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ROOFTOP GARDENING IN DHAKA: AN ADAPTATION MEASURE OF THE COMMONERS

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GROUP OF EIGHT AUSTRALIA

RESEARCH BACKGROUND

- The development process of the Bangladesh delta has gained momentum.
- In its path of progression it faces multi-dimensional challenges related to, among others, population growth, rapid urbanization, land use change and natural hazards compounded with likely climate change.
- Social, economic and environmental aspects, especially in urban areas, are under pressure.
- Dhaka, the capital city of Bangladesh, is the hub of socio-economic and cultural activities of the country.
- As this city is growing, managing its ecosystem services is becoming increasingly complex.

DHAKA: A HIGHLY BUILT UP CITY

DHAKA: GREEN AND BLUE

DHAKA: LACK OF ENVIRONMENTAL AWARENESS

OBJECTIVE

Contribute to urban ecosystem services management in Dhaka by recommending economically feasible and socially acceptable green adaptation strategies.

ADAPTATION STRATEGIES WORLDWIDE

Urban green management at city scale	
Park, pocket park, open spaces	Green/living roof
Green wall	Rooftop garden
Grasses planted in tram tracks	Street/roadside trees
Green facades	Green courtyards
Private/home garden	Community garden
Tree plantation	Greenbelt (network of parks, courtyards, squares, tree-lined streets and green roofs)

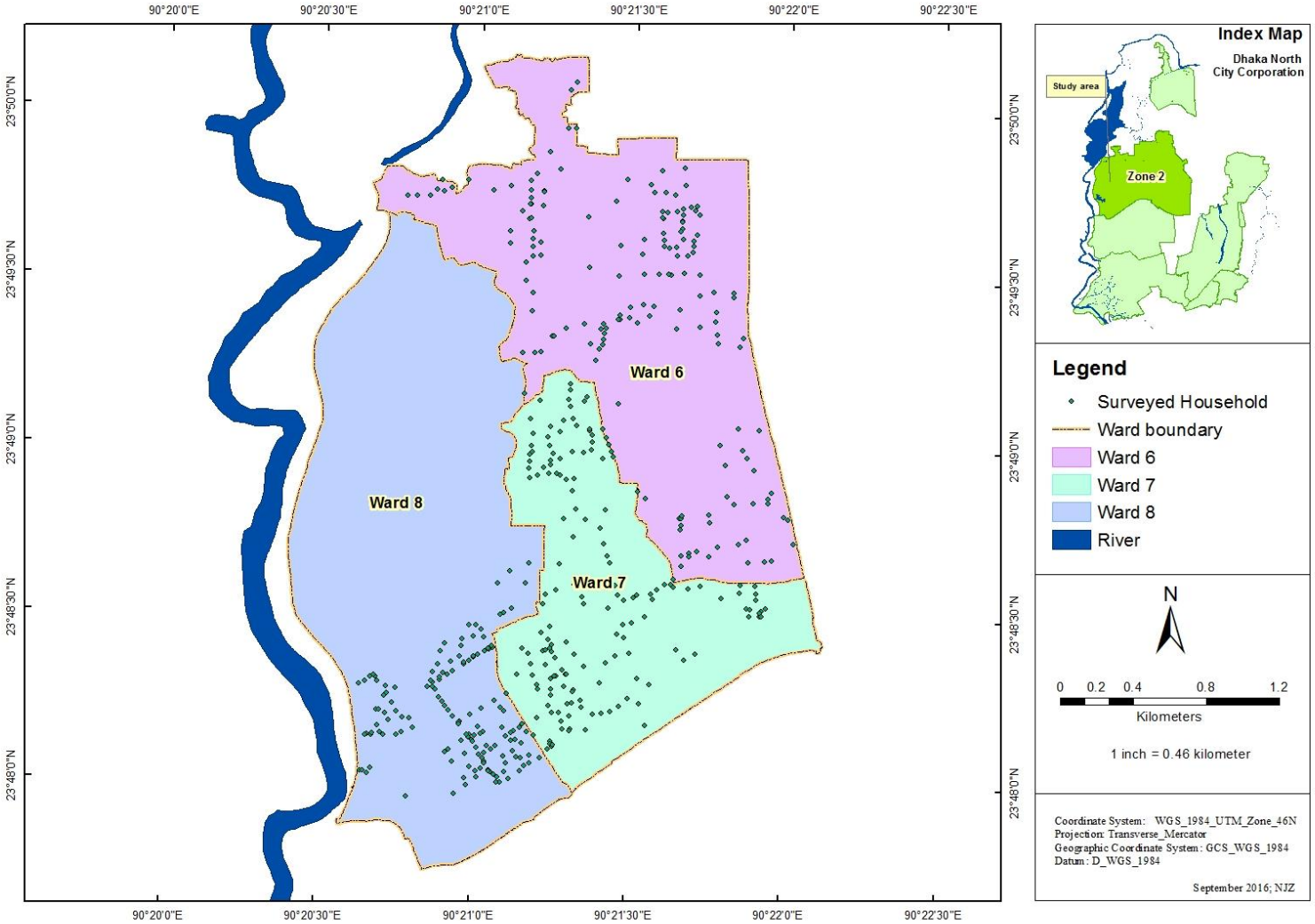
ADAPTATION STRATEGIES WORLDWIDE (Cont.)

