
Research Paper

Spatial planning and design for food security

Building Positive Rural-urban Linkages

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Abstract

Food is vital for human survival. Food has had a significant impact on our built environment since the beginning of human life. The process of feeding oneself was most people's primary job for the greater part of human history. Urban Migration moved people away from rural and natural landscapes on which they had been dependent for food and other amenities for centuries.¹ Emergence of the cities leads to a new paradigm where the consumers get their food from rural hinterland where the main production of food products happens². In a globalized world with an unprecedented on-going process of urbanization, There is an ever reducing clarity between urban and rural, the paper argues that the category of the urban & rural as a spatial and morphological descriptor has to be reformulated, calling for refreshing, innovating and formulating the way in which urban and rural resource flows happen. India is projected to be more than 50% urban by 2050 (currently 29%). The next phase of economic and social development will be focused on urbanization of its rural areas. This 50 %, which will impact millions of people, will not come from cities, but from the growth of rural towns and small cities. Urbanization is accelerated through Government schemes such as JNNURM (Jawaharlal Nehru National Urban Renewal Mission) , PMAY (Pradhan Mantri Awas Yojana), 100 smart cities challenge, Rurban Mission are formulated with developmental mindset. The current notions of 'development' are increasing travel distances, fuels consumption, food imports, deterioration of biodiversity, pollution, temperatures, cost of living. The enormity of the issue is realized when the cumulative effect of all cities is addressed. Urban biased development becomes an ignorant choice, causing the death of rural and deterioration of ecological assets. Most people live in places that are distant from production fields have been observed as an increasing trend. Physical separation of people from food production has resulted in a degree of indifference about where and how food is produced, making food a de-contextualized market product as said by Halweil, 2002³. The resulting Psychological separation of people from the food supply and the impacts this may have on long term sustainability of food systems. Methodology : . Sharing the learning about planning for food security through Field surveys, secondary and tertiary sources. Based on the study following parameters : 1. Regional system of water 2. Landforms 3. Soil type 4. Transportation networks 5. Historical evolution 6. Urban influences A case study of Delhi, India, as a site to study a scenario that can be an alternative development model for the peri-urban regions of the city. To use the understanding of spatial development and planning to formulate guidelines for sustainable development of a region that would foster food security.

Keywords

Food security, spatial planning, urbanisation

1. Introduction

1.1. Najafgahr

Zone L is one of the 6 zones that are demarcated as urban extension and rural area. Najafgahr is designated as a sub regional centre with 6 villages as service and growth centres. Najafgahr is a representative of the trend of transformation in the peri-urban areas of the developing nations. It is often representative of the edge condition of the metro cities that are growing in size, rapidly.

1.2. Current Scenario

By the year 2025, 83 per cent of the expected global population of 8.5 billion will be living in developing countries. Yet the capacity of available resources and technologies to satisfy the demands of this growing population for food and other agricultural commodities remains uncertain⁴. India is projected to be more than 50% urban by 2050 (currently 29%). The next phase of economic and social development will be focused on urbanization of its rural areas. This 50 %, which will impact millions of people, will not come from cities, but from the growth of rural towns and small cities. The current notions of 'development' are increasing travel distances, fuels consumption, food imports, deterioration of biodiversity, pollution, temperatures, cost of living. The enormity of the issue is realized when the cumulative effect of all cities, is addressed.

2. Trends

In the midst of this transformation, it is the urban-rural and rural-urban interaction that is deteriorating. Most people live in places that are distant from production fields, an emerging trend that is a result of our transformation from urban to rural societies. As urbanised specie, Humans have created a distinct division between agriculture and city life.⁵. Contextualisation and positive linkages between urban and rural can be built through a critical dimension of food systems.

Past 40 years, the government of India has emphasized on cereal farming (green revolution) now we are self-sufficient in that area. In many parts of the country, farmers are agitated because of insufficient income out of growing cereals. Speculation of land-use change in urban peripheries forces farmers to sell land for short-term monetary returns, as they lack the skill to adapt farming, to the changing needs of the city and climate. Leading to the disintegration of communities. Parallel to that, many studies have highlighted a shortage of vegetables & fruits. There are large price fluctuations, as they are not supported by the government and their supply is uncertain too. The huge requirement of food in the main consumption centres, like Delhi (25 million people) is transported from long distances (onions from Maharashtra and chillies from Karnataka). It is crucial to reduce transportation cost and energy. A more sustainable farming practice would be to grow vegetables and fruits close to the city and have a high value realization for farmers. This is where farming and industry come together i.e. farming done in an industrial mindset e.g: trellising system, poly houses, controlled irrigation etc. Here agriculture is not understood as a primary way of cropping but with a mindset of tertiary and secondary.

