Pubail= 09
NCC	2,7,1,5,6,4,8,9,11,12,14,15,16,17= 14	Siddirganj, Narayanganj Bandar= 02

Source: Field data (2022)

A wide range of areas were selected under four city corporations. Above table shown that beneficiaries selected under DNCC covered 29 Wards and 20 Thanas, DSCC covered 23 wards and 13 Thanas, GCC covered GCC covered 29 wards and 09 thanas and NCC covered 14 wards and 2 thanas .

Demonstration Selection

During KOM launching meeting it was suggested by the experts that different types of institutions need to be selected for demonstration set-up in the project areas. To keep it in mind, project team visited different institutions and had several meetings with the institution head and appropriate authorities. The team described the project activities and the objectives of the



demonstration establishment. They physically visited the institution's rooftop for the feasibility study. A formal consent letter was exchange between the interested institutions and the project authority. As per project plan,

by following the selection criteria, a total of 20 institutions were selected for demonstration establishment.

The criteria are ;

- Willingness and interest to involve in Roof top garden activities
- Willingness of implementation of rooftop gardening after receiving training from the project.
- Availability of labor/manpower for day-to-day care & maintenance should be involved by the Garden owner.
- Access to different stakeholder like researcher, students, professional to visit the garden
- Easy access for monitoring
- Allow the project authority to organize field days

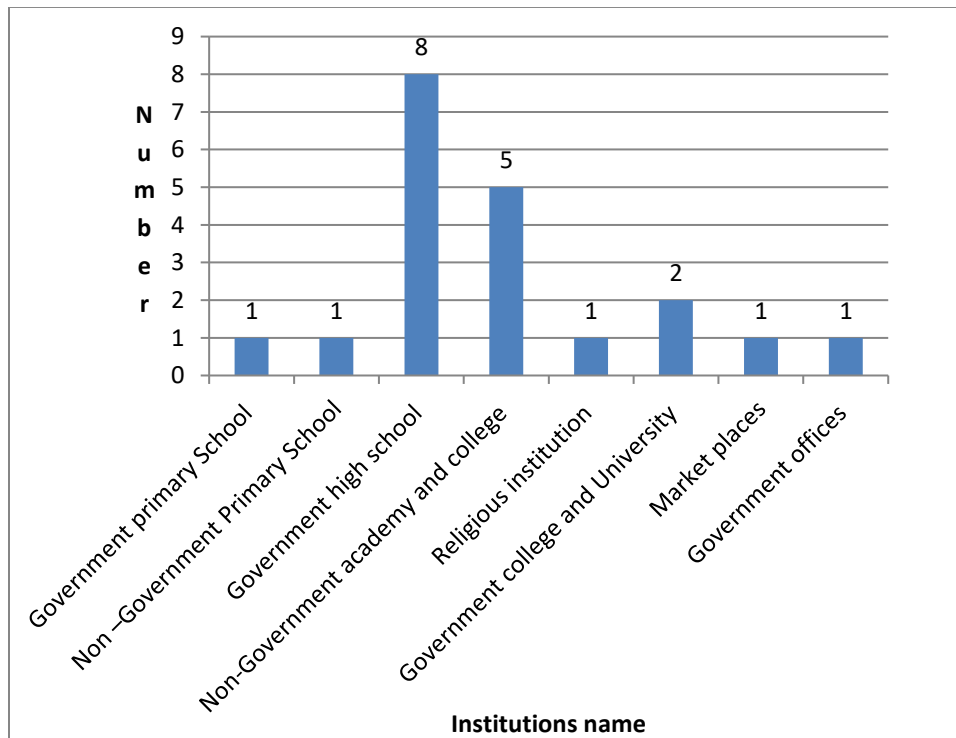


Figure-1: Demonstration Institutions categories

Source: Field data (2022)

The above-mentioned figure showed that 08 Government high schools, 05 non-government academy and colleges, 02 college and universities, 01 government primary school, 01 non-government primary school, 01 religious' institution, 01 market place and 01 Government office were selected for demonstration establishment

From DSCC and DNCC 06 demonstration institutions are selected from the each of the city corporation. Similarly, from Narayanganj and Gazipur City Corporation 04 institutions are selected from the each of the city corporation.

Training

Training of Trainer Course (ToT)

Training is one of the effective communication methods which bring changes in skill, knowledge and attitude of the trainees. Prior started the beneficiary training, Proshika organized a Training of Trainer course in the view to form an expert facilitator team. It was not actually with the project planning. But depending on the situation Project team arranged the training with the consultation



of FAO. The training was held at Horticulture Center, Asad Gate Dhaka from 24-25 August 2022. A total of 31 Participants participated in the course where 24 were male and 7 were female. The purpose of the training was to train the participants on the concept of roof top gardening and its role in the local food system and improve nutrition. A draft module was developed before the course. The participants attended the course comprised with DAE Agricultural Officers from four city corporations and Proshika Agricultural team and project staffs.

The two-day long training of trainer course on roof top garden module was organized with an objective; to orient the participants with the roof top garden module and to build the capacity of the expert on roof top module

The facilitators conducted the course were from DAE and Shere-e-Bangla Agricultural University. They have their specialization on horticulture, urban gardening, pest and disease management and food and nutrition. Participatory training methods were followed in the course such as; Practical on potting, repotting and de-potting, growing media, growing container, compost preparation, video projection, power point presentation, experiences sharing, question answering , live sample projection etc.

Outcomes of the Training of Trainer Course;

- The facilitators developed skill on facilitation technique on different contents
- The facilitators team developed an understanding on the module
- Revised the training module according to field experiences of DAE and Agriculture University experts
- A twenty members facilitators team was formed for beneficiaries training conduction.

Table-5: Facilitator team

SI no	Name	Sex	Designation	Education	Cell no
1	Md. Anisur Rahman	M	Community mobilizer, DNCC	Diploma, Agri.	01912860237
2	Rehana Pervin	F	Food & Urban Garden Specialist	MS. In Agriculture	01796587696
3	Md. Solaiman	M	Zonal Manager, Proshika Uttara	BSc. Agriculture	01714533493
4	Md. Abdul Khalaque	M	Trainers and Project supervisor, DNCC	Diploma, Agri.	01711456267
5	Prodip Kumar Gosh	M	Deputy Director, Proshika	BSc. Agriculture	01718785248
6	Kbd Dwijabar Barai	M	Food Urban Garden Specialist	BSc. Agriculture	01716644747
7	Kbd Jogesh Ch. Barman	M	Livelihood Specialist, SUFAL Project Proshika	BSc. Agriculture	01786458244
8	Bidyut Chandra Bhowmick	M	Supervisor, Urban Garden Project -NCC	Diploma, Agri.	01988382990
9	Shawan Mojumder	M	Agriculture Extension Officer, DNCC	BSc. Agriculture	01715984898
10	GM Bodrul Hasan	M	Agriculture Extension Officer, DSCC	Ms. Agriculture	01718927523
11	Dr. Sultana Al-Amin	F	Deputy Team Leader –Urban Garden Project -Proshika	PhD. Agriculture	01911731329
12	Farhana Sultana	F	Upazilla Agriculture Extension Officer, NCC-Bonder	Ms. Agriculture	0172700925
13	Mahmuda Hasnat	F	Upazilla Agriculture Extension Officer, NCC-Sadar	Ms. Agriculture	01922933163
14	Md. Hasibul Hasan	M	Upazilla Agriculture Extension Officer, GCC	Ms. Agriculture	018858200404
15	Md. Rafiqul Islam Khan	M	District Training Officer, Gazipur	Ms. Agriculture	01716602617
16	Delwar Hossain	M	Resource Person, Proshika	Diploma Agri.	01743923898
17	Sumona Rani Das	F	Deputy Team Leader Proshika, Proshika	Ms. Agri. Mgt	01711155356
18	Jahidul Hasan	M	Cluster coordinator –NCC	Ms. Agriculture	01677049839
19	Md Alhaz Hossain	M	Community Mobilizer	Diploma, Agri.	01764829261
20	KM Safiuddin	M	RTG. SAAO, ADE	Diploma, Agri.	01716743836

Source : Field data (2022)

Beneficiary Training;

Imparting training to the beneficiaries was a large activity in the project planning. Before practicing rooftop gardening, gardener must be mindful about important facts of gardening. Training will play an important role for the change in behavior by improvement of knowledge, skill and ability of the city gardeners. Bangladesh is an agrarian country. So, people acquire general knowledge on agriculture by generation.



Rooftop gardeners may have some general knowledge on gardening and may collect some information from you-tube channels about establishing the gardens.

Despite that, to obtain detailed general and technical knowledge on roof top garden, training is must for the specialized agriculture like roof top gardening

Gardeners may develop their overall knowledge and skill on establishing and managing the gardens through a comprehensive training. Without proper training or knowledge of garden's environment, soil, plants, Integrated Pest management (IPM), and weather– desired success by the gardeners may not be achieved. Training provision is an essential intervention for the targeted groups with limited Knowledge.

Proshika designed 2- day long training program with a goal of enabling beneficiaries to get appropriate knowledge, skills and information on rooftop gardening.

Objectives of the training;

- To increase knowledge of the beneficiaries about the rooftop agriculture technologies;
- To develop gardeners' skill for improved garden agricultural practices;
- To change the attitude of the beneficiaries towards improved agricultural technologies;
- To develop confidence of the beneficiaries for adoption of new technologies.

Training methodology

A Technical Training Manual was reviewed and finalized after the ToT course with the consultation of Proshika, FAO and DAE experts. A Hand-out was developed compiling all technical sessions for the beneficiaries and provided them during the training sessions.

The training was conducted by following a sort of training methods including Participatory discussion, Brain storming, Power point presentation, Experience sharing, Video presentation, Question & Answer, Open discussion and Practical activities. All the activities carried out during training were both appropriate and effective in meeting the needs of the beneficiaries and the objective of the project. Trainers engaged participants in discussions and kept the forum open for feedback, queries, and suggestions.



Training materials

Training materials used to meet required standard. The training was conducted by using a variety of materials like VIP card, Flip chart paper, Projector, White board and permanent marker, Banner, Name card, Training module, Pen and note book, Photographs, festoons etc. Essential practical materials used for field practices; fertilizer, sapling, seeds, organic pesticide, geo bag, vermicompost, coco dust, ash, compost, chemical fertilizer, pheromone trap, yellow stick, etc.



Training session's contents; the training contents mainly developed considering the rooftop gardening is a specialized agriculture. The comparison between homestead garden and rooftop garden made clear so that the important of rooftop gardening and its criteria is understandable to the beneficiaries. Planning and garden lay-out got the first priorities. Importance of growing media and containers preparation included focusing weight load reduction, soil nutrition management and proper drainage system. Intercultural operation included *aedes* larvae prevention technique and proper water management. For improvement of nutritional status, emphasis given on the composition and varieties (vegetable and fruit) inclusion in rooftop garden, better cooking methods and good eating practices.

Common problem faced by the participants

The frequently stated problems were; Flower and fruit dropping both for vegetables and fruit production, no fruit bearing after one year, pest and disease management, lack of knowledge on garden management.

Training Time line

The training started from the Month of September'2022 and continued up to February 2023.

Training Courses

Proshika Manobik Unnayan Kendra arranged training for 1500 project beneficiaries and 20 demonstration institution representatives on roof top gardening, so that, they can establish and manage their garden efficiently and make the garden economically viable and nutritionally enriched. A total of 56 training courses were organized in four city corporation areas. On an average 25-30 beneficiaries were attended in a course. The below figure shown that in DNCC and DSCC the training participants were more than the actual beneficiaries.



Some family members also attended the courses thus the total training participants increased from 1500 to 1543. Among them 770 female and 773 male were participated in the training courses.

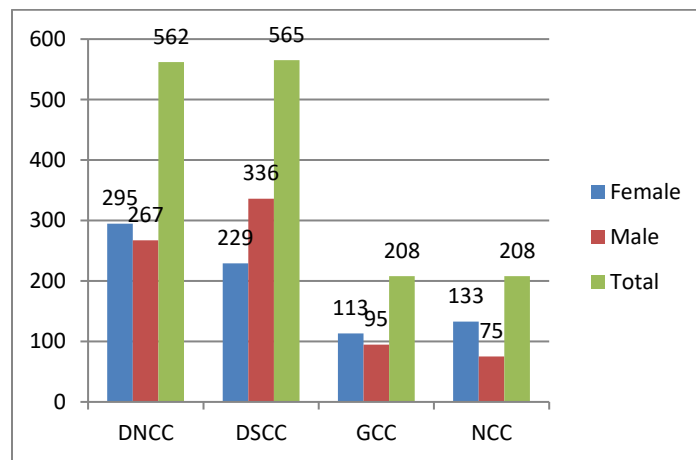


Figure-2: Training participant information in four city corporation

Source : Field data (2022)

Pre-test and Post test

A questionnaire was developed and used to test participants' knowledge about Roof top gardening. Participants attended the pre-test at the beginning and post-test at the end of the courses. The questionnaire was mainly prepared with open and closed-ended questions. The topics included in the questionnaire were from the rooftop garden module. It was found from the evaluation that, at the end of the training, the progress made by the participants was satisfactory.