Urban blue management at city scale	
Porous/permeable pavements	Watershed restoration
Rainwater harvest (tank/barrel)	Bluebelt (connecting canal, lake, pond, minor waterways, wetlands)
Storm water retention pond	Water sensitive urban design (using grass swales, underlying gravel trench, artificial wetland, open space, ornamental lake)
Wetland preservation/artificial wetland creation	Dual reticulation of non-potable treated wastewater for toilet flushing, garden watering, car washing
Infiltration of runoff in large shallow ponds	Storm water bump-out & storm water planter boxes

ADAPTATION STRATEGIES WORLDWIDE (Cont.)

Benefits from Adaptation	
Increased resilience to natural hazards & extreme events	Emergency water supply for household use & firefighting
Microclimate (heat island) regulation	Groundwater recharge
Influence on air quality; Noise abatement; Water purification	Biodiversity conservation; Habitat creation
Urban flood prevention; Erosion prevention; Shoreline protection; Storm water management	Cognitive development (ecological knowledge); Social activities
Food availability; Pollination	Aesthetics; Recreation

STUDY AREA

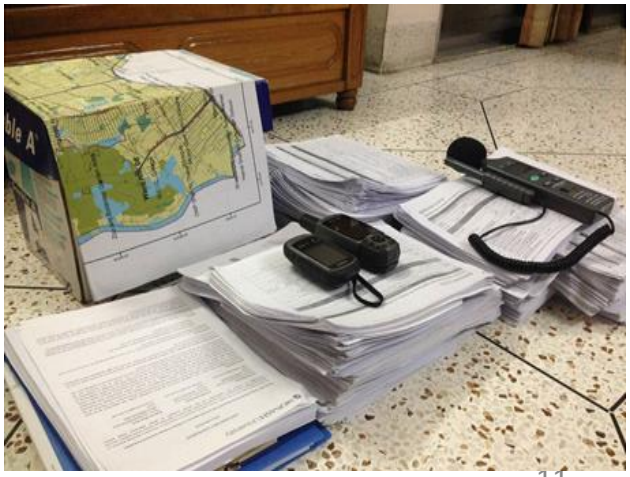

90°20'0"E
90°20'30"E
90°21'0"E
90°21'30"E
90°22'0"E
90°22'30"E
23°50'0"N
23°49'30"N
23°49'0"N
23°48'30"N
23°48'0"N
Ward 6
Ward 7
Ward 8
Index Map
Dhaka North City Corporation
Study area
Zone 2
Legend
Surveyed Household
Ward boundary
Ward 6
Ward 7
Ward 8
River
N
0 0.2 0.4 0.8 1.2
Kilometers
1 inch = 0.46 kilometer
Coordinate System: WGS_1984_UTM_Zone_46N
Projection: Transverse_Mercator
Geographic Coordinate System: GCS_WGS_1984
Datum: D_WGS_1984
September 2016; NJZ

HOUSEHOLD SURVEY

- A questionnaire based survey
- 510 households selected randomly
- About 40% female respondents
- Average household income >50 thousand BDT (Bangladeshi currency- Taka) per month
- Holding owner-tenant ratio 40:60 (approx.)

