



INSIDE STORIES

on climate compatible development

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Key messages

- The Western Province in Sri Lanka is the first provincial government in the country to include urban and peri-urban agriculture and forestry in its climate change adaptation action strategy.
- The province is promoting the rehabilitation of flood zones through their productive use as a strategy to improve storm water infiltration and mitigate flood risks.
- It also supports local agriculture to reduce dependency on imports, to lower greenhouse gas (GHG) emissions and energy requirements for food production, transport and storage, and to improve food security and livelihoods.
- Future upscaling of these interventions will need new urban design concepts and the development of a provincial climate change action plan, in parallel with a revision of local and national policies.
- Achieving this progress on policy will require improved impact monitoring and awareness raising at all levels of government, partnership and capacity-building, and local financing.

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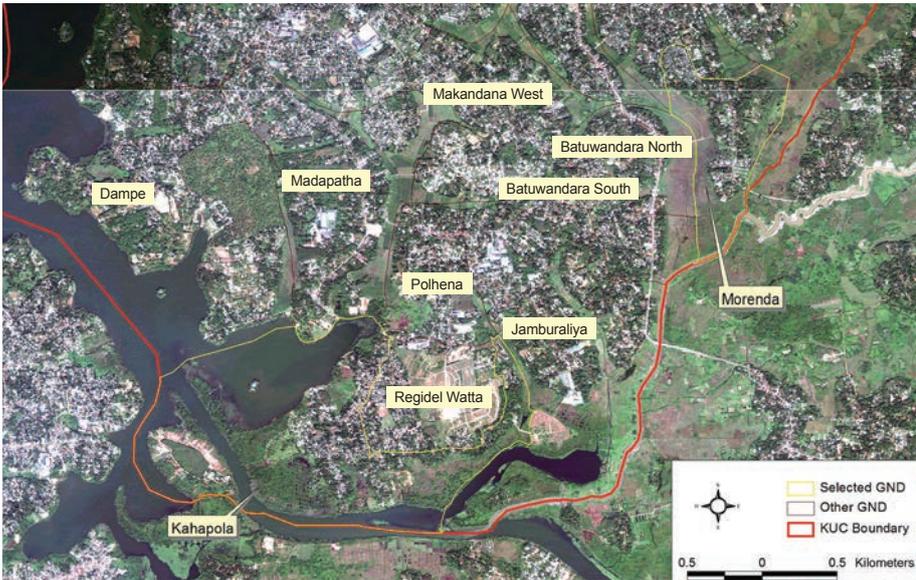
Integrating urban agriculture and forestry into climate change action plans: Lessons from Sri Lanka

The Western Province in Sri Lanka is the most urbanised province in the country. Rapid urban growth has posed a number of problems. Ever-increasing vehicle traffic and commercial industries have contributed to increased environmental and air pollution. Food and construction are two major sources of greenhouse gas (GHG) emissions, including those generated through transport. Large areas of agricultural lands have been converted for residential and commercial land uses, significantly altering natural water flows and drainage. This, coupled with an increase in average rainfall as well as heavy rainfall events, has resulted in recurrent flooding and related damages to infrastructure, utility supply and the urban economy. This brief illustrates how the Western Province is promoting urban and peri-urban agriculture and forestry as a strategy to reduce vulnerability to climate change, while at the same time enhancing urban liveability and livelihoods.

With close to six million people, the Western Province in Sri Lanka is home to about 25% of the national population – yet they occupy only 5% of the country's land area. Based on a climate vulnerability assessment by the Ministry of Environment (2011),¹ 70% of the Sri Lankan population will live in cities by 2030. According to the same report, the agriculture, urban and housing sectors will be increasingly affected by floods, sea-level rise and increasing temperatures. Food production in the province is not sufficient, and importing food from other areas of the country is threatened

by negative climate impacts on both agricultural production and transport.² At the same time, cultivable land, often located in low-lying areas, is being abandoned or converted to residential and commercial uses. Flood-related disasters are projected to increase, as will economic and social vulnerability to other effects of climate change.