The participants performances are shown below;

Table-6: Participants training performance

Sl no.	City corporation	Average participant s/batch	Pre-test (out of 15)		Post test (out of 15)	
			Pass mark obtained /part. (% in parenthesis)	Average number obtained/participants	Average number obtained/participants	Incremental score /participants
1.	DNCC	26	4 (15.38%)	2.54	12.49 (83.26%)	9.95
2.	DSCC	26	5 (19.23%)	2.77	11.59 (77.26%)	8.82
3.	GCC	26	2 (7.69%)	2.99	11.17 (74.46%)	8.73
4.	NCC	23	3 (13.04%)	3.61	11.28 (75.20%)	7.67
	All		3.5 (13.83%)	2.97	11.63 (77.54%)	8.79

Source : Field data (2022)

The above table shows that after the training courses in four cities the participant obtained an excellent incremental score. It found from the table that at the beginning the pass mark obtained participant was 15.38%, 19.23%, 7.69% and 13.04% in DNCC, DSCC, GCC and NCC respectively. But at the end of the training average marked obtained by the participants was increased to 83.26%, 77.26%, 74.46% and 75.20% respectively in DNCC, DSCC, GCC and NCC. The average number was 3.5 at the beginning and the end the average number increased to 11.63. The result was highly satisfactory in four City Corporation.

Common learning by the participants;

- All content on rooftop gardening is new to them
- Garden-lay out is a new concept to them
- Practical session on growing media preparation and growing container filtering is very attractive and useful
- Hand pollination and pruning is an ultimate solution for gourds cultivation.
- Got practical solution on , soil and seed treatment
- Re-potting for fruit cultivation was absolutely new to them
- Well explained video on growing media preparation and re-potting attract them most
- Got useful information on proper irrigation and drainage system and prevention of mosquito breeding
- Garden waste management
- Got solution on pest and disease management and use of organic pesticide etc.
- Food selection , cooking process and nutrition

Suggestion;

- Option for getting technical advice after finishing the project.
- Refresher course

Input distribution

In project planning it was designed that FAO will deliver different agricultural inputs as a startup materials to gardener. The purpose of this activity was to help the beneficiaries to practice their learning after attending the training in their rooftop. The inputs received per participants were 20 types of winter and summer seeds (Cabbage, Sweet gourd, Tomato, Broccoli , Capsicum, Gourd, Squash, Radish, Chili, Country bean, Red amaranth, Kangkong, Ladies finger, Cucumber, Yard long bean, Sweet gourd, Eggplant, Chili, Indian spinach , Bitter gourd), 05 types of fruit sapling (Mango, Indian jujube, Lemon, Malta, dragon) , 07 different sizes geo-bags (10 gallon, 15, gallon and 20 gallon), 03 agricultural tools (hoe, spade and watering cane), 50 kg vermicompost and 06 chemical fertilizers(Urea, TSP, MOP).



Input delivery started from the month of November'2022 and continued up to January 2023. Input supplied at project areas by FAO was delayed. FAO assigned different vendor for different inputs, even the same types of materials were supplied by different vendors. Different types of garden inputs scheduled for delivery, reached recurrently at the project areas. For example, Hoe, Spade and Water cane were not reached at a time. Furthermore, in some cases, same material of different sizes reached at different times, like- 10, 15 and 20 gallons of Geo bags. As a result, project staff had to organize the distribution events repeatedly which created additional cost of the project. On the other hand, project beneficiaries also suffered a lot as they had to come to the distribution points often to take their inputs. Besides increasing their transportation cost, it wasted their time also.

Beneficiary did not able to use the winter vegetables seed properly as the input reached to them lately. Geo-bags required huge soil and organic materials to set them ready. A total of 180kgs soil and organic fertilizer needed for the 07 geo-bags received by the participants. In the city areas they found it difficult to collect the volume of materials to buy and carry to the rooftop. Project team suggested them to use garden and kitchen waste for overcome the situation. The sapling distribution time was less feasible for its survival. So, gardener faces difficulties to manage their sapling in winter season.

It was found form the field monitoring that after receiving the start-up materials, they started their gardening activities. The beneficiaries introduced with the geo-bags first time and learn its benefits.



Demonstration Establishment

Main purpose of the demonstration establishment is to disseminate the rooftop garden technologies among the larger community. Both project team and demonstration institution jointly establish the garden. It was a participatory approach. The institutions involved with supplying more growing containers and physical labor. Under the rooftop garden project simple and short type demonstration method was followed to show an easy method of establishing a rooftop garden. The main principles of the demonstration are to learning by doing approach. Project followed clear-cut demonstrations of a single practice with new ideas. Proshika showed step by step methods to establish the garden among the students, teachers and other involved stakeholders.



Students and trained representative were involved with the implementation process. They involved with growing media and growing container preparation, seed sowing, sapling transplantation, intercultural operation and roof safety measure. To establish a demonstration 14 different sizes geo-bags, 20 type's summer and winter vegetables (double in amount), 2 sets of agricultural tools (hoe, spade and watering cane), 5 types of fruit sapling (double in number), 100 kg vermin-compost and 12 kg chemical fertilizer was supplied on behalf of FAO.



The technologies were; garden lay-out design, growing media preparation, growing container preparation and safety measure of the roof surface along with other intercultural activities.

Operational information:

The average size of the demonstration garden shown below. The average size in four City Corporation ranged from 2083 to 2875 square feet. The average size is 2381 which means the rooftops are feasible for demonstration establishment.

Table-7: Average demonstration garden size (square feet)

Sl no.	City corporation	Average size (Square feet)
1	DNCC	2083
2	DSCC	2433
3	NCC	2875
4	GCC	2133
	Average	2381

Table-8: Major technologies followed in the demo gardens garden

Technologies	Application methods
Growing media preparation	Soil+ cow-dung+ vermicompost + chemical fertilizer
Growing container preparation	Prepare filter with sand, soil and coil
Rooftop protection	<ul style="list-style-type: none"> - Establish proper drainage system - Provide support underneath of the containers
Crop selection	<ul style="list-style-type: none"> - Different color vegetables and fruit selection
Pest and disease management	<ul style="list-style-type: none"> - Yellow tape - Pheromone tape - Mechanical Control - Organic pesticide
Dengue prevention	<ul style="list-style-type: none"> - Proper water use - Observation - Establish proper drainage system in growing container - Garden cleaning - Trap cropping (Mint and marigold cultivation)
Irrigation	<ul style="list-style-type: none"> - Use watering cane
Intercultural operation	<ul style="list-style-type: none"> - Repotting and de-potting, pruning, pollination
Compost preparation	<ul style="list-style-type: none"> - In waste bin with garden and schools waste
Nutrition	<ul style="list-style-type: none"> - Multicolor vegetables and fruit production technologies
Selected vegetables	<p>Seasonal Vegetables: Cabbage, Sweet gourd, Tomato, Broccoli , Capsicum, Gourd, Squash, Radish, Chili, country bean</p> <p>Leafy vegetables: Red amaranth Kangkong, Ladies finger, cucumber, Yard long bean, sweet gourd, Eggplant, Chili, Indian spinach , Bitter gourd</p> <p>Fruit: Lemon, Mango, Indian Jujube, Malta, Dragon</p>



Growing container: Container is one of the elementary materials for developing plant in the rooftop. Selection of appropriate containers is vital for individual crops. From project side only geo-bags were supplied as a garden established container. But different sorts of containers were selected and had been used in the demo garden with the support of the institutions.



Table-9: Growing container use status in the demo gardens

CC	Different types of containers used in the demo garden in (%)										Average type
	Geo-bags	Half drum	Earthen pot	Plastic pot	Waste oil cane	Sack	Carets	Waste color pot	Water bucket	Permanent concrete bed	
DNCC	100	16.67	50	0	16.67	16.67	50	0	16.66	0	2.83
DSCC	100	33.33	16	0	0	16.67	83	0	16.66	0	2.67
GCC	100	0	100	100	50	25	75	25	0	75	5.5
NCC	100	50	0	0	0	0	0	21.75	0	25	2.75
Average	100	25.00	41.50	25.00	16.67	14.59	52.00	11.69	8.33	25.00	3.44

Source: Field monitoring data (2023)

From the above table it was found that a total of 10 types of containers were projected in different demo gardens. The highest used containers were geo-bag (100%) and carets (52%). But the permanent beds were established in GCC (75%) and NCC (25%). Waste oil and color pots were included in different demonstration garden. It was very useful to show the different types of low-cost growing containers and their uses. Mainly Geo-bags are used for fruit cultivation. But for vegetables cultivation all types of growing containers are used in the garden.

Table-10: Vegetable and fruit cultivation status in the demo gardens

Name of different vegetables and fruit	Vegetables and fruit Cultivation status in demo garden In (%)			
	Leafy vegetable			
	DSCC	DNCC	GCC	NCC
Indian spinach, Kangkong, Red amaranth	100	100	100	100
Amaranth	50	66.67	25	100
Spinach	16.67	16.67	0	25
Mint	50	66.67	100	75
Coriander leaf	16.67	16.67	25	25
Average (no)	4.5	8.3	5	5.56
	Vegetables			

Tomato, Chili, Okra	100	100	100	100
Bottle gourd	50	83.33	50	50
Sweet Gourd	16	83.33	50	25
Egg plant	100	100	50	100
Yard long bean	16.67	33.33	75	25
Bitter gourd	83.33	83.33	75	50
Cucumber	66.67	66.67	50	00
Spong Gourd	50	8.33	50	100
Average (no)	7.1	8.33	7.5	6.75
	Fruit			
Mango, Malta, Lemon, Indian Jujube, Dragon	100	100	100	100
Guava	16.66	50	100	50
Pomegranate	16.67	50	50	25
Others (Hog plum, Papaya, sapodilla, wood apple, wax)	16.66	32	50	75
Average (No.)	6	6.6	7	6.25

In winter season vegetables were not cultivated properly and the percentage was negligible. But in the summer three types of leafy vegetables namely Indian spinach (100%), red amaranth (100) and kang Kong (100%) were cultivated in all demonstration plot followed by mint coriander leaf and amaranth. For vegetables eggplant, tomato and chili were grown fully followed by bitter gourd, yard long bean and other gourds. Project supplied five types of fruit were planted with the geo-bags. But project team encouraged them to include Guava and pomegranate in their garden as the two fruit is very much feasible on rooftop. It was shown in the table that Guava found more preferable by the institutions. So different colors, types and nutrition reach vegetables and fruit were shown in the demonstration garden with their production technologies.



Vegetable and Fruit production and utilization status

It was found from the below figure that on an average 40 kg leafy vegetables and 33 kg of different vegetables were harvested from the demonstration garden from four city corporation within four months. And all the produced distributed among the teachers, student and institution authorities.

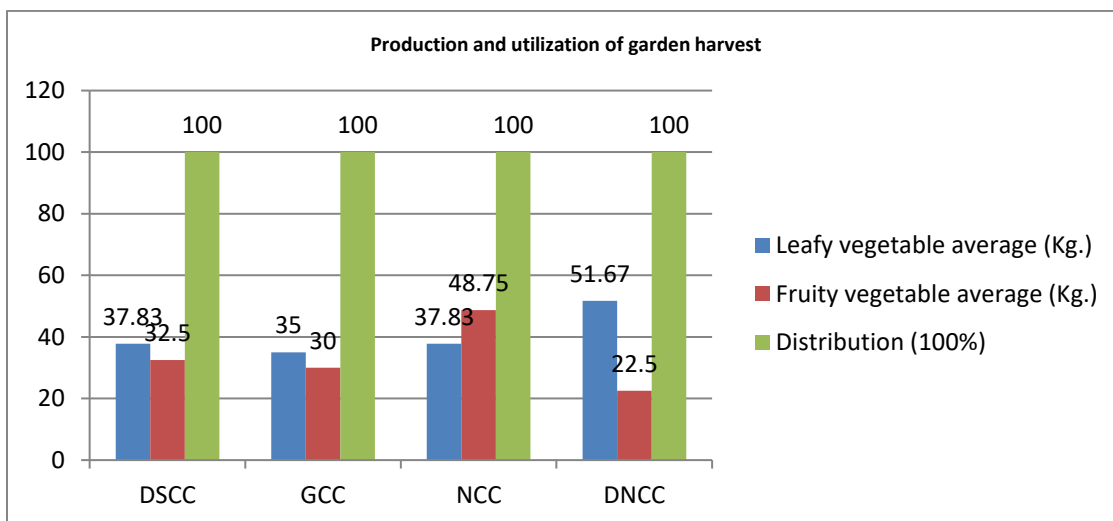


Figure-3: Production and utilization of demo. Garden harvesting

Expansion of rooftop garden activities

The main purpose of the demonstration was to motivate and disseminate the rooftop gardening technology among the wider community. Different strategic plan had been developed and executed. The activities were; field day organization, garden visit, monitoring team formation and competition announcement among the students for gardening. From the follow-up it was found from the below table that a total of 197 students, 69 teachers and officials, 111 potential gardeners visited the gardening activities. Later 49 students were engaged with garden establishment.

Table -11: Technology expansion status

City corporation	Garden visited by students (Average)	Garden visited by teachers/officials (Average)	Garden visited by others (Average)	Gardening Started by the students (Average)
DSCC (n=6)	55	15	75	11
GCC (n=04)	42	19	29	22
NCC (n=04)	33	10	00	06
DNCC (n=06)	67	25	07	10
Total	197	69	111	49

Motivational activities by the institution

- Competition among the student for good gardening and good gardener will be awarded by the school authority
- Garden selected as a practical class for the student
- Kept option for guardian and interested city dwellers to visit the garden
- Formed garden monitoring committee with students and teachers
- Garden will be expanded for encouraging more student and potential gardener.
- Agriculture extension officer has opportunities to get on farm learning from the demonstration garden
- Opportunity to encourage visiting farmer to learn about the urban farming.