Survey activity

A hand-held GPS device



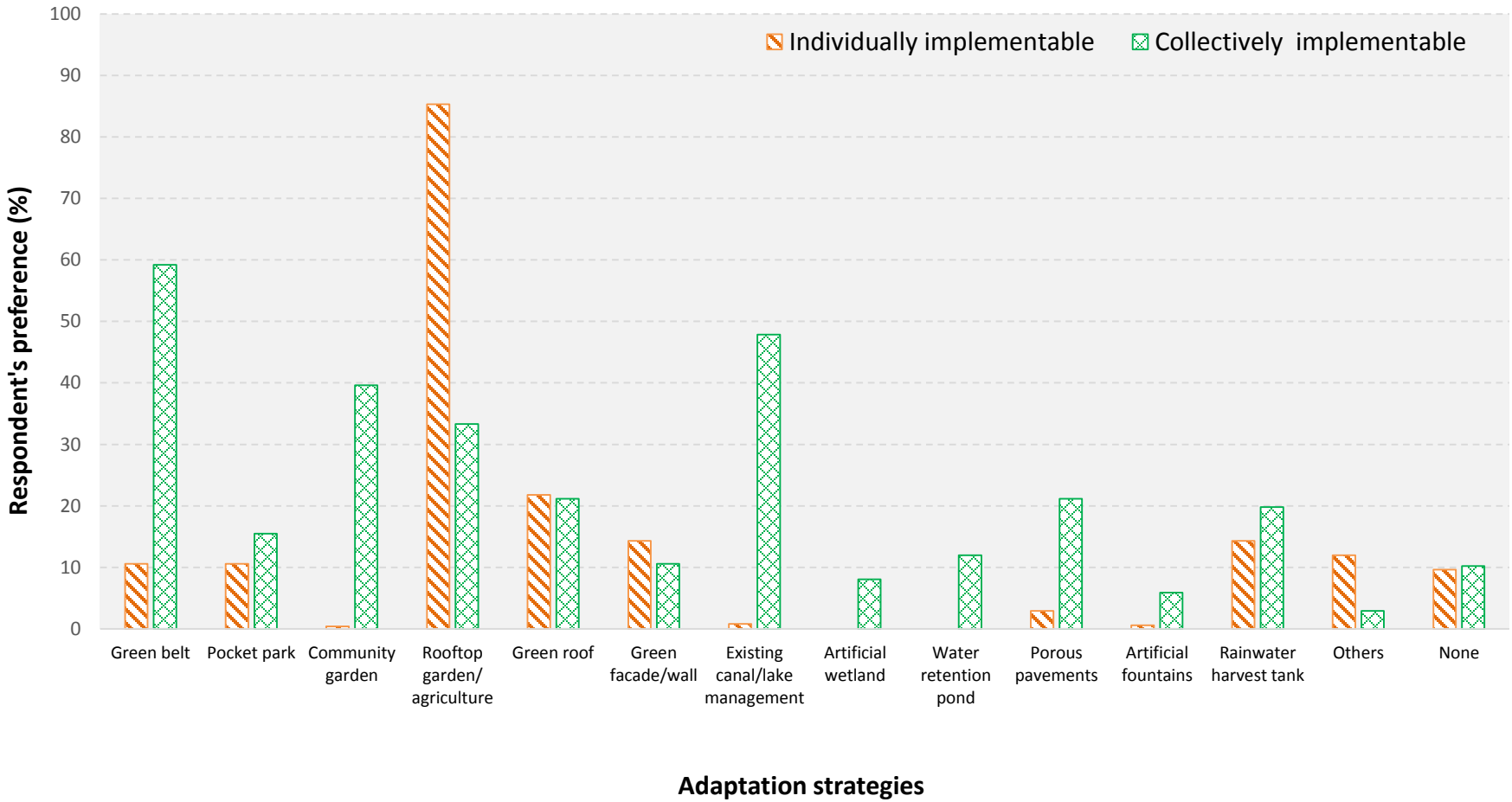
Materials used for the survey

IN-DEPTH INTERVIEW

- About 30 in-depth interviews with experts
- Affordability for implementing RG and other adaptation measures in Dhaka city with individual and collective efforts