When this is projected against real estate development, it will not only provide farmers a better livelihood, it will encourage them to learn and educate. By weaving this into the idea

of Rurban lifestyle at the edge of the city, with cultural characteristics of communities, every part of the city need not be a state-led urban development project, thereby creating a fresh way of dealing with city edges of mega-polis like, Delhi. Through the New urban agenda, agenda 21, Sendai framework, it is an opportunity to open a new way of developing a fresh mindset and action plan to create an alternate way of developing the urban extension / urban periphery.

3. Significance of Urban Rural linkage:

Urban rural linkages have been defined broadly as the reciprocal flows of people, goods, services, money and environment services with many of these linkages related directly or indirectly to food systems. There are significant changes happening within food systems that impact urban-rural linkages, such as the decline of traditional markets, globalizations of diets and increasing availability of highly processed food. Small holder producers and processors, who often rely on nearby urban areas for market are increasingly competing with food produced from distant sources, often selling for lower prices.

As a result of food system changes, with multiple and interacting economic, environmental and social impacts, urban and rural areas have become less interdependent in a food systems context in many countries. Paradoxically, the severing of local food chains linking rural and urban areas has occurred while urban and rural communities are also becoming more interdependent in other ways, for example in the flow of money labor, culture and social technologies. All these changes are having profound impact on smallholders across the urban rural continuum. The diverging interdependent realities of urban and rural communities need to be addressed if we are to achieve sustainable urbanization, resilient food systems and balanced urban rural development.

By strengthening linkages between people growing and consuming food is an effective way to increase harmony and synergy lessening the gaps between urban and rural communities. The food systems often have an effective policy area through which to strengthen urban rural linkages but the impact of the policy is often diluted during its spatial manifestation.

The 2030 Sustainable Development Agenda invites new narratives, including integration of *peri*-urban and rural sustainable development. climate change, biodiversity loss, land grabbing, water shortage, forced migration as a result of disaster, war and occupation, violation of land, food and other human rights all add to the pressures on food systems, most affecting women, children and other marginalized members of society. Despite the fact that food and cities are among the seventeen sustainable development goals (SDG2) both with developed targets, indicators and means of implementation, their integration has not been fully articulated. Until interdependence of these two areas is acknowledged as part of the implementation agenda for SDGs balanced urban rural development may not occur or not at all in places where urban expansion is the greatest and this balance is most needed. In order to develop spatial planning framework for strengthening food systems in the immediate peripheries of the city below method was adopted. Earnings about planning for food security through Field surveys, secondary and tertiary sources. Based on the study following parameters: 1. the regional system of water 2. Landforms 3. Soil type 4. Transportation networks 5. Historical evolution 6. Urban influences A case study of Delhi, India, as a site to study a scenario that can be an alternative development model for the

Peri-urban regions of the city. Challenges to integrate urban and rural are specific to local places and there is an urgent need to find constructive ways address the issues . As a solution to strengthening urban-rural connection, FOA (Food and agriculture Organisation) defined a term “ city region food systems “ in December 2013 “ Complex network of actors ,Processes and relationships to do with food production, processing , marketing , and consumption that exist in a given geographical region that includes more or less concentrated urban centre and its surrounding peri-urban and rural hinterland ; a regional landscape across which flows of people , goods and eco system services are managed . “ To use the understanding of spatial development and planning to formulate guidelines for sustainable development of a region that would foster food security.⁶

4. Research Parameters

The following parameters provide window to investigate and understand the local region and the origins of it from many perspectives. It is also a framework to explore the potential avenues for transforming the area into city region food system. Through these parameters, a vision to re-imagine an alternate development model for urban extension is imagined, where sustainable urban development is imagined as a consequence of food systems.

4.1. Ecology Historical evolution –heritage characteristics:

Historically, Najafgahr has been cultivated. It falls on the trade route starting from Rajasthan .This trade route is along the foot hills of Aravali range. The presence of Aravali, creates a unique scenario of rich network of natural drains.