Conceptual sharing meeting

Rooftop gardening project has implemented by involvement of different stakeholder in four city corporations. The activities started from June 2022 and a lot of works have been completed. Different stakeholders have a different perspective about the project success. So, it is essential to share the progress among the beneficiaries. According to project plan Proshika organized 08 conceptual sharing meetings in four city corporations. A total of 256 participants attended the meeting including 134 male and 12 female. Main objectives of the meetings were to share the project activity progress, to share the upcoming activity plan, to take suggestions from the participants. City corporation, DAE, FAO, project beneficiaries and interested gardener attended those meeting. In those meeting Proshika projected their work progress and informed the participants about upcoming project plan Project informed the



stakeholder that the activities like e-agriculture, field day observation, awareness campaign, advocacy and communications, workshops and monitoring activities would be completed within the time frame.

Comments from the workshop:

All gardener and institution head talked about the late input distribution for winter crop. The participants suggested that for better utilization of the roof top garden activities;

- The project duration should be increased because gardener need more support from the project
- Need to involve more city dwellers with the gardening activities
- More awareness among the younger generation
- Categories the gardener according to their performances
- Strong monitoring support

Policy guideline development and sharing meeting

According to Prof. Dr Mahub, Shere-E-Bangla Agricultural University, advanced nations have implemented laws for urban agriculture to reduce pollution and also ensure food safety. For example, Toronto City Council enacted a comprehensive 'Green Roof' by-law in 2006 that says a portion of the roofs of new residential, commercial and institutional buildings must be covered with trees.

The United States has introduced a rating system for commercial buildings called 'Leadership in Energy

and Environmental Design' which mandates rooftop greening and rainwater harvesting systems to compensate for environmental and green damage caused by building construction.

Singapore has taken initiatives to meet the demand for essential vegetables through sky-farming [gardening done on skyscrapers] to ensure urban agriculture and greening; the country has even launched a government agency called 'Urban Redevelopment Authority.'

In 2018, the Bangladesh Government included urban farming in its national agriculture policy for the first time. The policy was included in the specialized agriculture section and in 2021, local government minister



Md Tajul Islam announced that the city corporation would provide 10% holding tax rebate for the city dwellers if they plant rooftop gardening at their houses.

One of the project objectives is to, develop a set of policy guidelines for the Government that allows the City corporation to implement a policy to incentivize rooftop gardening. To combat this objective a technical and policy guideline review workshop was organized on 15th December 2022 at A.K.M. Gias Uddin Milky Auditorium Farmgate, Dhaka. Representative from DNCC, DAE, Roof top garden activist, social media representative, FAO, and Proshika were attended the meeting. The main objective of the meeting was; to identify the selection process of a garden for tax rebate.

The following suggestions and opinion on Technical and Policy guideline came out from the workshop.

Technical and other issues

- Awareness among the city dwellers: Every roof should be green will be a slogan and the publicity should be through print and electronic media
- Green building identification: Model rooftop garden should establish on the government office and the apartment and marked as a green building.
- Rooftop environment: weight capacity, water source and irrigation facilities, drainage system and waste management etc.
- Soil management: 20% soil and 80% organic matter should be considered for soil preparation (1% loamy soil+1% cowdung+1%vermicompost+1%cocodust). It will be minimized and reduce growing containers weight in rooftop
- Growing container management : For nutrition and water management , there should be a good filtering system in growing container
- Fruit and vegetable selection: Considering point; Nutritious fruit and vegetables, shallow rooted heat tolerance, less water loving etc.
- Irrigation management : Rain water harvesting, drip irrigation
- Environmental and economic evaluation of a garden

Tax rebate issues;

- Garden size: 1000 square meter should be an ideal size for taxation. 20% area of a rooftop or per square meter may be another option
- Building design: Some of the building has kept the gardening option during construction and need to consider those building

- Number of growing containers: 20 plants with growing containers in a garden may be consider for taxation
- Multistoried building: Flat owner association will decide who will get the tax rebate and how
- Types of building: Different rules for Commercial and residential building
- Record keeping: Every garden should keep their gardening record properly
- Monitoring: There should be special monitoring system in City Corporation. It may be off line or digital.
- Tax rebate rate: Tax rebate percentage may be varied from 7% to 10% depending on garden size (1000 square meter standard)
- Application process: Gardener should apply to ward commissioner office for tax rebate. Ward council office will nominate the garden for tax rebate
- Committee formation: For technical, economic and environmental evaluation a committee should be form comprising department agricultural Extension, Department of Environment and City corporation.

The outcome of the workshop was shared in training workshop for city councilor at DNCC on 21 December 2022.

Advocacy, policy and communication meeting

For sharing the above-mentioned outcomes with other city corporation authority, Advocacy, Communication and Policy Dialogue meetings were organized at DSCC, NCC and GCC. The objective of the meeting was to; Share the outcomes from 15th December 2022 workshop and include their opinion for their own city dweller. Participants attended the meetings were from city corporation's revenue department, city planner, Department of Agricultural Extension, Environment Activities, Scientist from Bangladesh Agricultural Research Council, Teachers, Gardener, Journalist etc. A total of 90 participants attended the meeting where 62 were male and 28 were female.



Outcomes of the meeting;

During the meeting GCC, NCC and DSCC participants agreed with the 15th December 2022 outcomes. New suggestions and comments from them are shown below;

Gazipur City Corporation meeting:

GCC meetings outcomes; Training should be compulsory for the gardener. In the application form there should be a section for signature of DAE personnel. City Corporation should create a monitoring cell for gardener. There is a suggestion that the City Corporation can follow the green garments incentive rules to incentivize the gardener. The garden should be start with 1000 square feet. Different seasonal vegetables fruit and flowers need to be included in the garden. Every year the garden will be evaluated by City Corporation and DAE staff. More awareness program needed for expansion of the activities. Rooftop gardening should be included with building plan. There should be an expert committee comprised with DAE and city corporations for implementing the activities.

Dhaka South City Corporation meeting:

From DSCC meeting, opinions are; If more city dweller engaged with gardening, it may convenience the city corporation authority for incentivizing them. More rooftop gardening activities need to be visible in the city areas for motivated the city authorities. Dhaka WASA should be one of the members of this process. Training needs to be compulsory for the gardener.

Narayanganj City Corporation meeting:

NCC meetings outcomes; All city corporation establishments should be under rooftop gardening for encouraging the people. For garden identification DAE and councilors office will be responsible. Need more awareness campaign both on line and off line platforms. City corporation revenue section will decide the tax rebate percentages.

Field day observation

A field day is a group extension event conducted at the site of any type of demonstration. An alternative is termed the “Field Day” extension approach. Field days provide the opportunity for 20 or more beneficiaries to visit a demonstration site, learn about what is being demonstrated, ask questions, and encourage them to try new ideas themselves on their own garden. To show the easy and proper garden establishing methods to a larger community a total of 16 field days have been observed in four city corporations under demonstration sites. A total of 602 participants were attended the events including 392 male and 210 female. Objective of the field days were; to show the proper technologies to establishing a garden; to motivate the participants on rooftop gardening.

Participants: Demonstration institution head, students, teachers, city corporation officials, councilors, federation leaders, NGO representative, Environment activities, District education officer, FAO representative, interested gardener, Project beneficiaries, Proshika representative, Journalist etc.

All events conducted in a festive mood. The garden was decorated with colorful papers. The venue was prepared with different colorful festoon. A Schedule activity was followed to conduct the events. Usually, the event was run in a more informal and less structure manner. A power point presentation was presented by Proshika. Mainly the major technologies followed to set-up a demonstration garden was presented elaborately among the participants.



After that all participants visited the demonstration garden. A practical demonstration on de-potting and repotting was conducted by the Proshika experts among the participants. Proshika team narrated about the garden lay-out, growing container like geo-bags, crop selection, intercultural operation focusing proper

irrigation and drainage systems etc. Integrated Pest management technologies; yellow trap, pheromone trap, insect and pest repellent crop; marigold and mint cultivation were projected in the garden. It was a seeing, doing and learning methods.

After demonstration garden visit all participants returned to the venue. Then an elaborate discussion took place on the events.



Outcomes:

Participants shared their experiences are follows.

- Project duration is short
- Projected technologies are new to them
- The demo garden is a learning tools
- The video on growing media preparation and pot preparation, filtering, potting, repotting and deporting attacked them more.

• Interested new gardener attended the field day events for first time and found the event was very useful for a new gardener

- Students are attended the event very attentively and said that they will start gardening at their home
- Attended teachers shared their gratitude for involving them and can able to teach the student on importance of rooftop gardening

- Two institutions head declared a competition and the best gardener award among the attended students.
- Environment activist told that garden will play a vital role to utilization of kitchen waste and garden waste for compost preparation.

Awareness campaign

Awareness raising means making people conscious about an issue. It makes any issue more visible within certain homogeneous group. Awareness campaign is important to increase enthusiasm, stimulate self-mobilization and action, and to mobilize local knowledge and resources. An awareness campaign can be a great way to educate people and get them to take action. Rooftop Gardening is one of the most innovative and cost-effective way to improve the urban agriculture.



Appropriate awareness campaigns at all levels are essential to promote the activity in a larger scale.

According to project planning eight (08) awareness campaigns have been organized in four City Corporation.

A total of 343 participants attended the events including 227 male and 116 female.

The main objectives of the campaign are;

- To create awareness on importance of roof top gardening among the participants and its necessity
- To create awareness on spreading the rooftop gardening to meet up the demand of nutrition by growing various vegetables, fruits and other crops.

Participants: City Corporation officials, Students, Teachers, Agriculture Experts, Department of Agricultural Extension, Bangladesh Agricultural Research Institute, Councilors, Federation leaders, NGO Representative, Environment activities, FAO representative, interested gardener, Project beneficiaries, Proshika representative, social elite, Journalist etc.

Implementation

At the onset of the program a power point presentation was presented by Proshika focusing the project activities and the importance of rooftop gardening.

After the presentation a rally was organized with carrying colorful festoon and banner. The festoon narrated the major issues for promoting rooftop gardening. A successful garden was visited by the participants and learned the benefit of the gardening from the owner.

After the rally and garden visit all participants returned to the venue. Then an elaborate discussion took place on the events. Participants shared their experiences; major comments are follows.



Department of Agricultural extension (DAE) and Bangladesh Agricultural Research Institute (BARI) :

DAE representative explained that the world is facing different crises, some are human made and some are natural. We may recall the COVID-19 situation and now the war between Russia and Ukraine. Every situation affects the worldwide food supply chain. We may get weapon easily but if the world face food crises, it is difficult to get food aid in time. So, it is the right time to use our all-food production possibilities properly. For urban dwellers need to take responsibility to increase their fresh and safe food supply and improve environmental pollution. Expansion of rooftop garden can play a vital role. Gardener should learn the proper technology before start their gardening.

Environmental activist: Environmental activities opined that from this awareness campaign they came to know about the multidimensional benefit of rooftop garden. They said that due to rapid urbanization cities

are facing very adverse situation. Rooftop garden will play a positive role to improve the situation. They said that campaign is their main activities, they will be included the rooftop garden activities with their campaign.

School representative: The teachers mentioned that we did not make city livable for our new generation. Our food is adulterated and environment is polluted. Urban agriculture can make a positive role to produce safe and fresh vegetable and fruit for urban dwellers. Many developed and developing countries have been establishing rooftop gardening on one hand to meet their daily food and nutrition necessities and on the other hand to protect the environment. We can also take appropriate action for ensuring healthier life and ecofriendly environment for our present and future generation. Attended teachers said that we will talk to student about the benefit of rooftop gardening with our daily class work. Some of the institution make a plan to involve student with gardening and will be awarded the best gardener.

Federation leader and gardener: Federation leader and Gardeners said they will continue their gardening and will encourage the other potential gardener.

NGO personnel, social elite and Journalist: Many of the city residents do not have proper training on agriculture. Starting gardening without appropriate knowledge may lead to create frustration among the gardener and this ultimately might result in unwillingness of the people in initiating new rooftop gardens. So, training needs to be ensured for new gardener by NGO or agriculture department.

Councilors: Councilors appreciated the initiative and said that urban gardening is very useful and a good approach to make city green. This kind of awareness program is time worthy. Project should organize more awareness program in the city. They made commitment to support the rooftop gardening activities in their wards. They will share the benefit of urban gardening to their constituency.

E-agriculture

There is project plan for providing technical guidance and tips on practicing rooftop gardening will be made available for urban communities. For these purposes the 'smart farming' concept will be prepared digitally by a Help Desk, mobile app, ICT, providing urban practitioners with access to information they may need on setting up urban gardens, purchasing seeds and inputs, and maintaining their gardens, by using mobile, tablets, or their personal computers through the Internet.

The application of Information and Communication Technology (ICT) in agriculture is increasingly important. E-Agriculture is an emerging field focusing on the enhancement of agriculture and rural development through improved information and communication processes. More specifically, e-agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use information

and communication technologies (ICT) in rural domain, with a primary focus on agriculture. E-Agriculture is a relatively new term. Mobile communications technology is creating opportunities for economic growth, social empowerment and grassroots innovation in developing countries.

In four city corporations the beneficiaries are located in disperse areas. They are in different part of the cities. It is not always possible to provide on time emergency service to the gardener by the service rendering organization. Help desk is useful to provide instant and convenient service delivery. The application of Information and Communication Technology (ICT) in rooftop gardening create an opportunity to help the remote gardener. Proshika created a help desk number in the month of January 2023by following IP PBX system, where IP phone coverts the IP address of the internet into a number so that the user can use the number easily. User need not to dial the IP number. Because it can be converted into any digital number. At a time, the same number can be used by different users from different places. The created number is +880-9613823547. The number is distributed among the project beneficiaries through bulk SMS with a voice message. The service provided to the beneficiaries 05 days in a week.