RESULTS

SURVEY RESULTS



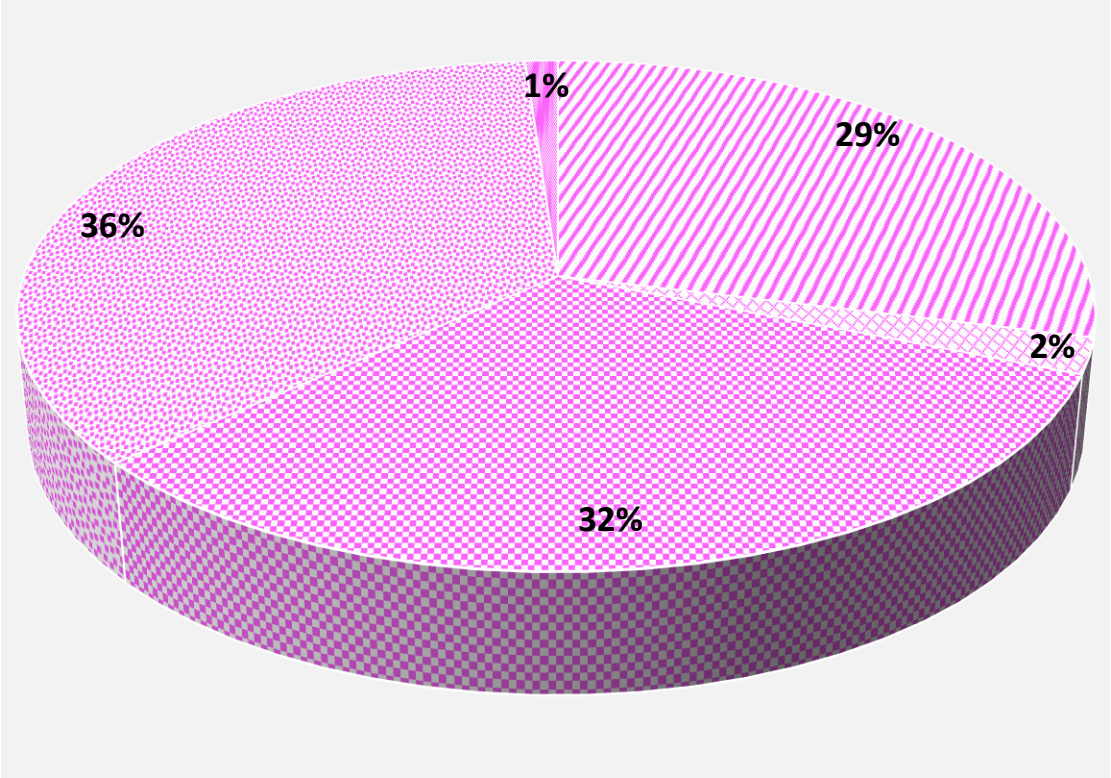
SURVEY RESULTS (Cont.)

- About 85% of the respondents consider rooftop garden (RG) as the most implementable adaptation strategy with individual effort.
- Roughly, 30% respondents think RGs are implementable with collective effort as well.
- Rooftop gardening is already in practice in the study area. Around 35% holdings have rooftop gardens.
- House front and house peripheral gardens have been seen as well. Many respondents have plants in balconies.

SURVEY RESULTS (Cont.)

