



Promoting Agroecology in Gorakhpur: Reduction in sale of agricultural land

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Dissemination of climate information to farmers. Photo by GEAG

Protection and preservation of agricultural land around cities, in their peri-urban areas and rural hinterlands, becomes more and more important in an era of rapid urban growth and increasing climate change impacts. A large percentage of agricultural production can be found in peri-urban and rural areas within reach of cities, with a recent study indicating that approximately 60% of all irrigated crop land and 35% of all rain-fed cropland is within 20 kilometres of city boundaries.

Rapid urbanisation extends into peri-urban and rural areas where food production has to compete with building or other land uses. This challenges traditional approaches to food and nutrition security. It also challenges thinking on how cities are fed. Urban expansion goes hand-in-hand with an increase in the demand for natural resources, including land and water that provide vital food and ecosystem services to cities. There are also increased challenges in terms of economic efficiency, land use and land rights. Large scale conversions of agriculture land to non-agricultural uses may cause problems in cities and rural areas with regards to drainage systems and flood retention. They can cause temperature increases, environmental pollution and increased vulnerability to disruptions in imported food supply, especially in areas affected by climate change.

These reasons led the Gorakhpur Environmental Action Group (GEAG), as part of the Asian Cities Climate Change Resilience Network (ACCCRN) and with financial support

from the Rockefeller Foundation, to embark in 2012 on the project ‘Enhancing climate resilience of Gorakhpur city by buffering floods through climate resilient peri-urban agriculture’. The project aimed to:

- Develop models of climate-resilient integrated agriculture-horticulture-aquaculture-livestock systems in small, marginal landholdings in the peri-urban context, employing a diversity of water systems
- Enhance the income and food security of the poor and vulnerable populations
- Ensure the sustainability of peri-urban agricultural lands through different regulatory and incentive mechanisms
- Enhance the flood-buffering capacity of the city as it expands, through the institutionalisation and replication of sustainable management of agricultural ecosystems.

Ensuring farming livelihoods

It was understood that these aims could only be realised by ensuring that agriculture remains the preferred land use option by both farmers and decision-makers. The hypothesis was that farmers would continue farming and not sell their land if they could make a good living out of agriculture.

Project interventions supporting improvement of agricultural production in peri-urban areas around Gorakhpur city consisted of four major components:

1. The project introduced a number of low-external-input, sustainable agriculture (LEISA) and climate-resilient production practices through farm models, with the underlying idea of “seeing is believing”. 30 farmers (12 women) were involved. The practices build on agroecological principles in terms of sustainable production, decreasing dependence on external inputs, reducing vulnerability and promoting food security and

Practices included:

- *compost: introducing several different composting forms*
- *trichoderma: introducing this fungi strain which enhances plant and root growth*
- *bio-pesticides: mostly made from locally-available resources to deter pests*
- *oil cakes: mostly using locally-available mustard oil and neem as additional fertilisers*
- *plantation: establishing tree plantations of teak, but also other species such as guava*
- *mixed farming: growing more crops (mostly a variety of vegetables) on the same piece of land during a single growing season*
- *seed production: producing seeds on-farm or buying them*
- *IPM: promoting the lowest-possible use of pesticides and only using chemical pesticides if bio-pesticides did not have sufficient effect*
- *kitchen gardening: gardening for home consumption*
- *loft farming: farming on a loft or roof*
- *bag or thermocol farming: planting seeds in thermocol or jute bags, and hanging them on poles above waterlogged or inundated land*
- *low tunnel polyhouse: raising early nurseries and vegetables in tunnel greenhouses*
- *permanent raised beds: raising beds, so that they remain above waterlogged soil during the monsoon season*
- *relay cropping: starting a second crop amid the first crop before it has been harvested.*

income for both men and women farmers.

2. Formation of local institutions such as the Farmers' Clubs, Agro-Service Centres, Farmer Field School and the Laghu Seemant Krishak Morcha (LSKM) that can be considered as farmer unions and fall under the umbrella of the national LSKM
3. Provision of the weather forecasts and agro-services provided by SMS
4. Establishment of direct linkages from farmers to government line departments and GEAG agronomic experts.

Complementary project interventions such as research, documentation and advocacy furthermore enhanced the understanding of policy- and decision-makers about the importance of preserving peri-urban agricultural lands.

In case of floods, practices such as bag and loft farming help farmers to grow saplings during the flood season. These can be planted into the fields once the water recedes. In case of water shortage, farmers are now able to rent the needed equipment from the agro-service centres to irrigate their fields when needed.