Help Desk Services are;

- 2 incoming and 1 outgoing call.
- Monthly call recording
- 2 Agriculturist for supporting the beneficiary and any other interested person.
- 24/7 client support
- One number for all the beneficiary and user.
- SMS to all beneficiary about health, nutrition's and roof top gardening.

Outcomes of the Help desk

A total of 124 telephone calls received from the beneficiaries from four city corporations. The problem addressed by the Help desk were; Flower and Fruit dropping problem with Mango, Litchi and lemon. Mealy bug control measure, anthracnose problem with tomato and Guava production, spot on Indian Spinach, Less growth of eggplant, No bearing with snake gourd, green chili leaf curl, No bearing with bottle gourd, pest attack with litchi and sweet gourd etc. Help desk response is growing slowly than the expectation.

Mobile Apps

There is already an increasing amount of evidence to suggest that making use of mobile and cloud-based applications addresses the sustainability challenges in agricultural field. The mobile phones have provided new approaches and thinking to the gardener for getting information. Spreading rooftop gardening information among new, enthusiastic and practicing gardener made easier with the help of cloud computing, integrated IT systems. One of the benefits of such connectivity and information flow is that it helps user make better their resource management decisions.

During the project implementation period it was broadly discussed about the sustainability issues of the project. It was suggested by the experts, gardener, and online activities that there should be information flow regarding rooftop gardening for the city dwellers. Under this project Proshika developed a mobile App named “Chad Krishi (ছাদ কৃষি) in Bangla and in English it is called “Rooftop Agriculture”.

The feature of the App;

- This is a small app in terms of memory with an easy user interface
- Easy download option with all kind of android phone
- Live chat option
- Online and Offline use option
- A new gardener can get information on how to start a garden with proper planning and individual lay-out
- All sorts of technologies are included specially focusing rooftop gardening as a specialized agriculture
- Two books on vegetables and fruit disease and pest management are linked with the app and easy to download (Produced by *Rahim et.al., 2016 & 2018*)



- One video on growing media and growing container preparation produced by Department of Agricultural Extension (DAE) is linked
- One useful video on repotting and de-potting was linked from a YouTube channel
- Service provider database information for easy access to gardening service
- Question answering option for all respondent

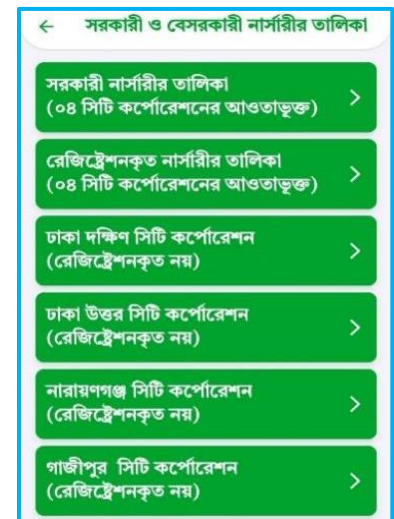
Outcomes of the Apps

People started using the app. So far, the interested practitioner completed more than 100 downloads and it is continuing day by day.

Service Provider data base

Different input market players and service providers are working on rural gardening and as well as rooftop gardening. They have the available inputs needed for rooftop gardening and have available technical information with them.

During the project implementation process it was a common discussion on availability of quality input and the linkages with the service providers with gardener. To prepare a data set Proshika communicated with the Department of Agricultural Extension, the organization is responsible for giving the registration of the Nursery owner. Proshika also communicated with



Department of Forestry, the organization have a record on the potential service provider/nursery owner. Proshika visited the website of different organization and learnt about their services. Different organizations also visited by the Project personnel in four city corporations. A total of 113 service providers' information was included with the data sheet.

Brief information on listed service provider

- Government Nursery
- Department of Agricultural Extension (DAE)-
- Bangladesh Agricultural Research Institute (BARI)
- DAE-Horticulture centers
- Bangladesh Agriculture Development Corporation (BADC)
- Private nursery owner registered by Department of Agricultural Extension

The feature of data set

- The Service provider Name (Nursery, Seed Company, Gov. etc.)
- Contact person Name, Mobile Number , Address
- Types of services (Technical support, Fertilizer, Sapling, Seed, Agri. Tools and others)

Outcomes:

Service providers' data sheet was incorporated with mobile app, beneficiary handout and module.

Interim Workshop

According to the plan Proshika organized a National Interim workshop on 5th April 2023 at AKM Gias-Uddin Milky Auditorium, Khamarbari, Dhaka. Main purpose of the workshop is to disseminate the activities progress with the concern stakeholders and to get necessary suggestions about the sustainability of the project activities.



Participants attended the workshop were from the Department Agriculture Extension, City Corporation officials, Gardener, Social Group representative, Demo representative, NGO representative, social organization , journalist, Proshika representative, FAO representative , Agricultural University Representative, Horticultural Experts etc. The participants are actively involved with different Roof top gardening activities with their organizations. Some individual activists are also participated in the workshop. A total of 42 participants were attended the workshop including 13 female and 29 males.



A total of 42 participants were attended the workshop including 13 female and 29 males.

The suggestions came out from the workshop are ; Awareness build-up about the advantages of Roof top garden; Building-up linkages between the gardeners and relevant service providers like City Corporation, DAE, Proshika, BADC, Seed agency etc.; Continuing strong and regular monitoring and follow-up at the field level; Increasing technical knowledge and skill of the gardeners; Using Helpline or Apps for getting regular

support; Organizing refresher training courses; Developing rain water harvest devices, inclusion of modern technologies in rooftop garden, inclusion of roof top gardening in agricultural education books for inspiring future generation ;Extension of DFS project up to 2024;

Outcomes;

- PROSHIKA committed to continue the activities without project support.
- City corporation committed to support the implementing organization in future

Final Workshop

Proshika organized Final national workshop on 2 May 2023 at AKM Gias-Uddin Milky Auditorium, Khamarbari, Dhaka. A total of 89 participants were attended the workshop including 22 female and 67 male Participants attended the workshop were from the Department of Agricultural Extension officials from four city corporations , City Corporation officials from four city corporations,



Seed companies, Gardener, Social Group representative, Demo representative, NGO representative, Social organization, Private organization, journalist, Proshika representative, FAO representative, Agricultural University Representative, Horticultural Experts, Bangladesh Agricultural Research Institution (BARI) representative etc. The participants are actively involved with different Roof top gardening activities with their organizations. Some individual activists are also participated in the workshop. The objectives of the workshops are; to share the implemented project activities; to enlighten the challenges, opportunities and possibilities of the project; to share the experiences learned from the project; to share the suggestions and opinion on sustainability of the project; to take opinion on further expansion of rooftop garden activities.

Through the workshop Proshika shared the project activities with performance. Two study result shared in the workshop; one on water use estimation for rooftop gardening and another on the impact of the project activities.

Outcome of the workshop;

- PROSHIKA committed to open an urban agriculture wing
- Local Government Department committed to expand the activities with different arrangement
- PROSHIKA committed to continue the monitoring through help desk and field visit
- Linkages with DAE and other implementing organization

ESTIMATION OF CROP WATER REQUIREMENT

One study was conducted to learn about the irrigation water management by the rooftop gardener. A Senior agriculture engineer conducted the study under Dhaka North City Corporation and Dhaka South City Corporation.

Outcomes of the study ;

It was found from the study that annual Irrigation Water Requirement (IWR) for 100 sq. meter (1075 sq. ft) rooftop garden = 8519.86 liters

Average monthly IWR = 709.99 liters.

- From field visit report it was found that the rooftop gardeners used 60% more water from the actual need of plants.
- They used hose pipe/watering can.
- Drip irrigation system is not known to them.
- Annual Irrigation Water Requirement (IWR) for 100 sq. meter (1075 sq. ft) rooftop garden is 8519.86 liters.
- Average monthly IWR 709.99 liters.
- Drip irrigation system, a relatively new technology in Bangladesh, is being used for growing vegetables crops.
- It has created interest because of decreased water requirement and possible increase in production (Jain et al. 2000).
- The system has proved its superiority over other conventional methods of irrigation.
- This is specially so for irrigating fruit and vegetable crops owing to its precise and direct application of water in the root zone with a considerable saving in fertilizer and water.

Activity monitoring outcomes

Monitoring and evaluation are essential to any project or program. Through this process, organizations collect and analyze data, and determine if a project/program has fulfilled its goals. Monitoring begins right away and extends through the duration of the project. Evaluation comes after and assesses how well the program performed. To keep the rooftop gardener activities in right tract Proshika conducted the monitoring during the project period.

A total of 145 beneficiaries monitoring data have been calculated for activity performance analysis. Among them 50 gardeners were selected from DNCC, 50 were from DSCC, 25 were from GCC and 20 were from NCC through field visit. The monitoring outcome are shown below;

Operational data

Container used: Growing containers is one of the elementary materials to start a garden. Selection of growing container is vital for plant management. From project side geo-bags were supplied as a start-up container. So, all gardener included the geo-bags in their garden. It was found from the field survey that the gardener had been used different sorts of growing containers for producing fruits and vegetables. Ten(10) types of containers were used by the participants; Geo-bag, half drum, earthen pot, plastic pot, waste oil cane, waste color pot, water bucket, crate, tray, permanent bed etc.



On an average 5.86 number of containers used by a gardener. The below table shows that 81.75% participants used half-drum, 47.5% participants used earthen pot, 23% participants used plastic pot, 62.5% participants used waste oil cane, 25% participants used sack, 14% participants used tray, 20% participants used waste color pot, 25.5% participants used crates, 31.25% water bucket and permanent bed 13% participants used permanent bed. Major selected containers were recycled oil cane, color pot and water bucket.

Table-12: Container use status among gardener in (%)

City Corporation	In % of participants who used the following types of growing container											Av. types
	Geo-bag	Half-drum	Earthen pot	Plastic pot	Waste oil cane	Sack	Tray	Waste color pot	crate	Water bucket	Permanent bed	
DNCC (n=50)	100	90	94	24	70	34	16	28	30	26	12	5.36
DSCC (n=50)	100	58	60	0	60	22	12	0	8	19	16	6.04
GCC (n=25)	100	84	16	32	56	20	12	28	32	36	20	6.04
NCC (n=20)	100	95	20	36	64	24	16	24	32	44	4	06
All	100	81.75	47.5	23	62.5	25	14	20	25.5	31.25	13	5.86

Vegetable and fruit production

Project provided 10 types of winter vegetables namely Cabbage, Sweet gourd, Tomato, Broccoli, Capsicum, Gourd, Squash, Radish, Chili, country bean and for summer the vegetables are red amaranth Kangkong, Ladies finger, cucumber, Yard long bean, sweet gourd, Eggplant, Chili, Indian spinach, Bitter gourd. Fruits included in the package were Mango, Indian Jujube, Lemon, Malta and Dragon. Due to late supply beneficiaries did not try with winter vegetable production with few exceptions. But they have started cultivating summer vegetables. The status of their vegetables and fruit cultivation is shown below.

Leafy vegetable cultivation status: Major participants had been involved with three types of leafy vegetable production. On an average 4 types of leafy vegetables produced by the participants in the project areas. Indian spinach, red amaranth and Kangkong were the preferred leaf vegetables among the beneficiaries and the participants involvement percentages are 100%, 81% and 94.5% respectively.



In the training, emphasis was given to the participants for cultivating some crop and flower as source of pest and mosquito repellent. It was noticed that 37.75% participants cultivated mint and coriander leaf as a repellent crop.

Table-13: Percentages of beneficiaries' involvement in Leafy vegetables production

City Corporation	In % of participants who cultivated the following types of leafy vegetables.							
	Indian	Spinach	Red	Amaranth	Kangkong	Mint &	Others	Average
	Spinach		Amaranth			Coriander		No.
DNCC (n=50)	100	8	74	28	98	52	28	4
DSCC (n=50)	100	10	70	42	98	36	26	4.12
GCC (n=25)	100	16	80	28	92	48	12	4.28
NCC (n=20)	100	5	100	5	90	15	0	3.2
Average	100	9.75	81	25.75	94.5	37.75	16.5	3.9

Seasonal vegetables cultivation status: On an average each of the participants cultivated 6 types of winter and summer vegetables in their garden. Commonly egg plants, Tomato, chili and okra were mostly cultivated by the gardener. The below table shows that 86.5% participants cultivated eggplant, 76.5% cultivated tomato, 63.5 % cultivated chili and 72% cultivated okra as a priority. Different kinds of gourds were also cultivated by the gardener.



Table-14: Percentages of beneficiaries' involvement in vegetables production

CC	In % of participants who cultivated the following types of seasonal vegetables										
	Bottle	Sweet	Egg	Tomato	Chili	Okra	Yard long	Bitter	Country	Cumber	Average
	Gourd	Gourd	Plant				bean	Gourd	Bean		No.
DNCC (n=50)	40	56	84	84	70	86	32	62	48	14	6
DSCC (n=50)	72	60	80	74	34	78	18	54	34	10	5.38
GCC (n=25)	80	68	92	68	80	64	44	40	12	20	6.04
NCC (n=20)	70	60	90	80	70	60	15	15	10	35	5.45
Average	65.5	61	86.5	76.5	63.5	72	27.25	42.75	26	19.75	5.72

During the training period it was discussed among the beneficiaries regarding crop selection with feasible crop list. It was shown in the below table that beneficiaries planted all project supplied fruit sapling in their garden. More over the guava (66.75%) and pomegranate 35.75%) were found the next two fruits in their cultivation list. Both of the fruit are feasible for rooftop garden with their fruit value. Wax is getting priority among the beneficiaries. Beneficiaries increased their garden including sugarcane, hog plum, pomelo, pineapple, star fruit and wood apple which belongs to other categories.

