

Changing Land Use pattern & Impact of Peri-Urban Agriculture in Greater Hyderabad region, Telangana State *

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Abstract: Peri-urban areas are characterized by great heterogeneity and rapid changes of land use. Furthermore, population composition changes as peri-urban areas offer attractive residential alternatives to city centers or more remote locations. The dynamic processes leave peri-urban areas in an in-between situation, neither city nor country side and home to a range of functions, spanning from agricultural production to residential and recreational areas. This paper investigates the urbanization of agricultural areas in the Greater Hyderabad region based on quantitative data collected on agricultural properties in Four study areas between 1990 and 2012. The overall conclusion is that agricultural land use have continually largely unaffected by the processes of urbanization. However, most of the production is concentrated on a few very large full-time farms. In addition, the economic activities have been greatly diversified. The structural components of the areas (land use and landscape elements) thus appear to be more resilient than the socio-economic system (declining number of full-time farmers and increasing number of owners engaged in other gainful activities). However, at some point this discrepancy will disappear and rapid land use changes may be expected. For an ideal urban land use, a balanced multi land use policy emphasizing peri-urban agriculture is suggested.

Keywords: Land use, livelihood, peri-urban agriculture, hidden urbanization, agricultural restructuring

I. Introduction:

India's population of more than one thousand million people, 35-40 percent currently lives in cities. This proportion is expected to increase to about 60 percent by 2025 (Brockerhoff, 2000). The creation of employment has not kept pace with the growth of urban populations. As a consequence, the traditional pattern of poverty incidence is rapidly shifting from rural to urban areas. Migrants move to the relatively inexpensive fringe areas of cities, where clusters of slums are emerging. These environments are characterized by poor sanitation, lack of water and electricity services, and substandard housing. Urban food security is becoming a matter of increasing concern and urban poverty is reflected in the nutritional status of the people. Households in large cities in low-income countries spend 50-80 percent of their incomes on food (PCC, 1990, cited in Mougeot, 2000) and nutritional deficits in macronutrients and essential micronutrients are common. India's agricultural policies have focused strongly on rural areas, aiming to achieve self-sufficiency in food production and to reduce rural poverty. Accordingly, urban food needs are expected, explicitly or implicitly, to be fulfilled by production in rural areas. With the emphasis on rural agriculture, the positive contribution that production closer to the cities can make has hardly been acknowledged. However, the role of urban and peri-urban agriculture as a major source of produce, a means of improving food security and enhancing the livelihoods of poor producers, is increasingly described in the literature (Bakker *et al.*, 2000).

Peri-urban agriculture has brought out two clear impacts on farmers and the rural economy. The first is the long-term impact of rise in land prices associated with reduced size of holding for agriculture, and the second, the short-term impact of rise in agricultural wages. In peri-urban and rural agriculture, the contribution from wage income exceeds 50%. Nevertheless, the per capita incomes of farmers in these scenarios are 50% lower than the per capita income of an average Indian. Steps are suggested to improve the economic situation of peri-urban farmers.

Peri-urban areas thus come to be valued in different ways by diverse groups. These values vary between continents, nations and regions. They include:

For the poor: places where it is easier to build shelters and to occupy land for agriculture

For industry: sources of materials essential for urban life: water, brick-clays, sand and gravel, limestone, fuel wood and timber

For the middle class: a place for houses in a rural setting, with golf courses and other recreational facilities

For local government: sites for landfills, waste dumps, peripheral freeways, airports or noisy and toxic industries

For conservationists: the site of valuable protected areas, forested hills, preserved woodlands, important wetlands or mangroves, and major coastal ecosystems

For education and human well-being: the place of first contact that urban people have with major areas of natural vegetation and biodiversity.

The poor and the middle class affect peri-urban land use differently. Low density middleclass urban sprawl - the occupation of former rural land by low-rise/ a development is becoming a major issue in developing countries.

II. Objectives:

The study attempts to examine the urban growth and trend of development of Hyderabad city and its impact on land use change between 1990 and 2012 and also to estimate the extent of instability in agricultural production.

III. Materials and Methods:

The data was collected from the mandal Sub-registrar of Ranga Reddy district of AP which encircling Hyderabad city. The Ibrahimpatnam, Shankarpally, and Basherabad mandals of Rangareddy district has highest area under Agriculture. The total Geographical area in Ibrahimpatnam is 28305 ha, Shankarpally is 21382 ha and in Basherabad are 20412 ha. Rainfall in these mandals varies between 468 to 869 mm. Therefore efforts should be made for enhanced and stable agriculture production in these areas to with stand frequent droughts.

IV. Analytical Tools and Techniques:

Estimation of extent of instability: For the calculation of extent of instability, Coppock's Instability Index (CII) was employed. CII is a close approximation of the average year-to-year percentage variation adjusted for trend. In algebraic form:

$$C.I.I = [\text{Antilog } \sqrt{\log V} - 1] \times 100$$

$$\log V = \frac{[\text{Log } (X_{t+1}/X_t) - m]^2}{N-1}$$

Where,

X_t = Area/ production/ Productivity in the year 't'

N = Number of years

log V = Logarithmic variance

m = Arithmetic mean of difference between the logs of X_{t+1} etc.