4.2. Ecological setting and environmental conditions:

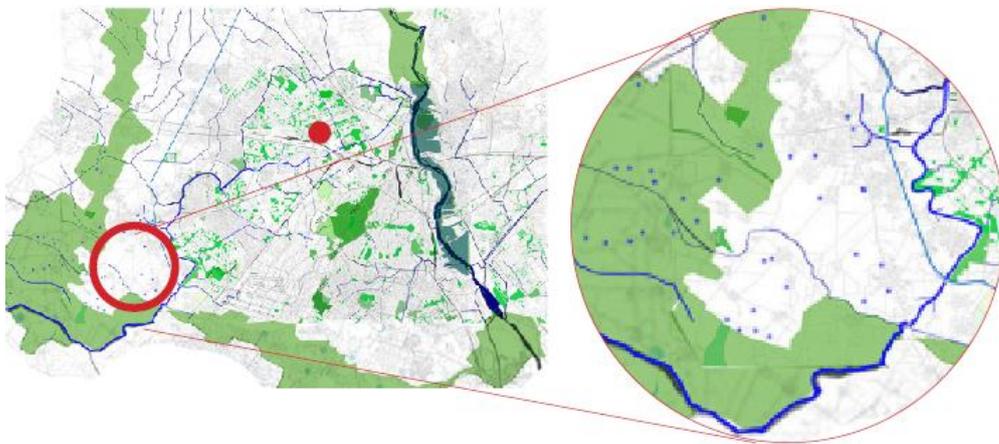
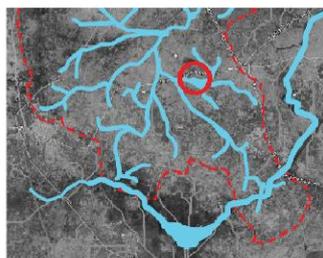
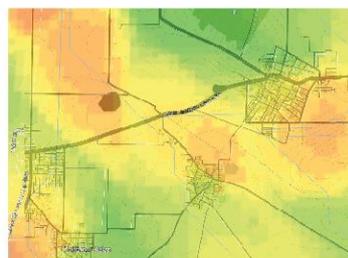


Figure 1 Map: Natural Drains of Delhi , Source : The Yamuna Project



MAP Water shed Basin
Source : GIS



GIS Stream Density map
ource : GIS



Seasonal streams
Source :GIS

Figure 2 Natural Drainage of the village cluster L-3, GIS map Stream density , Seasonal Streams , Source , Author .

The above maps show the network of natural drains from macro scale, meso to micro scale. Analysis of natural terrain, drainage system, seasonal drains, reveals the valley zones. Study of soil and various zones of fertility based on scientific data is mapped. Fertility of soil and natural drain density has a healthy coherence. These valleys are valuable in structuring and guiding demarcation of buildable land. These valleys are zones that must be protected in order to ensure well irrigated region and there for high water table. Super imposition of the two data sets, can reveal structure and function of natural systems that have evolved to fit the natural resources of the given location. Developing an understanding of such kind can inform agro ecology and reveal ways to incorporate into farming systems and food systems. Since the natural water systems is continuous , by strengthening the eco system in these zones can serve as valuable habitat for wildlife , key part of integrated natural systems and a boon to those people who want to observe this aspect of the system Simultaneously , also revealing that areas where built expansion can happen , as shown in Figure 2 . If this system is designed well, along with native species, it will begin to flourish independently. A well-designed interface with this area itself can become a forum for recreation, education and potential economic interaction. ⁶