Table-15: Percentages of beneficiaries' involvement in fruit production

CC	In % of participants who cultivated the following types of fruits											
	Mango	Indian	Malta	Lemon	Dragon	Guava	pomegranate	Papaya	Sapodilla	Wax	Others	Av.
		Jujube										No.
DNCC (n=50)	100	100	100	100	100	88	56	46	16	14	34	8
DSCC (n=50)	100	100	100	100	100	48	12	18	0	8	26	6
GCC (n=25)	100	100	100	100	100	76	60	24	12	28	28	7
NCC (n=20)	100	100	100	100	100	55	15	25	0	5	10	6
Average	100	100	100	100	100	66.75	35.75	28.25	7	13.75	24.5	7

Training learning practiced in the garden

Technology adaptation is important for garden establishment and increase production. It was found that at the beginning participants give less attention on good garden management practices like lay-out preparation, growing media preparation, repotting, de-potting, pruning, fertilization and other management practices. At the end gardener put that knowledge in practices. The table shows that almost all beneficiaries started lay-out and growing media preparation with other improved management practices. It is also mentionable here that the project supplied input help them to improve their garden management

Table-16: Technology adaptation status among beneficiaries in (%)

Management practices	City corporation			
	DNCC	DSCC	GCC	NCC
	Beneficiaries In (%)			
Lay-out				
Partial	100	100	100	100
Growing media preparation				
Soil+ Cow dung + Vermicompost+ Chemical	100	100	100	100
Fertilizer use				
Organic	100	100	100	100
Chemical	100	100	100	100
Irrigation				
Use water cane & maintain timing	100	100	100	100
Fruit tree management				
Repotting, de-potting (where applicable)	100	100	100	100
Pruning (where applicable)	100	100	100	100
Pollination (where applicable)	30	50	50	50
Mosquito prevention measure				
Establish well drainage system	100	100	100	100
Daily cleaning	100	100	100	100
Pest management				
IPM	100	100	100	100
Rooftop protection				
Use support with growing containers	100	100	100	100





Problem faced by the gardener during implementation

Setting up of rooftop garden was not easy for all the respondent at the beginning. The geo-bags supplied by the project demands huge volume of soil. A total of 180 kg soil needed for kept 07 geo-bags ready for cultivation. Lots of beneficiaries are living multi-storied building without lift. It takes more time to collect and transfer the soil. Project team suggested them to prepare organic fertilizer by using kitchen and garden waste and use it in the garden for minimizing the problem. All sampled garden reported the problem of harsh summer and it refrain them from on time regular visit in the garden. During the summer season it demand more water in the garden. Pest and disease attack was visible in every garden. Gardener stated that they prepared organic pesticide by using soap water and chili powdered for disease and pest control.

Table-17: Problem faced by the gardener

Problems	Beneficiary in (%)			
	DNCC	DSCC	GCC	NCC
Soil collection and transfer	100	100	100	100
Harsh summer	100	100	100	100
Pest and diseases	100	100	100	100
Demands regular attention	50	-	-	-
Others (Birds, lack of helping hands)	-	30	-	-

Production and utilization of garden produce

Gardener started their production activities after receiving all start up material from the project. It was a four month activities output shown in the below table. .

Table-18: Vegetables and fruit production status by the gardener

City Corporation	Leafy vegetables (av.kg)	Vegetables (Av.kg)	Fruit (Av.kg)
	Beneficiaries in (%)		
DNCC	14	15.94	6
DSCC	22.9	29.9	3.38
GCC	21.44	19.84	4.87
NCC	12.4	18.35	8
Average	17.685	21.01	5.56

The average vegetable harvested by DNCC gardener was 14 kg leafy vegetables, 15.94 kg vegetables and 6 kg fruits. Similarly, in DSCC the production was 22.9kg, 29.9 kg and 3.38 kg respectively. 21.44 kg leafy vegetables, 19.84 kg vegetables and 4.87 kg fruits were harvested by the GCC Gardener. By the NCC gardener on average 12.4 kg leafy vegetables, 18.35 kg vegetables and 8 kg fruit were harvested within the four-month time. The respondent reported that they did not use their whole produce in family consumption but also shared with friends, relatives and neighbor. So, 4 to 10 percent production was shared by the gardener in four cities.

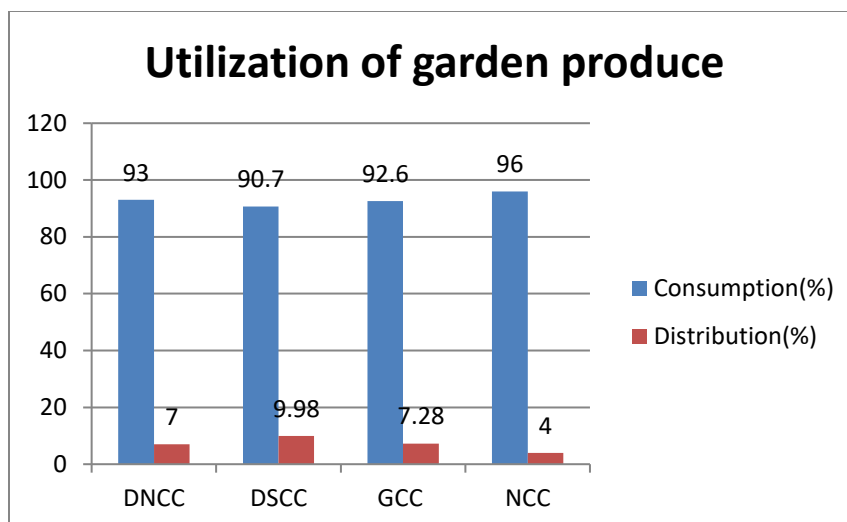


Figure-4: Utilization of garden harvesting

It was found from the production data that on an average a gardener included a total of 38 kg different types of vegetables in their family consumption. They produced safe and fresh crop in their garden. They reported they can buy this from the nearby market quickly but harvest a bunch a leafy vegetables guava and wait for the next harvest gave an uncountable mental peace and that the gardening is helping.

Nutrition and safe food

During training session emphasis was given on the composition and varieties inclusion in the rooftop garden, better cooking methods and good eating practices.

Balanced diet, different categories food with their nutrient value, food selection, processing, cooking and eating process were discussed among the participants. The below table shown that in four cities beneficiaries have shown their positive changes in food selection to cooking process. They included different categories food item in their menu and selecting colorful fruit and vegetables. On the other heading categories beneficiaries were following different types of habit changes activities like to avoid junk food, refrain to having extra salt, to reduce excess oil use in cooking, iodize salt use, include a fruit in daily diet etc.

Table-19: Nutritional Behavioral changes among beneficiaries

CC	Mixed and colorful vegetable/fruit selection	Wash before cutting and cutting in big size	Cooking with medium heat and with lead	Eating different categories food	Others
DNCC	100	100	100	100	100
DSCC	100	100	100	100	100
GCC	100	100	100	100	100
NCC	100	100	100	100	100

7. Challenges faced during the implementation and solution for overcome the challenges

Beneficiary selection:

Gardener selection and rapport building with them took more time than expectation. Project team faced difficulties to communicate with the city dweller at the beginning to share the project information. At the beginning they treat the project team as a stranger and not permitted to visit their house.

Solution: To overcome the situation, project made a strategic plan. Proshika started meeting with project stakeholders, city councilors, local leaders, social workers, school teachers, local NGOs, Proshika regional offices. Project team used their personnel linkages in different part of the cities. In different areas they search for key informant and communicated with them. Project team identified and communicated with local house owner Association (samity) for identification of house owner as they are familiar with the community. After making a primary list the team started visiting door to door with their official identify. But due to ownership conflict potential tenants are left-out from the project. Flat owner association selected the beneficiary from their flat.

Location specific venue selection and training organization

Beneficiary selected under four city corporations covered large and remote areas. Training was organized indifferent locality. During the month of November and December some gardener did not manage their time to attend the training course as their children are participated in their final year examination. Moreover, due to their personal issues some beneficiaries changed their mind during the training time. Different categories (heterogeneous) beneficiaries; housewife, retired personnel, government employees, students, teachers, media personnel, self-employed, agriculturalist etc. participated in different training courses. Ensure all participants' presence for whole courses with their other businesses was really difficult to manage the time schedule. Feasible venue selection within the budget line was a real challenge.

Solution: To cope with the situation project team included some interested new beneficiaries. Therefore, the old beneficiary data have been revised. Team searches the local opportunities and organized the training in schools, clubs and offices. For that reason, lots of training courses were organized during the weekend. But the training contents and methods attracted these heterogeneous groups to attend two days training courses.

Input distribution among the participants

Project has identified 1500 rooftop gardener in four city corporations along with 20 demonstration plots. Every city corporation covered a large area for beneficiaries' selection. The selected inputs are seeds, geo-bags, agricultural tools, saplings and fertilizers (chemical and vermicompost).

Different types of garden inputs scheduled for delivery, reached recurrently at the project areas. For example, three agricultural tools (Hoe, Spade and Water cane) were not reached at a time. As a result, project staff had to organize the distribution events repeatedly which created additional cost of the project. On the other hand, project beneficiaries also suffered a lot as they had to come to the distribution points often to take their inputs. Besides increasing their transportation cost, it wasted their time. Beneficiaries were not able to cultivate winter vegetables for late delivery of winter vegetables seeds.

Solution: Proshika overcome the situation by engaging more manpower. Proshika had meeting with city councilors, advanced gardener, federation leaders, master trainers and school teachers. The councilors help for materials storage, venue for distribution and event management. Proshika's regional staffs help for venue selection and input distribution.

Demonstration establishment

Proshika selected 20 institutions for demonstration establishment to show the roof top garden technologies. During the project planning there was no special production plan for modern and smart technology projection with demonstration establishment. It was only a big garden. But there were more opportunities to show the smart and modern technologies among the new generation. For example, vertical gardening, rain water harvesting, rooftop protection materials, use of coco dust etc. There were no special input arrangements for the demonstration. More over late input supply seriously hampered the demonstration establishment process.

Solution: To start the demonstration, the project team had a meeting with all the institutions head and made a secondary plan. Proshika invested some money from its own fund for the preliminary work. They used the opportunities had with the institutions are like; growing containers, physical labor, growing container protection support.

Unwillingness of investment by the gardener:

Some of the beneficiaries are fully depended on the project input. They showed less interested to invest money for better output from the garden.

Solution: Project team made more visit to those gardeners. Ensure their attendance in awareness campaign and field days to visit the successful gardener. They have participated in open discussion and learn more about the garden benefit.

8. Lesson learned

Scope of expansion of rooftop garden

It was found that the unused or underused spaces of the roofs are available in the city areas. People are not aware of the potential benefit of the rooftop gardening. Garden establishing by the city dwellers without proper and well-thought planning. Lack of information about rooftop garden establishment decreasing its potentiality. Proper information flow and extension approach will be helpful to overcome the situation.

Lack of technical knowledge about rooftop gardening

In Bangladesh the older generation learned agricultural activities by generation. It is natural that the common agricultural activities are practicing in rooftop by the gardener. Lack of technical knowledge on rooftop farming creating frustration among the gardener. Improper technology adaptation by the gardener hindering production and increasing water consumption. Gardening started without proper drainage system creating mosquito breeding ground and risking human health in danger.

No evidenced based solution on gardener hands

There are common problems narrated by the gardener during training session that; flower and fruit dropping is a common problem in each garden for vegetable and fruit production. Decreasing fruit production after one or two is another common problem for the gardener. Fruit tree management is unknown to them. Proper intercultural operation is not practicing by the gardener. Water management was not a concern for them. They have little solution on disease and pest management.

Practical based training for Gardener

Project has set-up an objective to promote better public access to technical understanding and know-how on how to create a rooftop garden and grow safe, nutritious and healthy fruits and vegetables. It was found during the project period that amateur and new gardeners are interested to attend the training. Practical and solution-based training program increased their knowledge and skill. They understood that Training is a must for specialized agriculture like roof top gardening. Gardener learned the importance of proper planning. Participants got new information on garden lay-out. Practical session on growing media and growing

container preparation creates a new window among the gardener. Different categories participants worth the training program.

Technical and other services for gardener

Lack of proper input supply is a common issue with the gardener. They stated that sometimes they got adulterated input from nurseries. After discussion it was found that in some cases the gardener blaming the nursery inputs adulteration without knowing the proper use of the input. There is less knowledge on growing container selection for different fruit and vegetable production. There are fewer linkages between service providing agencies and the gardener community. Involvement of Department of Agricultural Extension in the training conduction builds direct linkages among the gardeners. In training session, presence of service provider and social awareness raising groups encourage the beneficiary. Nowadays new types of services are emerging for taking care of the rooftop farming in Dhaka cities. From project some Input supplies for the rooftop gardener help them to practice their learning in the garden immediate after the training.

Fresh, safe and nutritious food production on rooftop

Gardeners are involved with rooftop gardening without considering the nutritious issues even this is not their concern. A crop calendar share with the beneficiaries for their better understanding on it. The crop selection criteria and their nutritious value. Knowledge on different kind of food selection, cooking process and nutrition management will help participants to increase their nutritional status.