Until recently, climate change literature has almost exclusively called for increasing the density of cities to make transport and services systems more efficient. However, Sri Lanka's Western Province is taking



Low-lying agricultural areas (pictured in green) in Kesbewa Urban Council are facing rapid urbanisation.

a different approach. Its urban plans include ecosystems design principles and low-cost climate change adaptation strategies, such as rehabilitating and re-connecting productive green spaces throughout the city. This strategy aids in storm water management (by reducing surface flows and enhancing infiltration), reduces flood risks and increases urban food production.

The province is monitoring potential adaptation and mitigation benefits, along with other positive social and economic impacts, to support policy lobbying and formulation. It is also putting into practice strategies that promote awareness and networking, policy dialogue, capacity development, new partnerships and pilot financial activities.

Pilot projects adapt existing development initiatives for climate compatibility

Since 2005, the Western Province has promoted home gardening and urban

agriculture as part of the country's policy aimed at achieving food sovereignty and promoting domestic food production. However, this was not done from a climate change perspective. In partnership with the international network of Resource Centres on Urban Agriculture and Food Security (RUA), the International Water Management Institute (IWMI), UN-Habitat, Wageningen University-PPO and the School of Forestry at University of Florida, the Western Province undertook a CDKN-funded assessment of the potential impacts of urban and peri-urban agriculture and forestry on climate change adaptation, mitigation and developmental benefits. Based on this assessment, RUA, UN-Habitat, the Western Province, Kesbewa Urban Council and the local non-governmental organisation (NGO) Janathakshan selected and financed pilot projects on two promising urban agriculture models: i) the productive rehabilitation of abandoned paddy lands and; ii) intensification of home gardening, coupled with promotion of

rainwater harvesting and organic waste composting.³

The projects are implemented in Kesbewa Urban Council, a fast-growing city located 21 km south of Sri Lanka's capital city Colombo. Current land-use patterns in Kesbewa – with 32% of land still being used for agriculture – suggest that home gardens and abandoned paddy lands have the highest potential to be used for urban and peri-urban food production.

In 2011, Kesbewa had over 600 hectares of paddy lands, and 32% of the total paddy area was abandoned, as a result of paddy cultivation in this part of the country being less economically profitable in comparison to production in the North of the country, where labour costs are lower. Further, there is an increasing problem with salt water ingress, resulting in lower crop yields and incomes to paddy farmers. Paddy lands are privately owned. Over the past two years about 5% of this land has been converted into residential housing⁴ and this trend

Exposure to floods, strong winds and extreme temperature events will increase in the future. Vulnerability of the Kesbewa Urban Council area will increase by more than 200% (from 25 to 82%) within the next 20 years. This emphasises the need for reinforcing the adaptive capacity of the city in order to cope with expected climate change scenarios."

– Prof. P.K.S. Mahanama, University of Moratuwa

is only expected to increase. This trend represents poor urban planning: as paddy lands are located in low-lying areas and flood zones, any housing in these areas suffers from regular flood damage during periods of heavy rainfall. In contrast to abandoned paddy lands, well-maintained and well-drained paddy lands function as buffer zones, storing water and controlling drainage, thus reducing flood risk in nearby areas.