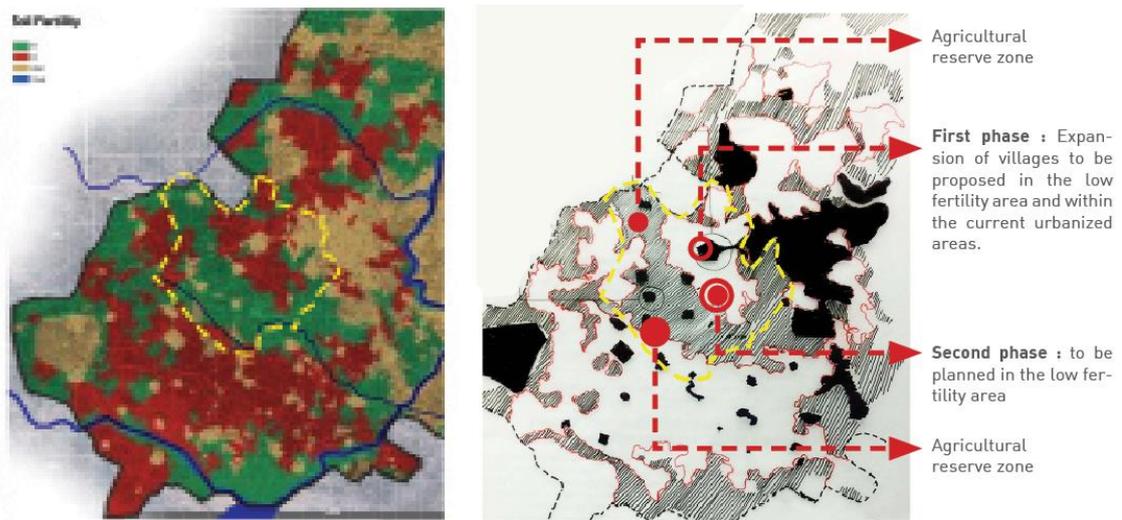


Figure 3 Soil Fertility map, Source: SLUSI , Development zones and protected zones , source : Author

4.3. Social, cultural and demographic attributes:

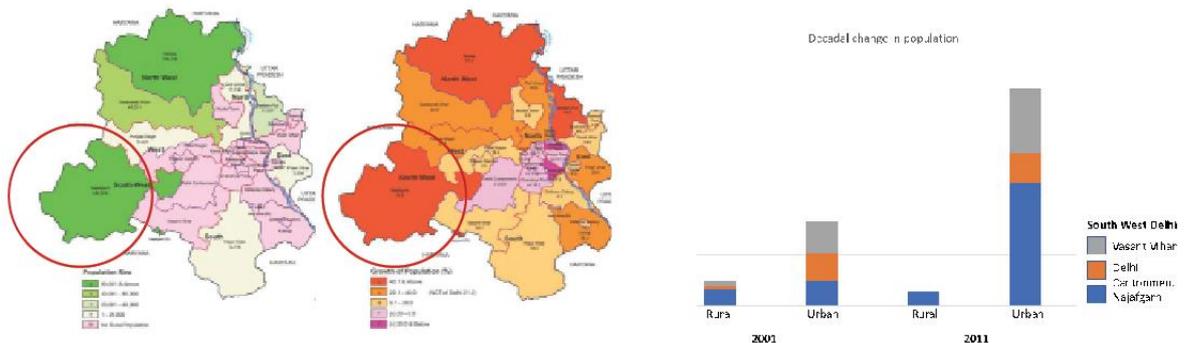


Figure 4 Increase In rural population ,Increase in population , Occupational shift in L-zone , Source : N.C.R.P.B

Decadal growth in population, literacy rate and occupational shift are indicative factors that project that scale of urbanisation.

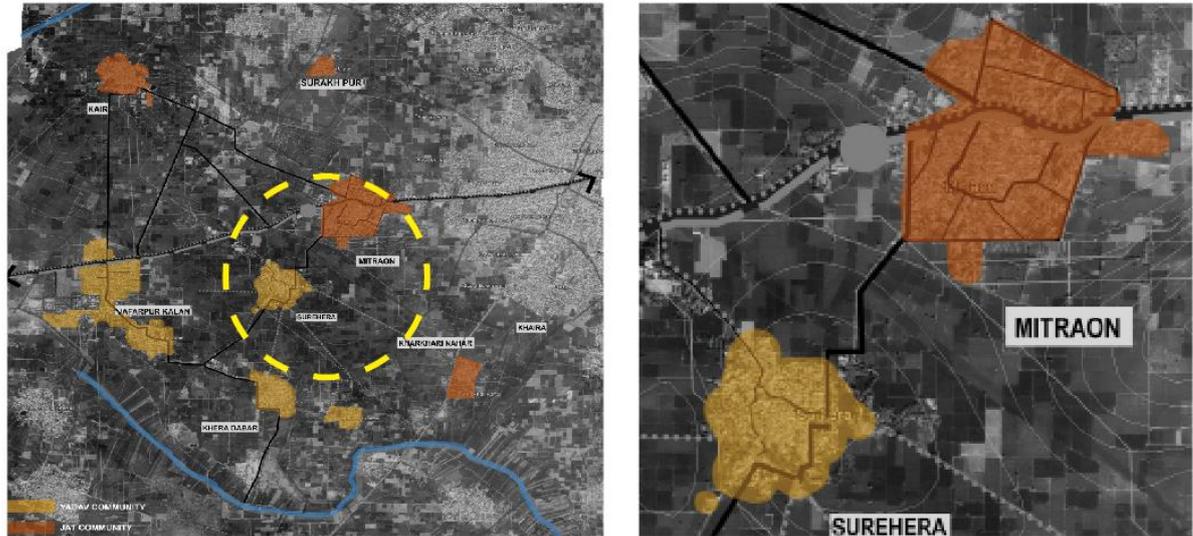


Figure 5 Map : Social Structure in village cluster , Sub cultural groups. Source : Author.