9. Impact and benefit

- 1500 beneficiaries established garden after attending the training
- Enthusiastic gardener; getting insight into rooftop gardening is a specialized agriculture is an eye-opener for many of them
- Participants perceived the economic, social environmental and mental benefit of rooftop gardening
- Prepared production plan with 50% of vegetable production in target
- Enriched gardener knowledge on rooftop gardening through training
- Participants adopted low-cost production technique
- Beneficiaries adopted improved management practices in the garden
- Three to four types of recycled growing containers (waste oil cane, color pot, water bucket) used by the gardener
- Beneficiaries learned the rooftop safety measure and weight load management

- Mosquito prevention technique (proper drainage system in growing container, daily observation and regular cleanness) were widely adopted by the gardener
- Mint leaf cultivated by the gardener as a mosquito repellent crop.
- 10 types of vegetables and 7 types of fruit were cultivated by the gardener
- Produced fresh and safe vegetables for family consumption
- Vegetables cultivation included fresh and safe vegetables in their family consumption
- On an average 18 kg leafy vegetables 21 kg seasonal vegetables and 5 kg fruit produced in a garden and included with their family consumption
- 4 to 10% of their production was distributed among friends, relatives and neighbor.
- Increased social harmony among the neighbor and relatives
- Retired personnel spend quality time with their gardening
- Potential gardener motivated by project activities

10. Recommendations for future projects

- The duration of the project was very short. Gardener needs three seasons follow up support for a fruitful outcome from the project.
- Periodic follow-up workshop on cultivation practices for clarifying doubts and up to date technical information.
- Project staff should be recruited depending on number of the beneficiaries
- More awareness program needed for motivation of large number of urban city dwellers and communities.
- Develop and Published extension materials like leaflet, billboards on rooftop gardening
- Develop pictorial booklet on rooftop garden production technologies
- Large scale involvement of print and electronic media for motivational purposes
- Develop documentary drama on misconception on rooftop gardening
- Special scheme on urban agriculture should be promoted in different cities
- Rooftop gardening should be included with urban planning
- There should be proper material management planning
- In the input distribution list different kinds, types and shapes of growing container should be selected for fruit and vegetables production

- Demonstration garden should be a hub of different types of smart technologies.
- There should a plan on green building establishment
- All demonstration management activities should be handled by implementing partner
- Need more easily accessible production technologies for increasing productivity
- Best gardener award should to be included in the project activities
- Easy access to information technologies on rooftop gardening

11. Conclusion

Densely populated urban settlement like Dhaka, Narayanganj and Gazipur and constant migration of people from rural areas to urban resulted many associated problems in these cities. In recent year, roof top garden has gained importance and seen as one of the viable options to get fresh food locally. Growing vegetables and fruits in each house, on the rooftops will certainly help in providing safe and healthy food to the urban population. Rooftop gardening is a private eco-friendly venture that provides a chance to be close to the nature and to harvest fruits and vegetables in one's hand. As the agricultural land of our country is shrinking at a rapid rate, rooftop gardening can play a vital role to preserve nature. Rooftop gardening is a method of transforming underutilized or neglected space in a resource providing opportunities for environmental improvement, safe and fresh vegetables and fruit production and recreation. Value of leafy green vegetables to combat nutrient deficiency is irreplaceable and irrefutable. It has low start-up costs and short production cycle. With this in mind multi-sector extension program has begun to help the gardener in Dhaka Metropolitan areas. Bangladesh Government included Rooftop gardening activities under specialized section in Agricultural Policy Act 2008.

However, poor access to technical advice, services and quality inputs at reasonable price, technical advice for rooftop gardening related to load bearing capacity of roof, potential leakages, lack of training and follow-up etc. are the major hindrances in sustaining the practice.

It was found from the project monitoring data that all the beneficiaries involved with rooftop garden establishment and got satisfied result from their action and produce. Start-up materials inspired beneficiaries to start the gardening activities properly. By using the materials, they produced different kind of fresh and safe and nutritious fruit and vegetables in their garden. Project made a positive impact on rooftop gardener. The activities encouraged and motivated the younger generation. Retired person sending quality time in the

garden, it improves their physical and mental health. Gardener shared their harvesting with friends, neighbor and relatives that help increase social harmony . Through demonstration students are motivated to involve with the gardening activities. More people motivated and inspired by attending different workshops, meetings, awareness campaign, field days and learned about the benefit and impact of rooftop gardening for reduction of heat island effect, fresh and safe vegetable production and increase nutritional status of the gardener. Prepared data set on service provider will be ensured quality input in time for the gardener. E-agriculture service like help-desk and mobile app established for providing information beyond the project. Advocacy, communication and policy dialogue motivated policymaker to give thought on incentives issues. The outcomes achieved by this project can be useful for another city areas in Bangladesh. Researcher, policy maker and academician can use the outcomes as a reference for expansion of urban agriculture activities in other parts of the countries.

Appendices

Case studies

Sarder Mahbub Alam established a simple but productive rooftop garden

Along with the industrialization of Gazipur City Corporation, the population and the habitat have increased. Arable and crop land is decreasing under the pressure of industries and housing. Sarder Mahbub Alam is living under Gazipur City Corporation. Mr. Ali, A resident of Nalgani under ward # 18 has the garden on the roof of his four-storied building. 60 years old Mahabub is a retired person. He is very passionate about gardening. Mahbub started his gardening in 2021 as a hobby with some flower and vegetables. There is a felt need inside him to attend training and acquire knowledge on roof top gardening.

Proshika project team selected him as a beneficiary under “Promoting Roof top gardening in DMA for improved Nutrition” in the Month of August 2022. He attended the project organized 2 days long training courses on Rooftop gardening. According to Mahbub there is no alternative of learning. From the training he acquired knowledge on garden lay-out, growing media and container preparation, different types of growing container selection for different crops, pest and disease management, garden waste management, intercultural operation, and got important information on food and nutrition. He learnt how to keep roof safe and free from mosquito.

Mahbub received FAO supplied 20 kinds of vegetable seeds, 07 types of different sizes Geo-bags, 56 kg fertilizer (50 Kg vermin-compost and 06 Kg chemical fertilizer), 05 types of fruit sapling as a start-up material.



Mahbub try to apply all learning he gathered from the training. At first, he selected different types of low-cost growing containers. He bought 260 used

oil cane, 44 water buckets, and 08 crates, 04 cock sheets, 02 half drum and prepared 04 wooden beds. For irrigation he bought different shape water tape for proper use of water.

He said that I have learnt from the training that in a garden, there should be 50% vegetables, 20% fruit and spices, 5% flower and medicinal plant and the remaining area will be kept for road and resting place. He organized his garden with vegetables, fruits, flowers, medicinal and ornamental plants.

He used Geo-bags, crates, half drum and water bucket for mango, malta, dragon, lemon and Indian Jujube cultivation pomegranate and mint leaf production.

Flower (Rose, hibiscus, jasmine), Medicinal (Neem) and ornamental plants are grown in the water bucket.

In winter oil cane were used for eggplant, tomato, chili and red amaranth production. Bottle gourd, sweet gourd, cauliflower, broccoli, squash, cucumber, yard long bean and cabbage were cultivated with wooden beds and cock sheet. The production of cauliflower, broccoli, squash and cucumber was negligible for late cultivation. But bottle gourds, sweet gourds, egg plants, tomato and chili had a bumper production. In winter he produced 100kg.



Bottle gourds, 32 kg sweet gourds, 08 kg eggplant, 200 kg tomatoes and 21 kg chili. The winter produced market value was tk. 21435.

In summer he cultivated Indian spinach, Okra, Kank Kong ash gourd, snake gourd, sponge gourd and mint leaf were cultivated in oil cane. Mint leaf included in the garden as a mosquito repellent crop. By three months in summer, he produced a total of 75 kg from Indian spinach, 20 kg Okra and 52 Kangkong . The market value of his production was Tk. 5880.

Mr. Mahabub' invested a total of tk. 19,000 for container preparation, soil, fertilizer seeds and sapling. So far The market value of his production from winter and summer season was 27,315. So gross profit from his garden was Tk. 8315.00.

Sarder Mahbub did not sell but 20% of his production was distributed among the neighbor and relatives. He preserved chili for year-round use. Fresh and safe food is his main target.

He established an organic fertilizer heap and producing organic fertilizer for his garden. He uses garden waste and kitchen waste to produce the organic fertilizer.



Mahbub stated that his garden created cooling effect of the nearby living room and he did not use air conditioner in the room. He established a compost production pit in wooden made permanent Structure. He

spent a quality time in the garden with his wife. All the time he kept his garden clean. For efficient water use he is using different shape water tap.

Project organized an awareness campaign nearby his garden and the neighboring gardener was surprised to see his effort. His garden attracted the professional, students, new garden. Every time he re-stated his learning from the project. His clean garden attracted the researcher, academician , student and potential gardener.



Project team shared his success in the final workshop and congratulate him.

‘Gardening is a wonderful way to spend leisure time!’

Md. Abdur Rab, aged 68 years, lives at Mirpur-02 under 07 no. ward of Dhaka North City Corporation. He was a Businessman, he retired from work 02 years ago. As a way to spend his leisure time Abdur Rab decided to do roof top gardening. In the meantime, he met a field staff of Proshika and came to know about the training on roof top gardening. He expressed interest in receiving training. Finally, he received the training under the project ‘Promoting Roof Top Gardening in DMA for Improved Nutrition’ at the end of January 2023. He has never received this kind of training before. He thinks that he has benefitted much from the training because he has learned many new things from the training.



He said “I have started gardening after getting the training from Proshika. I have established my garden by using training learnings. I have organized the garden following layout; soil preparation and treatment has also been done according to training learnings. I have also prepared filter for the growing containers including permanent beds. I have done ‘3G cutting’ to Bottle and Sweet gourd plants. I plant seedlings in the growing container, remaining upper level of the soil ball 1-1.5” high, from the soil surface. Now I use organic pesticides by preparing them at home. I have also learned how to do potting, de-potting and re-potting.”

Abdur Rab uses permanent beds, earthen and plastic tubs, plastic and tin buckets, geo-bags, half-drums, fruit crate and oil containers for plantation. He planted Bitter gourd and Yard-long bean in the geo-bags and made a small vertical trellis in it for better creeping. He made a big horizontal trellis on the permanent bed and raised the sweet gourd plants on it.



Abdur Rab mainly uses cow dung and vermicompost in the garden. He has also prepared compost according to training learning and used it to the plants. Besides, he often prepares a liquid compost by decomposing kitchen waste, tea leaves, banana peels, egg shells, dry & green foliage etc. This waste decomposed water is mixed with normal water in the ratio of 1:8 and then it is used on the plants.

He planted Brinjal, Sweet gourd, Okra, Kang Kong, Red amaranth, Indian spinach, Amaranth, Capsicum, Chili by using seeds which he got from the project. Besides he has also cultivated Coriander and Mint leaves. Among the fruit trees, he has Mango, Jujube, Malta, Dragon, Lemon, Guava, Banana and Pomegranate in his garden. He also planted Neem tree as a medicinal plant. He harvested Red amaranth and Indian spinach 4 times so far and got 5 kg and 7-8 kg yield respectively. Besides, he once harvested Kang Kong until now and got a yield of 1.5 kg. He harvested Okra twice and got 1 kg yield. He did not get any sweet gourd so far, only ate the gourd leaves. He is thinking of doing hand pollination in sweet gourd. Yard long- bean and Bitter gourd plants are now at the growing stage. Furthermore, at the end of winter, he was cultivated Bottle gourd and Cucumber but he did not get any yield from it, he ate gourd leaves only.



He usually goes to the garden after early morning and afternoon prayers. He does all garden work by himself; his caretaker sometimes helps him. He waters the garden early in the morning by using watering can. Besides watering, he also does other necessary work like cleaning of old and dead leaves & branches, weeding,

pruning, hoeing, sowing seeds, planting seedlings, earthing up, shading, preparing soil and filter, treating soil, giving trellis, staking, observing insect and disease pests, spraying pesticides etc. He has a good source of water on his roof.

Abdur Rab is very concern about Dengue. So, he keeps his roof always dry and clean. He left 10-12 inches of open space below the permanent beds. Besides, pipes have been placed on the side walls of the beds to drain out the water. The roof is sloped and has pipes around it for drainage.



He said “I used to do business, now I am retired. Spending time early in retirement was tough. My mood was not good, I used to get angry often with my family members, there was no specific time to wake up. But when I started gardening, everything changed. Now I get up early in the morning and go to the garden after praying. Garden keeps my mind much better; it gives me mental peace. My daily exercise is done by working in the garden. It keeps my health well. I enjoy gardening very much; it has become like an addiction! The taste and pleasure that I get from eating fresh and poison-free vegetables from the garden is not found in market vegetables. I also give my garden’s vegetables to my relatives. Many people are encouraged by seeing my garden, they also want to do garden, want to take training. Gardening is a wonderful way to spend leisure time, I learned it by myself. I have just started a new garden; I want to plant more trees and make it more beautiful!”

“Gardening is my hobby and I love it!”

Md. Nasiruddin, aged 52 years, lives at Jhawchar, Hazaribagh under 55 no. ward of Dhaka South City Corporation. Three years ago, there was an open fellow space of his neighbor next to his one-story building. Nasiruddin started gardening there, as a hobby. He used to grow different kinds of vegetables in that garden. Later on, a building was built on that open space in 2021. In the meantime, he built his own four-story building. Now, Nasiruddin has a roof of 1050 sq. feet. About eight months ago, he met a field



staff of Proshika and became interested about roof top gardening. In November, 2023 Nasiruddin got training from Proshika on roof top gardening under the project ‘Promoting Roof Top Gardening in DMA for Improved Nutrition’. Besides training, he also got geo-bags, winter and summer vegetable seeds, saplings, hoe, spade, watering can, organic and chemical fertilizers for establishing the roof top garden.