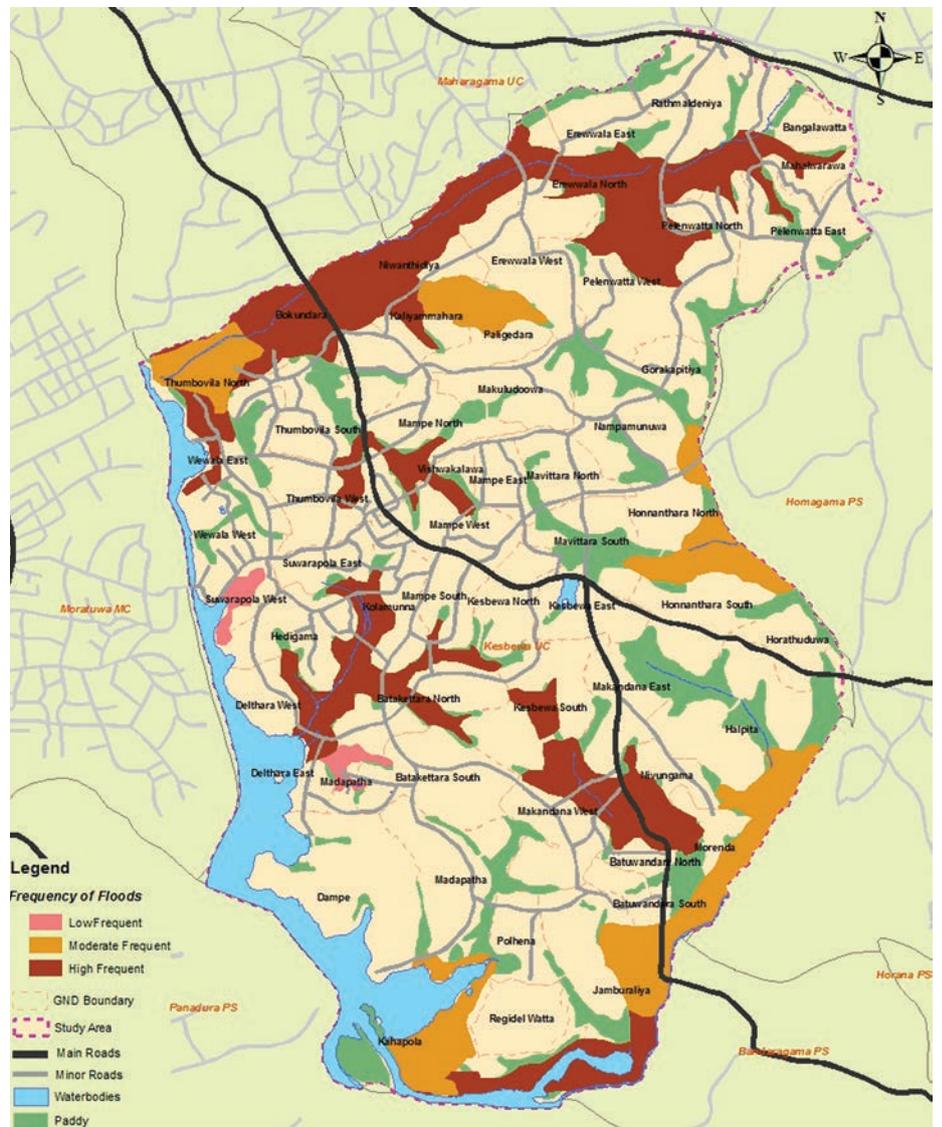
Pilot project 1: Rehabilitation of abandoned paddy lands

For this project, two clusters of abandoned paddy lands were selected, located in medium- to high-risk flood zones. Their sustainable rehabilitation included the promotion of more salt-resistant and local varieties of paddy (which are in high demand and fetch good market prices), alongside the cultivation of vegetables in raised bunds that generate additional income.

Pilot project 2: Intensification of home gardening, coupled with promotion of rainwater harvesting and organic waste composting

In Kesbewa in 2011, a total of 410 hectares was used for home gardens, while another 285 hectares remained available for cultivation.⁵ The Kesbewa urban population is not wealthy: 84% falls in the low- to middle-income category.⁶ Home gardening is practised by around 30% of the population for both home consumption and income. Home gardening helps lower household vulnerability by enhancing access to more diverse and nutritious food and by diversifying income sources. Thus, people with home gardens are less vulnerable to disturbances in food supply from rural

Figure 1: Flood exposure in Kesbewa, Sri Lanka



Source: Faculty of Architecture, University of Moratuwa (2012). Based on data from the Ministry of Disaster Management, Government of Sri Lanka: Colombo, Sri Lanka.



Urban gardens such as these can contribute substantially to household nutritional needs.