Social structure of clusters: The cluster is divided such that the major census town and the rest of the villages in the cluster are always at a conflict. The Government documents bind this cluster of villages as a unit, but there is a sub cultural divide amongst these. Forming 2 groups. The historical evolution of the 2 communities is fundamentally different and therefore the present day differences are there.

4.4. Morphological districts and their characteristics

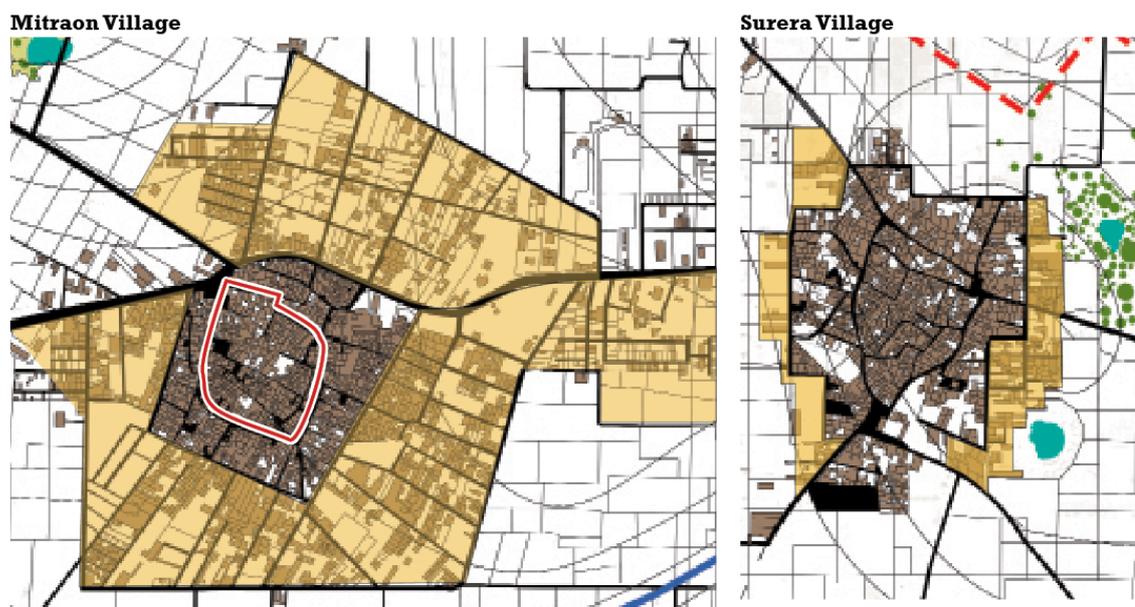


Figure 5 Mitraon village of Jat community, Surera Village of Yadav Community, Highlighting the sprawl .

Morphological character reveals the cultural attributed of the community, their lifestyles, activities and trends of development. The above map indicates the difference in the nature of sprawling according to different communities.

4.5. Physical and social infrastructure – distribution and access:

The hard infrastructure of roads , processing , storage and agricultural services business and the soft infrastructure knowledge , culture and social supports , financial credit and remittance link rural and smaller settlements and intermediate scale cities in different ways than larger cities².

4.6. SPATIAL Recommendations:

Outcomes: To identify systems that reinforce agriculture as green infrastructure in areas those are close to the urban centres, as a defence against an urban-biased expansion of cities.

To strengthen the presence of the local community by providing healthcare, education and social infrastructure and locating facilities by the understanding its cultural fabric.

Facilitate young farmers to develop scientific and technical skills, business and management skills to practice farming with an industrial mindset, thereby creating productive landscape and employment opportunities. To protect and enhance the ecological assets of the place.