The project has had a tangible and demonstrated impact on direct beneficiaries and "outreach" farmers. The average agricultural income of farmers has more than doubled due to uptake of agroecological practices, reduced input costs, crop diversification, crop intensification, expansion of agricultural land under cultivation, and reduced crop loss due to natural hazards such as floods. Income also increased because of better market linkages and better prices for products.

Evaluation data available estimate that 50-80% of the farmers in the intervention villages adopted one or more of the above practices, while the adoption rate in neighbouring villages was estimated at 10-30%.

The project's activities have also resulted in greater resilience of farmers based on:

- increased resourcefulness (due to better access to needed equipment through the agro-service centres), resources (such as capacity building and finances), and services (such as government programmes)
- increased access to information due to its provision, discussion, and dissemination through farmer clubs, farmer field schools, and LSKMs, and GEAG's provision of weather and agro-services data to help them make more informed decisions
- increased responsiveness, due to their increased abilities to respond and adapt to their situations.

By demonstrating improved practices and increased income, the project has renewed people's interest in farming in the peri-urban areas. As a result, according to a project sample study, the sale of agricultural land decreased substantially in the eight project intervention villages. According to the study, 1.83 acres of land were sold in the northern cluster of the city in 2010, while this was reduced to 0.66 acres of land in 2015. In the southern cluster the decrease was even more apparent: from 6.9 acres in 2010 to 0.2 acres in 2015 (according to a sample of 166 farmers in the northern cluster and 108 farmers in the southern cluster in the 8 project villages). This is despite many builders still coming to inquire if there is land for sale and land prices having gone up by 10 times over the last years.

Reducing flood risks

The project's contribution to its overall goal of buffering floods in Gorakhpur has not been clearly established. The project implementation was only in eight villages of the 170 in the peri-urban agricultural area – a scale too small to have a tangible impact on buffering floods. Moreover, the production interventions and typology promoted by the project were oriented toward reducing climate change impacts on agricultural production and income. They were not oriented toward reducing climate change impacts on the city through preservation and improved management of agricultural land areas.

The project recognised that implementing peri-urban agriculture to buffer floods is only part of the solution. Other parts of the solution, such as attention to the city's poor drainage and introduction of holistic planning, would call for controlling city expansion and development, establishing

proper drainage systems, and ensuring conservation and proper management of open spaces, water bodies, and agricultural lands in peri-urban areas and beyond.

Monitoring sale or preservation of agricultural land

Habitat III and the New Urban Agenda (NUA) recognise that urbanisation has increasingly linked cities with their peri-urban and rural hinterland, spatially as well as functionally. Given the large scale of urbanisation and the transformation of rural space, it is argued that sustainable urbanisation must promote integrated territorial development. Balanced urban-rural linkages are needed as part of a common system for the benefit of the urban and rural population alike.

Such balanced urban-rural linkages have to build on protection and preservation of agricultural lands in city regions. Such protection is also key to the building of more resilient City Region Food Systems. In terms of the Sustainable Development goals, the project addresses the following three:

- SDG 2 - End hunger, achieve food security and improved nutrition and promote sustainable agriculture)
- SDG 11 - Make cities and human settlements inclusive, safe, resilient and sustainable–
- SDG 12 - Ensure sustainable consumption and production patterns

Specifically, the project addresses target 11a: Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning. Under SDG 12 it addresses Target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources; target 12.3: By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses; target 12.7: Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

Sustainable planning and management of peri-urban agriculture areas is also key to the implementation of the NUA in three key ways. First –and as illustrated by the Gorakhpur project- its benefits are multiple and stretch beyond the food system to key policy areas of concern. These include local economic development, spatial and economic planning, and ecosystem protection. Second, the development of sustainable city-region food systems can generate positive political support for wider urban-rural linkages through coalition building centred on food. And thirdly, protection of peri-urban agriculture production merits attention in its own right given the importance of addressing more sustainable urban food systems and climate-resilient urban growth.

The promotion of agroecology in connection to other support interventions has proven to be the key to increase economic viability of peri-urban farming systems in Gorakhpur. Beyond the more traditional monitoring of impacts on farmer livelihoods (food and nutrition security, income),



Bag farming. Photo by GEAG

there are others. Monitoring the sale, or conversely, preservation, of agricultural land, is an important indicator to monitor not just effectiveness of farming practices, but also of more sustainable urban growth.

Replication potential

There is a huge scope for replication of the project in other villages in the peri-urban areas of Gorakhpur. This project's scope for replication, at city and district level and beyond, would require continued advocacy work to promote agroecological production as a peri-urban land use management strategy. Inclusion of such land use in disaster risk reduction and management plans would also be paramount.

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