Rehabilitated paddy areas with vegetables growing on raised bunds.

areas or imports and to increases in food prices – both of which may be aggravated by climate change. In light of continuing urban development and increasing competition over land, home gardens should be designed with future space restrictions in mind. In this project, researchers conducted a food flow analysis to help determine the best vegetable and fruit varieties to be promoted in home gardens, selecting ones that can potentially replace food imports, such as gourd, cucumber, eggplant, okra, chilli and capsicum.⁷

Impact monitoring by the University of Moratuwa and the University of Colombo shows that households involved in the production and sale of urban food can increase their income and reduce their food expenditures, improving both food security and dietary diversification. Flooding incidences and impacts are also estimated to be lower when paddy lands are preserved and well-managed. And when computing the difference between the amount of GHGs released during the production and transportation of a ton of each of the selected vegetables to Kesbewa and the amount of GHGs emitted when this amount of vegetables is produced locally, GHG emissions can be lowered by 75 tons per year. Emissions of GHGs could be further reduced if home gardens are used more intensively, yields are increased and nutrient management is improved (as only low quantities of compost are used), requiring extension and technical support.⁸

Policy implications

In parallel to project implementation and monitoring, researchers conducted a policy review to determine where

intervention would be needed to scale up these models, at three levels:

- **Local level** – promoting the integration of urban agriculture into urban development plans and in municipal programmes and budgets. Starting with Kesbewa Urban Council, a call was made for i) the identification and zoning of urban agriculture areas; ii) the design of such areas, building on the results of the pilot projects and including direct support for interventions (e.g. financial incentives for rainwater harvesting in home gardens); or iii) the rehabilitation of drainage canals in paddy areas.
- **Provincial level** – developing, with the contribution of all stakeholders, a provincial climate change adaptation action plan that will help the Western Province better cope with climate change impacts. The plan should identify concrete actions for implementation over the short, medium and long term. It should also seek to integrate urban agriculture and forestry in each of the five sectors to be covered: food security, biodiversity, health, water and human settlements.
- **National level** – revising the Paddy Act, which previously allowed for paddy cultivation only in assigned areas. The Act should promote and support new production models for mixed cultivation of rice and vegetables that can increase income, promote and revalorise agro-ecological forms of production and traditional salt-water resistant rice varieties, and maintain the natural drainage functions of paddies.

Policy revision and development is currently ongoing and builds on awareness raising, impact monitoring and broad stakeholder participation. Revision of the Kesbewa Urban Development Plan (KUDP) has been done in consultation with Kesbewa Urban Council, the Divisional Secretariat and the Urban Development Authority. The KUDP already proposes to develop agriculture in the environmental protection zone around the Bolgoda Lake (shown in blue on the flood exposure map) and low-lying areas, bringing economic benefits while facilitating ecotourism and botanical research. Promotion of home gardening is also mentioned. However, clear choices on production systems and land use design still need to be included, as do tangible proposals and incentives for urban agriculture production and marketing.

Triggered by the interest in and attention to climate change risks and adaptation strategies raised by the project, the Ministry of Agriculture and Environment of the Western Province drafted a proposal to prepare a provincial climate change adaptation action plan in collaboration with the Climate Change Secretariat of the Ministry of Environment. It will be streamlined with the National Climate Change Policy (2012) and the National Climate Change Adaptation Strategy (2010) of Sri Lanka to the best extent possible. A fact sheet on the specific contributions of urban and peri-urban agriculture to the five sectors is currently being prepared by RUAF, and will be shared with all stakeholders. The publication will include international examples of climate adaptation, as well as inputs from all levels of society in order to identify concerns faced by the population and pinpoint practical solutions. However,



Harvesting time at Kesbewa. Photo: RUAF

the design and planning of stakeholder consultation and preparation of sectoral actions, plans and implementation strategies has been delayed by the loss of institutional memory after a change of staff in the Ministry of Agriculture.

The Paddy Act is regulated by the Department of Agrarian Services in the Ministry of Agriculture. Current agrarian policy deals with the revitalisation of abandoned paddy lands. Based on the pilot project results, a recent circular published by the Department supports the promotion of short-term vegetable crops as an alternate crop to paddy. However uptake of this new practice is lagging. A clear implementation plan is needed as is further awareness raising and information for interested farmers, as well as financial support to rehabilitate drainage systems.

Enabling factors and challenges

Project results to date have been facilitated by integrally linking project implementation, monitoring and policy-making, building of local partnerships and mobilisation of local funding. However challenges remain with regards to validating the monitoring framework used and improving researchers' outreach to policy-makers.