Principles to enable this project:

1. Integration of system: Drainage, Movement, Ecological, Agricultural
2. Morphology of interface
3. Function at interface
4. Typology of buildings at the interface

5. Strategy

Strategies are an outcome synthesising information of a broad spectrum into spatial guidelines. The guidelines are crafted with a belief that all policy, programs, social and cultural issues , economic and environmental issues have a spatial translation . Therefore a solution to create the urban rural continuum through the lens of food systems, spatial solution is created.

5.1. 1.1 Regional level strategy:

1. Plantation to be seen in such a way that there blue green infrastructure.
2. To identify and secure water catchment area. And harness it.
3. Using native, indigenous plant species as they are climate adaptive and high yielding.
4. Studying soil to identify least fertile soil -barren land to limit high density construction (if needed) in those boundaries.
5. Moving towards multi crop farming, harvesting greens-vegetables as a part of the increasing higher economic valuation of crop. – Especially in the areas with high real-estate value.
6. Strengthening the role and presence of educational institutes.
7. Implementation of the form guideline in the region in order to strongly secure the predominant identity of this area.

5.2. 1.2 Village cluster level:

1. To strengthen the presence of education institutes at cluster level.
2. Decentralizing the supply chain system according to the strengths and skill of each village.

3. To locate the given infrastructure by the government in such a manner that the inter-connecting bond of the villages strengthens.
4. Creating interface of amongst villages that strengths their relationship with one another.
5. Creating a movement network for efficient movement of produce.
6. Ensuring that the natural drainage is protected by creating bio-swales and dirt tracks at the valley areas.
7. High impacting but less no. of vehicular roads. To avoid dissection of farmlands. Placement of vehicular road is THE MOST crucial part of working in the agricultural landscape. Roads often area the starting point of strip development, with the characteristic widening of this strip, the farm lands tend to become the constantly shrinking backyards.
8. Creating decentralized system of settlements that work as a cluster of villages with each specializing in a service. The FAO studies have shown that when village work in a cluster the profitability can multiply 3 folds. Can be done by creating interdependencies and specializations at the same time.
9. To identify sub-cultural divides and build interface for cohesion.
10. Movement network to have strong hierarchy that will be maintained by the design of the section, such that people are encouraged to walk and cycle and recreate.

5.3. 1.3 Village level

1. In India, MSME accounts for 45% of manufacturing output, fostering growth of MSME sector along with the provision of social infrastructure for hamlets and villages can diversify employment opportunity for the rural population and alleviate the need for migration or give up farming practices.
2. Recreating the rule of commons, something was a fundamental part of village functioning as a unit.
3. Strengthening sense of community
 - By strengthening congregation spaces of the village and making them more accessible.
 - Creating shared facilities.
 - Making space for cultural attributes of the community.
 - Creating new ways of congregation that is inclusive of youth generation.
4. De-congesting core roads to protect the community life at the dense core.

5.4. Local intra village strategy:

1. Protecting, strengthening and creating potential natural drainage spines.
2. Based on soil fertility and capability the village expansion must be located.
3. The interface of the new and the old much be designed to accommodate new scenario and morphological continuum in order to retain the landscape quality.
4. Ensuring no strip development between 2 villages.
5. Careful locational setting of educational institutions based on their capacity and to enhance accessibility.
6. Making this area also be a training foreground and outreach program for the new generation farmers.

5.5. Built Forms

1. Systematizing the new development.
2. Morphological transition with the existing structure.
3. The form must respond to the fact that the soil is loamy.
4. The new structures will be a shared facility (present day commons) therefore modularity is a crucial point in the design.

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5. The form must enhance the relationship of the people with farmlands and farming practices.
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6. Conclusion

Integrated planning for urban and rural areas around the world is extremely challenging and the rise of structural inequity and polarization is not reducing the level of challenge. And yet, there are new openings and opportunities of developing alternate ways of development. However, the benefits of a balanced urban and rural approach to strengthening urban rural linkages summarized in this paper will only occur with deliberate efforts to integrate urban, peri-urban and rural food system planning in sustainable development planning at all levels. The significance of having an ecosystem of urban and rural is the only way to move towards a sustainable future. The Agenda 21 Document strongly advocates for urban rural continuum and food security, this paper is an attempt to translate the ideas into spatial guidelines, as it is observed, that often the spirit and intentions of the project is lost in translation from text to space. Frameworks for design and planning must be created to factor in new Narratives that are specific to local context so that ecology and biodiversity, therefore sustainability of the region at large is made possible.

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