Nasiruddin took initiatives to establish garden at his own roof by using learning from the training and the essential inputs he got from the project. Besides, he also bought 40-50 sacks of soil and required number of bricks to place under the growing containers. He organized his garden according to layout. Different types of growing containers have been used there for plantation like- Earthen tubs, half drums, Geo-bags, oil containers, paint buckets, fruit crate and large water containers. He made both horizontal and vertical trellis for creeping vegetables. He also made a long bamboo stage to hold geo-bags and other containers and put it under horizontal trellis to avoid direct contact with the



roof. He is very conscious about maintaining roof protection. He keeps his roof dry and clean. The roof is sloped and has pipes around it for drainage.

He said “I have benefited greatly from the training. I have never received this kind of training before. I have some general idea about farming but I have learnt many new things from the training such as preparation of soil and filter, soil treatment, preparation of organic pesticides and compost at home, hand pollination, 3G cutting etc. Before I used to plant trees directly in the tubs, but now I prepare tubs and soil properly and then

plant the trees. Specially I have never treated soil before but now I do it. I have also learnt how to transfer plants from small tub to big one. In case of pest management, I used to buy pesticides from the shop and applied it as per shopkeeper's suggestion. But now I know about the organic pesticides and how to prepare it at home."

Due to late received of winter seeds, Nasiruddin was able to cultivate only red amaranth at the end of the

season. One kg of Red amaranth has been harvested every week then. Now he is cultivating various kinds of summer vegetables such as- Okra, Brinjal, Indian spinach, Amaranth, Kang Kong, Sweet gourd, Bitter gourd, Yard-long bean and Chili. He has raised the Bitter gourd plants on the vertical trellis. The plants have yielded a lot, he has got 1.5 kg Bitter gourds after a week. He has also got 15-20 Okra one day after another and half kg of Yard-long bean after 5-6 days. He has harvested Indian spinach once so far, and got 1.5-2 kg yield. He received Mango, Jujube, Malta, Lemon and Dragon saplings from the project. He planted the seedlings in geo-bags and buckets. Growth of all fruit seedlings is good.



Nasiruddin usually does the garden work with his own hand like watering, cleaning, fertilizer application, hoeing, weeding, pruning, sowing seeds, transplanting seedlings, making trellis, staking, preparing soil and filter etc. Usually, he goes to the garden after early morning prayers and water the plants. He always prefers organic farming, that's why he uses cow dung and compost relatively more. His children help him a lot in gardening.

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Nasiruddin said, "Gardening is my hobby, I love it! I spend my leisure time in the garden with my family. It is very nice when the trees bear fruits, children feel very happy to see it which inspires me more for gardening. My neighbors also visited my garden. Vegetables and fruits of the garden are very tasty, fresh and safe. My wife like it very much. I distribute my garden products to my relatives and neighbors. I am very happy with my garden."

Print media and electronic media publication on project activities

আসফাতের নতুন ধরন
২৭ জুন '২২

আসফাতের নতুন ধরন
২৭ জুন '২২

চার সিটি করপোরেশনে ছাদ বাগান করে দিবে প্রশিকা



PROMOTING ROOF TOP GARDENING IN DHAKA FOR IMPROVED NUTRITION

গত ১৪ জুন ঢাকা আগারগাঁওস্থ এনজিও ব্যুরোর ট্রেনিং রুমে ঢাকা ফুড সিস্টেম ২০৪০ কর্মসূচির আওতায় প্রমোটিং রুফ টপ গার্ডেনিং ইন ঢাকা মেট্রোপলিটন এরিয়া ফর ইমপ্রুভড নিউট্রিশন প্রজেক্টের লক্ষ্যে মিটিংয়ে এ কথা জানানো হয়।

২৯শে ১৪ আওতার প্রশিকা মানবিক উন্নয়ন কেন্দ্র ছাদ বাগানী বাড়ির মালিকদের প্রশিক্ষণের আয়োজন করবে এবং বাগানীদের মানসম্মত গাছের চারা, জৈব সার, টব, টবের মাটি, ছাদের লে আউট করে গাছ লাগানোর সঠিক প্রান ইত্যাদি সরবরাহ করবে। এই প্রজেক্ট লক্ষ্যে মিটিংয়ে উপস্থিত ছিলেন এফএও'র একাধিক শীর্ষ কর্মকর্তা, শেরেবাংলা কৃষি বিশ্ব বিদ্যালয়ের শিক্ষক, বাংলাদেশ কৃষি গবেষণা ইনস্টিটিউটের কৃষি বিজ্ঞানী, কৃষি সম্প্রসারণ অধিদপ্তরের বিভিন্ন পর্যায়ের কর্মকর্তা, প্রতিষ্ঠিত সিটি কর্পোরেশনের প্রতিনিধি, সিটি করপোরেশনের প্রতিনিধি, নার্সারি এসোসিয়েশনের প্রতিনিধি, প্রতিষ্ঠিত এনজিও প্রতিনিধি, সফল ছাদ বাগানী এবং সুশীল সমাজের প্রতিনিধি। এফএও'র ফুড সিস্টেম পলিসি ইকোনমিস্ট বি. পেত্রো প্রজেক্টের সামগ্রিক দিক বিশ্লেষণ করে সূচনা বক্তব্য রাখেন। প্রজেক্টের সফল বাস্তবায়নে অবশ্য করণীয় বিভিন্ন বিষয় নিয়ে আলোচনাপাত করেন। প্রশিকা মানবিক উন্নয়ন কেন্দ্রের চেয়ারম্যান ও প্রধান নির্বাহী প্রকর বাস্তবায়নে প্রশিকার সফলতা, পরিবেশ সম্মত কৃষি চর্চায় প্রশিকার অবদান ইত্যাদি আলোচনার পর উপস্থিত গণ্যমান্য ব্যক্তিদের ধন্যবাদ জানান।

সুজন কৈরী : আগামী একবছর প্রশিকা মানবিক উন্নয়ন কেন্দ্র ঢাকা উত্তর ও দক্ষিণ, নারায়নগঞ্জ এবং গাজীপুর সিটি করপোরেশনের ১ হাজার ৫০০টি ছাদ বাগান করে দেবে। এ বাগান তৈরিতে আর্থায়ন করবে এফএও (জাতিসংঘের খাদ্য ও কৃষি সংস্থা)।

জাতিসংঘের অর্থায়নে চার সিটি করপোরেশনে ছাদ বাগান করে দিবে প্রশিকা

সুজন কৈরী: প্রশিকা মানবিক উন্নয়ন কেন্দ্র আগামী এক বছর ঢাকা উত্তর ও দক্ষিণ, নারায়নগঞ্জ এবং গাজীপুর সিটি করপোরেশনের এক হাজার ৫০০টি ছাদ বাগান করে দেবে। এ বাগান তৈরিতে আর্থায়ন করবে এফএও (জাতিসংঘের খাদ্য ও কৃষি সংস্থা)।

গত ১৪ জুন ঢাকা আগারগাঁওস্থ এনজিও ব্যুরোর ট্রেনিং রুমে ঢাকা ফুড সিস্টেম ২০৪০ কর্মসূচির আওতায় প্রমোটিং রুফ টপ গার্ডেনিং ইন ঢাকা মেট্রোপলিটন এরিয়া ফর ইমপ্রুভড নিউট্রিশন প্রজেক্টের লক্ষ্যে মিটিংয়ে এ কথা জানানো হয়।

প্রকল্পের আওতায় প্রশিকা মানবিক উন্নয়ন কেন্দ্র ছাদ বাগানী বাড়ির মালিকদের প্রশিক্ষণের আয়োজন করবে এবং বাগানীদের মানসম্মত গাছের চারা, জৈব সার, টব, টবের মাটি, ছাদের লে আউট করে গাছ লাগানোর সঠিক প্রান ইত্যাদি সরবরাহ করবে।

এই প্রজেক্ট লক্ষ্যে মিটিংয়ে উপস্থিত ছিলেন এফএও'র একাধিক শীর্ষ কর্মকর্তা, শেরেবাংলা কৃষি বিশ্ব বিদ্যালয়ের শিক্ষক, বাংলাদেশ কৃষি গবেষণা ইনস্টিটিউটের কৃষি বিজ্ঞানী, কৃষি সম্প্রসারণ অধিদপ্তরের বিভিন্ন পর্যায়ের কর্মকর্তা, প্রতিষ্ঠিত সিটি কর্পোরেশনের প্রতিনিধি, সিটি করপোরেশনের প্রতিনিধি, নার্সারি এসোসিয়েশনের প্রতিনিধি, প্রতিষ্ঠিত এনজিও প্রতিনিধি, সফল ছাদ বাগানী এবং সুশীল সমাজের প্রতিনিধি।

সেতর ডাক
২৬ জুন '২২

Daily Observer
17 June '22

চার সিটি করপোরেশনে ছাদ বাগান করে দিবে প্রশিকা

স্টাফ রিপোর্টার : আগামী এক বছর প্রশিকা মানবিক উন্নয়ন কেন্দ্র ঢাকা উত্তর ও দক্ষিণ, নারায়নগঞ্জ এবং গাজীপুর সিটি করপোরেশনের এক হাজার ৫০০টি ছাদ বাগান করে দেবে। এ ছাদ বাগান তৈরিতে আর্থায়ন করবে জাতিসংঘের খাদ্য ও কৃষি সংস্থা (এফএও)।

ঢাকারদীর্ঘ আগারগাঁওস্থ এনজিও ব্যুরোর ট্রেনিং রুমে হতে গেল ঢাকা ফুড সিস্টেম ২০৪০ কর্মসূচির আওতায় প্রমোটিং রুফ টপ গার্ডেনিং ইন ঢাকা মেট্রোপলিটন এরিয়া ফর ইমপ্রুভড নিউট্রিশন প্রজেক্টের লক্ষ্যে মিটিংয়ে এ কথা জানানো হয়। এই প্রকল্পের আওতায় প্রশিকা মানবিক উন্নয়ন কেন্দ্র ছাদ বাগান বাড়ির মালিকদের প্রশিক্ষণের আয়োজন করবে এবং বাগানীদের মানসম্মত গাছের চারা, জৈব সার, টব, টবের মাটি, ছাদের লে আউট করে গাছ লাগানোর সঠিক প্রান ইত্যাদি সরবরাহ করবে। এই প্রজেক্ট লক্ষ্যে মিটিং এ উপস্থিত ছিলেন এফএও'র একাধিক শীর্ষ কর্মকর্তা, শেরেবাংলা কৃষি বিশ্ব বিদ্যালয়ের শিক্ষক, বাংলাদেশ কৃষি গবেষণা ইনস্টিটিউটের কৃষি বিজ্ঞানী, কৃষি সম্প্রসারণ অধিদপ্তরের বিভিন্ন পর্যায়ের কর্মকর্তা, প্রতিষ্ঠিত সিটি করপোরেশনের প্রতিনিধি, সিটি করপোরেশনের প্রতিনিধি, নার্সারি এসোসিয়েশনের প্রতিনিধি, প্রতিষ্ঠিত এনজিও প্রতিনিধি, সফল ছাদ বাগানী এবং সুশীল সমাজের প্রতিনিধি।

এফএও'র ফুড সিস্টেম পলিসি ইকোনমিস্ট বি. পেত্রো প্রজেক্টের সামগ্রিক দিক বিশ্লেষণ করে সূচনা বক্তব্য রাখেন। প্রজেক্টের সফল বাস্তবায়নে অবশ্য করণীয় বিভিন্ন বিষয় নিয়ে আলোচনাপাত করেন। প্রশিকা মানবিক উন্নয়ন কেন্দ্রের চেয়ারম্যান ও প্রধান নির্বাহী প্রকর বাস্তবায়নে প্রশিকার সফলতা, পরিবেশ সম্মত কৃষি চর্চায় প্রশিকার অবদান ইত্যাদি আলোচনার পর উপস্থিত গণ্যমান্য ব্যক্তিদের ধন্যবাদ জানান।

FAO-Proshika to create 1005 new rooftop gardens in four cities

Staff Correspondent

In next one year, a total of 1005 rooftop gardens would be established in four city corporations - Dhaka North, Dhaka South, Gazipur and Narayanganj - under the 'Dhaka Food System 2040' programme.

With the financial support of Food and Agriculture Organization of the United Nations (FAO), a non-government organization Proshika Manohik Uthayan Sangstha will implement the 'Promoting Rooftop Gardening in Dhaka Metropolitan Area for Improvement of Nutrition' project, according to a press release issued on Wednesday.

Earlier on Tuesday, the project launching programme was held in Agangon's NGO Bureau office in Dhaka. FAO's senior officials, teachers of different agriculture universities, scientists, Department of Agriculture Extension officials, representatives of seed companies, city corporations, nursery owners, NGOs and rooftop gardeners attended the programme.