“If research plausibly demonstrates that urban and peri-urban agriculture (UPA) can result in climate change mitigation and reduced climate vulnerability, then this would raise the profile of UPA as a mitigation and adaptation instrument and increase political and financial support as well as

demand for UPA. Data can then be effectively used to develop climate change action plans, considering UPA next to other interventions, as well as to integrate UPA in urban planning as an appropriate use for physical vulnerable sites and viable response to climate change effects such as excess storm water.”

– S.T. Kodikara, Former Secretary, Ministry of Agriculture and Environment, Western Province

Pilot activities and impact monitoring to guide parallel policy-making

The ongoing policy revision and programme design are guided by pilot and demonstration activities and impact monitoring. Project results and available monitoring data are directly used in policy-making. The participation of

policy-makers (from local, provincial and national government) in the project and monitoring activities allows for this direct flow of information. At the same time, policy-makers can guide researchers on the type of data needed at specific points in time. Project results are already being upscaled from Kesbewa to Colombo areas, where abandoned paddy areas are being rehabilitated following the Kesbewa model. However, since a validated monitoring framework for monitoring impacts of urban and peri-urban agriculture and forestry on climate change was not available at the start of the project, development and testing of such framework is being done while monitoring data are collected. This may imply that certain factors or data are not yet sufficiently looked into, such as methane emissions from paddy compared with natural bush growth on abandoned paddy lands.

Partnerships and capacity building

Established partnerships among local NGOs, civil society, different levels and sectors of governments, universities and international research and support organisations are essential to integrating project implementation, monitoring and policy formulation. Efforts to establish policies before initiating action planning/implementation may result in policies that do not work due to lack of political will, lack of resources or severe distortions during translation into actions later on in the process. On the other hand, actions that are not translated into adequate guiding policies tend to stay localised, with few or less-sustained impacts on the livelihoods of larger segments of the population.

Finding a common language and interest among researchers and policy-makers

proves difficult at times, but it is crucial for the uptake of results. For example, presenting research data on reductions in GHG emissions in tons of CO₂ may have no meaning to policy-makers unless it is compared to impacts of other interventions or presented in other forms like 'the emission or energy equivalent of X urban households'. Individual householders simply want to know how much money they can save by reducing energy costs. Similarly, data on local food production should be presented as a percentage of urban consumption (for specific crops) and linked to land availability and land use potential (i.e. how much food can realistically be locally produced and how much land would it require).

Importance of critical policy review as a basis for policy formulation

In order to define how urban agriculture can best be integrated into climate change and urban development plans or how better production and land use can be promoted as part of agricultural programmes and policies (e.g. the Paddy Act), it is important to review critically and build on existing policies, plans, norms and regulations. Such critical review was helpful in order to identify: i) the extent to which urban agriculture land uses were already integrated into various plans and policies; ii) options to further enhance such integration; and iii) the specific stakeholders to be involved and lobbying strategies to be applied.

Local funding

Assessment, pilot project implementation, impact monitoring and policy formulation during the projects were all co-funded by local partners and international support organisations (UN-Habitat, RUAF/IWMI

and CDKN). Inclusion of pilot projects into the operational plans and budgets of the Ministry of Agriculture were crucial for its implementation and follow-up, as external project funding was limited to two cropping cycles only. Funding was assigned from various programmes and departments such as the *Divina Naguma* home garden programme and the Department of Agrarian Services. The Ministry of Agriculture also made available and funded the participation of their agricultural officers and extension staff, who will play a key role in future upscaling of the activities in the province. (Co-)funding has also been put forward for the development of the Provincial Climate Change Action Plan. Municipal funding is being leveraged for rainwater harvesting and composting equipment.

Conclusions

There is growing recognition of urban and peri-urban agriculture and forestry as an important strategy for climate change adaptation and disaster risk reduction. However, the inclusion of urban agriculture into climate change plans and financing requires better monitoring to understand its contributions, as well as a review of urban planning and design concepts.