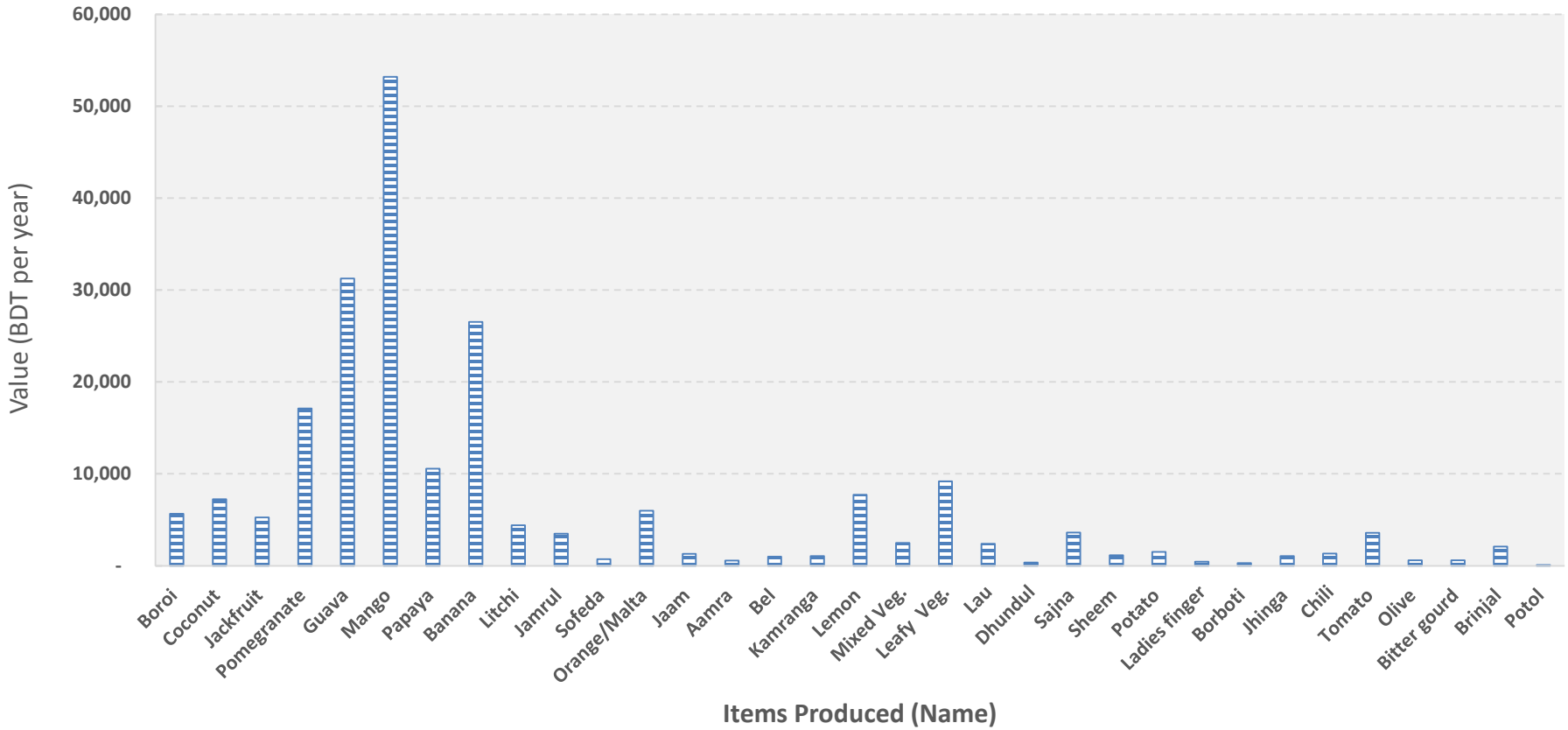
SURVEY RESULTS (Cont.)

Types of rooftop garden (RG) in the study area (%)



SURVEY RESULTS (Cont.)

Valuation of the produces (fruits and vegetables) from RGs in the study area



SURVEY RESULTS (Cont.)

- In case of individual implementation, preference for RG has moderately strong association (0.29) with household income and moderate association with ownership of holding (0.23).
- Preference for RG (0.23) has moderate association with household income in case of collective implementation.
- Gender, age, education and marital status are found to have weak or no association with RG preference.
- Out of 510 respondents 76% are found to be willing to pay for RG with a mean payment of BDT 320 per month.

INTERVIEW RESULTS

- Interviewees select RG to be a highly affordable adaptation measure.
- Interviewees show concerns regarding initiation of such adaptation at large scale even if its affordable.
- Citizens will willingly adopt RG if they can be made understand the benefits.
- Many of the interviewees suggest the government's role as facilitator.
- Behavioral changes through awareness raising campaigns are necessary.

KEY FINDINGS

- Rooftop gardening practice already exists in Dhaka but mainly for aesthetic reasons.
- RG is highly preferred by common people which are found to be affordable as well.
- Social and economic benefits are expected to outweigh environmental benefits of RG.

KEY FINDINGS (Cont.)

- Rooftop garden (RG) is appreciated worldwide as a low cost adaptation measure influencing micro-climate regulation, storm water retention, air quality, aesthetics, recreation and social interactions.

- The residents can play crucial roles in making Dhaka city climate resilient. This research implies the importance of RG as an adaptation measure that can be implemented by common people requiring less capital, technology and govt. intervention.

THANK YOU

Questions? Suggestions? Remarks?

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