চার সিটি করপোরেশনে ছাদ বাগান করে দিবে প্রশিকা

স্টাফ রিপোর্টার : আগামী এক বছর প্রশিকা মানবিক উন্নয়ন কেন্দ্র ছাদ বাগান বাড়ির মালিকদের প্রশিক্ষণের আয়োজন করবে এবং বাগানীদের মানসম্মত গাছের চারা, জৈব সার, টব, টবের মাটি, ছাদের লে আউট করে গাছ লাগানোর সঠিক প্রান ইত্যাদি সরবরাহ করবে। এই প্রজেক্ট লক্ষ্যে মিটিং এ উপস্থিত ছিলেন এফএও'র একাধিক শীর্ষ কর্মকর্তা, শেরেবাংলা কৃষি বিশ্ব বিদ্যালয়ের শিক্ষক, বাংলাদেশ কৃষি গবেষণা ইনস্টিটিউটের কৃষি বিজ্ঞানী, কৃষি সম্প্রসারণ অধিদপ্তরের বিভিন্ন পর্যায়ের কর্মকর্তা, প্রতিষ্ঠিত সিটি করপোরেশনের প্রতিনিধি, সিটি করপোরেশনের প্রতিনিধি, নার্সারি এসোসিয়েশনের প্রতিনিধি, প্রতিষ্ঠিত এনজিও প্রতিনিধি, সফল ছাদ বাগানী এবং সুশীল সমাজের প্রতিনিধি।

এফএও'র ফুড সিস্টেম পলিসি ইকোনমিস্ট বি. পেত্রো প্রজেক্টের সামগ্রিক দিক বিশ্লেষণ করে সূচনা বক্তব্য রাখেন। প্রজেক্টের সফল বাস্তবায়নে অবশ্য করণীয় বিভিন্ন বিষয় নিয়ে আলোচনাপাত করেন। প্রশিকা মানবিক উন্নয়ন কেন্দ্রের চেয়ারম্যান ও প্রধান নির্বাহী প্রকর বাস্তবায়নে প্রশিকার সফলতা, পরিবেশ সম্মত কৃষি চর্চায় প্রশিকার অবদান ইত্যাদি আলোচনার পর উপস্থিত গণ্যমান্য ব্যক্তিদের ধন্যবাদ জানান।

Print media and electronic media publication on project activities

News ;

আজ পবিত্র লাইলাতুল কদর
শীতলক্ষ্যা রোড: আজ ১৮ এপ্রিল, মঙ্গলবার। মধ্যরাত্তর গড়ে পবিত্র লাইলাতুল কদর বা শবে কদর। এই রাত মুসলমানদের কাছে অত্যন্ত মহিমান্বিত একটি রাত। প্রতিবছর পবিত্র রমজানের ২৬ তারিখ নিশাগত রাতে শবে কদর পালন করা হয়। ইসলামত: কবেরির মাধ্যমে পরমালি মুসলমানদের এ রাত কাটাতে। ইসলাম ধর্ম অনুযায়ী এ রাত অমূল্য। হজরত মুহাম্মদ (স:) এর অনুপ্রাণিতের সন্ধান সূত্র করা হয় এবং মানবজাতির জগৎ পুনর্নির্মাণ করা হয়। তাই মুসলমানদের কাছে এ রাত অতীব পুণ্যময় ও মহিমান্বিত। ২০ রমজানের পর বেকেন্দো বিজোক্ত রাত কদর হয়ে পারে। অতীত ১৬ হাজারের নিশাগত রাতেই লাইলাতুল কদর আসে বলে আলেমদের অভিমত। শবে কদরের ▶ পৃষ্ঠা-২, কলাম ৫

রেজি: নং ডিএ - ১৭৪৩ || বর্ষ ২৮ || সংখ্যা ৭৩তম || নারায়ণগঞ্জ, মঙ্গলবার ||



রূপক কার্য
শীতলক্ষ্যা রিপোর্ট: স্যালাইন উৎপাদক কারখানায় পরিচালিত ছাত্র সার্ভিসের দুইটি ইউনিটের স্টেশনীয় সভা হয়েছে। সোমবার দুপুর সাড়ে তিনটায় স্যালাইন উৎপাদক কারখানায় স্টেশনীয় সভা অনুষ্ঠিত হয়। সভায় উপস্থিত ছিলেন পরিচালক ড. ম. হুমায়ুন কবীর ও সভাপতি ড. ম. হুমায়ুন কবীর। সভায় স্যালাইন উৎপাদক কারখানায় পরিচালিত ছাত্র সার্ভিসের দুইটি ইউনিটের স্টেশনীয় সভা অনুষ্ঠিত হয়। সভায় উপস্থিত ছিলেন পরিচালক ড. ম. হুমায়ুন কবীর ও সভাপতি ড. ম. হুমায়ুন কবীর।

ছাদ বাগান সম্প্রসারণ প্রকল্পের আওতায়ে আডভোকেসি ও পলিসি ডায়ালগ সভা

শীতলক্ষ্যা রিপোর্ট: সেন্সালাইন সরকারের আর্থিক সহযোগিতায়, জাতীয় সরকারের বিদ্যমান রূপক কার্য পরিচালনা পরিষদের আওতায়ে, ছাদ বাগান সম্প্রসারণ প্রকল্পের আওতায়ে উন্নত পুষ্টি জন্ম তাকা ও মেট্রো পলিসি

নারায়ণগঞ্জ প্রেসক্লাবের নব-নির্বাচিত সাধারণ সম্পাদক

রফিকুল ইসলাম জীবনকে ইসদাইর সমাজ উন্নয়ন সংস্থার অভিনন্দন ও শুভেচ্ছা
শীতলক্ষ্যা রিপোর্ট: ইসদাইর সমাজ উন্নয়ন সংস্থার প্রাথমিক সভায়, নারায়ণগঞ্জ প্রেসক্লাবের সাধারণ সম্পাদক



শীতলক্ষ্যা রিপোর্ট: ইসদাইর সমাজ উন্নয়ন সংস্থার প্রাথমিক সভায়, নারায়ণগঞ্জ প্রেসক্লাবের সাধারণ সম্পাদক

সুষ্ঠু নির্বাচন হলে সরকারের ৭

শীতলক্ষ্যা রিপোর্ট: মঙ্গলবার বিএনপির মুখ. অ.ম.ব.কে এবং কবির উপজেলায় সবেক প্রোগ্রামের আওতায়ে রহমান তুলসি হলেন, দিন. মতই যাচ্ছে এই অবধি সরকারের উত্তম নির্বাচনের মাত্রা ততই বৃদ্ধি পাচ্ছে। এখন আমায়ের



খবর **আজাতবুদনিক**
মে ১০, ২০১৩ | ১৯ টের ১৯২৩

মেট্রোরেলের জন্য হচ্ছে বিশেষ পুলিশ ইউনিট

মেট্রোরেল স্টেশনের পরিদর্শন, মেট্রোরেল উন্নয়নের পর যাত্রী স্বাভাবিক ও নিশ্চিন্তকর সুরক্ষায় ও সেকেন্ডারি স্টেশনের পরিদর্শন প্রক্রিয়া শুরু হবে। বিশেষ পুলিশ ইউনিট গঠন করা যাবে।

নগর জীবনে উন্নত পুষ্টির যোগান দেবে ছাদ বাগান

শীতলক্ষ্যা রিপোর্ট: নগর জীবনে উন্নত পুষ্টির যোগান দেবে ছাদ বাগান।

সংবাদ

লুবে ১৯ এপ্রিল আরো একটি ম্যাচে ড্র করলো বার্সেলোনা

নগর-মহানগর

নগর জীবনে শান্তি ও উন্নত পুষ্টির যোগান দেবে ছাদ বাগান

সংবাদ অনলাইন রিপোর্ট

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মঙ্গলবার, ১১ এপ্রিল ২০২৩

নগর জীবনে পরিকল্পিত ছাদ বাগান নগরবাসীর উন্নত পুষ্টির যোগান দেবে ছাদ বাগান। এমনটাই বলেছেন ছাদবাগান সম্প্রসারণ সংশ্লিষ্টরা। তারা বলেন, প্রতিনিয়ত জলবায়ুর পরিবর্তন হচ্ছে, শহরে বনায়ন ও গাছপালা কম হওয়ার কারণে তাপমাত্রা বেড়ে যাচ্ছে এবং প্রচণ্ড গরমে বসবাস করতে হচ্ছে মানুষকে। গাছপালা অক্সিজেন ত্যাগ করে তা আমরা গ্রহণ করে বেঁচে থাকি অন্যদিকে আমরা যে কার্বন-ডাই-অক্সাইড ত্যাগ করি তা গাছপালা গ্রহণ করে। পরিবেশের ভারসাম্য রক্ষায় জৈনের সরবরাহ বৃদ্ধিতে ছাদ বাগান গুরুত্বপূর্ণ

বাংলা ২৪

করব্দার, ১৩ জানুয়ারি ২০২৩, ২৯ পৌষ ১৪২৯

জাতীয়

ছাদ বাগান ও নগর কৃষি সম্প্রসারণে প্রশিক্ষণ দিচ্ছে প্রশিক্ষণ

ছাদ বাগান ও নগর কৃষি সম্প্রসারণে প্রশিক্ষণ দিচ্ছে প্রশিক্ষণ

০৭:১৯ পিএম | ১৩ জানুয়ারি, ২০২৩
২৯ পৌষ ১৪২৯
১৯ জামাদিউল সানি ১৪৪৪
সিনিয়র কনসাল্টেন্ট, বাউন্স ২৪.কম, ঢাকা

Facebook, WhatsApp, Twitter, Email

ছাদ বাগান ও নগর কৃষি সম্প্রসারণে প্রশিক্ষণ দিচ্ছে প্রশিক্ষণ

বাংলা ২৪ • জাতীয়



মিরপুরে ডিএনসিসির ছাদ বাগান প্রকল্পের প্রচারণা

নিরঞ্জন প্রতিবেদক

রাজধানীর মিরপুরে ঢাকা উত্তর সিটি করপোরেশনের ছাদ বাগান প্রকল্প বাস্তবায়নে সচেতনতামূলক প্রচারণা কার্যক্রম অনুষ্ঠিত হয়েছে। রবিবার মিরপুরের রূপনগরে টিপু গার্ডেনে এফএও এর আর্থিক সহযোগিতায় প্রশিকা মানবিক উন্নয়ন কেন্দ্রের ব্যবস্থায় এ ও নোদারলাভাসের আর্থিক সহযোগিতায় এ কার্যক্রম অনুষ্ঠিত হয়। অনুষ্ঠানে ছাদ বাগান তৈরিতে বিভিন্ন সচেতনতামূলক আলোচনা করা হয়। এ সময় ঢাকা উত্তর সিটি করপোরেশনের ছাদ বাগান প্রকল্পের টিম লিডার শেফালী বেগম ছাদ বাগানের বিভিন্ন বিষয় নিয়ে আলোচনা করেন। অনুষ্ঠানে একটি ছাদ বাগান তৈরিতে শুরু থেকে শেষ পর্যন্ত সকল বিষয় প্রকল্পের মাধ্যমে উপস্থাপন করা হয়। অনুষ্ঠানে বক্তব্য রাখেন, বাংলাদেশ মহিলা আওয়ামী লীগ রূপনগর খানার সাধারণ সম্পাদক ফজিলাতুন্নেসা হৌজা মিরপুর মেট্রোপলিটন কৃষি অফিসের উপ-সহকারী কৃষি কর্মকর্তা শারমিন খাতুন ও সোনালী ব্যাংকের প্রিন্সিপাল অফিসার আমির হোসেন। এ সময় উপস্থিত ছিলেন বিভিন্ন প্রতিষ্ঠানের শিক্ষক, সমাজসেবক, এনজিও কর্মকর্তা, ডিএনসিসির কর্মকর্তাসহ রূপনগরের ছাদবাগানীরা। উল্লেখ্য, ঢাকা উত্তর, দক্ষিণ, গাজীপুর ও নারায়ণগঞ্জ ৪ সিটিতে ১৫০০ বাগানীকে প্রশিক্ষণের মাধ্যমে ছাদ বাগান তৈরিতে সহযোগিতা করা হয়েছে।

Awareness on rooftop and urban gardening underscored

Staff Correspondent

Speakers at a discussion meeting on Tuesday urged all to create awareness on spreading the matter of rooftop and urban gardening among the people to meet up the demand of nutrition by growing various vegetables, fruits and other crops.

Proshika Manobik Unnayan Sangstha organized the discussion meeting at Proshika Liaison Office in Mirpur as part of its activities to create awareness on rooftop and urban gardening.

With the financial support of Netherlands government and technical assistance of Wageningen University in Netherlands

and Food and Agriculture Organization (FAO) of the United Nations (UN), Proshika is implementing a project on rooftop and urban gardening in four city corporations across the country. The city corporations are- Dhaka North and South and Gazipur and Narayanganj city corporations.

Presided over by Proshika Chief Executive Serajul Islam, its chairman Poet Rokeya Islam, Dhaka North City Corporation's Ward-11 Councillor Dewan Mohammad Mannan, FAO's Food System Trainer SK Muhibullah, City Coordinator Najrul Islam, Sustainable Agriculture Specialist Jahangir Alam, Department of Agriculture

Extension's Urban Agriculture Officer Badrul Hasan and Shawon Majumder also spoke the event. Deputy Project Leader Sumona Rani presented the brief of the project.

Under the project, some 1,500 rooftop and urban gardeners were given training and assistance on establishing rooftop and urban garden. A total of 20 display garden were also established.

DAE's Urban Agriculture Officer Badrul Hasan said that six urban agriculture offices are there in Dhaka city to promote the entrepreneurs to train and create rooftop and urban gardening in Dhaka city.

Workshop on rooftop gardening held

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Print A+ A- A



Dhaka North City Corporation (DNCC) Chief Executive Selim Reza on Tuesday said that well-designed rooftop gardening can protect us from the adverse impact of climate change and various diseases including diabetics along with giving us fresh nutrition and entertainment. So, the urban people are being encouraged to create rooftop gardens for getting healthy air, fruits and vegetables.

He made the remark while talking at a national workshop on 'Expanding Rooftop Gardening in Dhaka for Improved Nutrition' organised at the Krishibid Institution Bangladesh (KIB) auditorium in Dhaka's Farmgate. With the support of Food and Agriculture Organisation of the United Nations (FAO), Proshika Manobik Unnayan Kendra organized the event.

With the financial assistance of the FAO, Proshika is implementing a project to promote the urban people on creating rooftop gardening in four city corporations in Dhaka, Gazipur and Narayanganj, so they can have healthy air, fruits and vegetables and entertainment, according to FAO press release said.

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