Localised monitoring of urban agriculture impacts on climate change adaptation and mitigation

More locally specific knowledge and data are needed on:

- the potential of specific forms of urban and peri-urban agriculture to contribute to climate change adaptation and mitigation, to improving livelihoods, and to sustainable urban development at the household and city levels
- the capacity of urban agriculture to adapt to climate change through new

production and storage practices or, for example, selection of more drought- or salt-resistant crop species

- policies and spatial planning measures to promote urban agriculture as a climate compatible development strategy; specifically, which production systems (e.g. home gardens, community gardens, or agroforestry) are working where (e.g. on rooftops, in backyards, in peri-urban fringes), and what are the related barriers and enablers (e.g. regulations, incentives and zoning)?

The experience in Sri Lanka provides a first set of answers to these questions, and informed the development and testing of a monitoring framework. Local application of this methodology elsewhere could be effectively used to: i) develop GHG emission reduction plans, taking into account urban agriculture as well as other interventions; ii) develop local food system strategies; iii) integrate agriculture in urban planning as an appropriate use for vulnerable sites and a viable response to climate change effects; iv) enhance awareness among citizens, the private sector and policy-makers on urban agriculture and climate change; and v) obtain national and international support and funding for adaptation measures involving urban and peri-urban agriculture.

Review of urban design concepts in order to integrate green mosaic planning

Development of urban and peri-urban agriculture and agroforestry should go hand-in-hand with the development of a clear urban development and zoning plan. By promoting urban densification in certain zones, while protecting other

zones (where home gardens and paddy lands are or could be located), such an approach can lead to a clearer and more sustainable urban structure, where dense urban areas are intertwined with green productive spaces (the 'green mosaic'). (Peri-)urban agriculture areas can function as buffer zones against climate change effects such as flooding. Preserving open spaces helps prevent development encroachment, and shorter farm-to-table food transportation can reduce GHG emissions.

Recommendations

Urban policies need to focus more on building cities that are more resilient to crises. Such policies can best be informed by showcasing best practices and replicable urban agriculture models and integrating policy advocacy and operationalisation into project design from the start. Urban agriculture may be considered as a relevant strategy bringing multiple benefits.

Put in place successful new techniques at local level early on

Implementing the pilot projects produced tangible results that reinforced the commitment of all stakeholders and informed public policy-making. From the outset, it proved useful to develop pilot projects and actions that offered benefits in the short term, in order to create a positive environment for more complex and long-term policy formulation processes.

Plan from the start for operationalisation of policies and plans

Policy review and lobbying can lead to the formulation of new policies, plans or regulations. Examples in this case are:

i) the inclusion of urban agriculture and home gardening in the Kesbewa Urban Development Plan and ii) the Agrarian Services circular, which formally allowed for new forms of cultivation of paddy lands and the future inclusion of urban agriculture in the provincial climate change adaptation action plan. However, unless it is supported by a clear road map and the necessary allocation of resources, policy formulation will not automatically follow the implementation of proposed actions, nor will it result in expected impacts on the ground.

Consider urban agriculture as a potential adaptation strategy with co-benefits

Climate change adds an ominous set of challenges to the existing ones faced by cities. For example, increased risk of flooding magnifies existing serious deficiencies in storm drainage provision in many developing countries. Cities are highly vulnerable to disruptions in critical food and other supplies, and climate change exacerbates this vulnerability for example when rural production and food imports are adversely affected by storms, floods or droughts, resulting in (temporary) food scarcity and increases in food prices. Urban economies will suffer as rural agricultural production is adversely affected by storms, floods, shifting seasonal patterns, droughts or water scarcity. Experiences in Sri Lanka have shown that urban agriculture can help reduce the vulnerability of the urban poor *and* enhance their coping capacity by: i) diversifying food and income sources; ii) keeping low-lying zones free from construction so that floods have less impact; iii) reducing storm water runoff; and iv) establishing green open spaces that can store and



absorb excess water. At the same time, local production may help reduce urban energy use and lower GHG emissions by requiring less energy for transport, cooling, storage and packaging. Therefore, urban agriculture can be a low-cost adaptation strategy, bringing with it potentially significant co-benefits in the form of food security and job creation.

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