V. Context Analysis of Study Area:

Hyderabad is the capital city of the state of Andhra Pradesh (5th largest state in India, both in terms of area and population) located in South India in the heart of the Deccan Plateau is at 536 meters above sea level. Over 49% of the state Gross Domestic Product (GDP) is generated by the service industry with approximately 25% of India's software professionals based in Hyderabad. The industrial sector in Andhra Pradesh is ranked 2nd in India in terms of industrial estates with the industrial sector accounting for 27% of state GDP. Andhra Pradesh is ranked 4th in terms of Foreign Direct Investment (FDI). With regards the agricultural sector, approximately 30% of the land are of AP is under agriculture with 22% under forest cover. Agriculture accounted for 22% of the state GDP in 2004-2005. Horticulture has been identified as one of the growth engines for Andhra Pradesh. In 2004-2005 the total area under horticultural crops was 1,533,000 ha with an annual production of 11,364,000 tonnes. Andhra Pradesh is the 2nd largest producer of fruits and vegetables in India and 1st in terms of mango, citrus, oil palm, chillies and tumeric. The horticulture sector in Andhra Pradesh accounts for 4.01% of the State's GDP. As per provisional reports of Census India, population of Hyderabad in 2011 was 6,809,970 of which males and females are 3,500,802 and 3,309,168 respectively. Although Hyderabad city has a population of 6,809,970 its urban/ metropolitan population is 7,749,334.

Hyderabad Urban Agglomeration (HUA) is located within Ranga Reddy District. Bordering the peri-urban limits of HUA north of Ranga Reddy District and towards the east/west of HUA (adjoining Quthbullapur, Medchal and Shamirpet) is Medak District and towards the east/west of Ranga Reddy District south of HUA (bordering Ghatkesar, Keesara and Balanagar) is Nalgonda District. The average daytime temperature in Hyderabad ranges from 25-30°C during November to February and 40-45°C during April-June. Annual precipitation is between 700-1000 mm yr-1 and falls predominantly during the 4 months of July to October. Soils are dominated by Red Sandy Soils with areas of Black Cotton Soil.

VI. Results and Discussion:

The extent of land underutilization is more in Rangareddy district the current fallows also indicate that the year to year fluctuation in cropped area is more due to deficient rainfall. Incidence of degradation is more in Rangareddy district where agriculture is predominantly dry land-based dependent on rainfall. However, in Ibrahimpatnam, Shankarpally, and Basherabad, land value prices increased on an average of 46.28% during these years from 1990-2012, the agricultural production intensity is decreasing; land values and prices are increasing in peri-urban areas. Therefore, we can expect that the growth in agriculture and allied sectors would fall short of the growth rate.

VII. Cropping Pattern of vegetable chain:

There are 4 major vegetable belts, which supply vegetables to the HUA namely, Shamirpet-Vantimamidi, Shamsabad-Shadnagar, Cheverala-Vikarabad and Medchal-Tupram. This vegetable catchment area meets 75 to 80 % of the demand in HUA in the 4 months from October to January. In the remaining 8 months, these vegetable

production areas are only able to meet 30% of the demand in HUA. The residual demand in all seasons is met by supply from outside the HUA, from the following belts namely, Ibrahimpatnam to Chowtuppal, Vijaywada-Mangalgiri and Bangalore-Kolar. However, Hyderabad is a major trading center for vegetables. There are around 13 AMC regulated markets in HUA (6 in Hyderabad and 7 in RR district but part of the HUA) for trading of vegetables. The large number of wholesale vegetable merchants and commission agents cater to the supply of the HUA and also channel the supply to other districts of the state e.g. Karimnagar and also to distant places such as Khammam and Chennai for leafy vegetables. The practice is to purchase and load in own vehicles for transportation to other districts. There are 6 Rythu Bazaars also established by the government in different parts of the HUA. The Rythu Bazaars are marketplaces where Rythus or vegetable producers can sell directly. However, as per an estimate, around 60 percent are non producers. In Rythu Bazaars and other vegetable markets, small non-farmer retailers are women. However, no women are involved in the wholesale purchase activity.

Leafy vegetables produced in peri-urban Peerzadiguda, and Parvatapuram are primarily sold in Uppal vegetable market. Vegetables are in general harvested in the late afternoon and washed and stored in the producer's household before being sold to wholesalers at the market in the early morning (5 a.m – 6 a.m).

Poultry Farming:

Commercial poultry production is mostly located in out skirts of the urban areas. The impressive growth in the poultry meat industry is the result of technological breakthroughs in breeding, feeding, health and sizeable investments from private sector. Private sector partnership in broiler production through contract farming systems and the vertical integration has played a major role in this spectacular growth, especially in Telangana State. During the recent three decades there have been major changes in the structure, size and no. of broiler farms. Now a typical broiler farmer raises 10,000 to 50,000 for a weekly cycle against a few hundred broilers per cycle before. This sector employs around three million people. About 80 percent of the employment is generated directly by the farms, while the remaining 20 percent of the employment is contributed by the feed, pharmaceuticals, equipment and other services required by the poultry sector. Further, there may be a similar number of people who are employed in marketing and other channels of servicing the poultry sector. In Telangana is the number one state in the country in poultry production. Hyderabad's poultry sector is likely to see double-digit growth in 2015 because of stable feed prices and encouraging rural demand, notwithstanding local and global challenges including a recent outbreak of bird flu and threat of chicken-leg imports from the US, say analysts and industry players.

The domestic poultry sector had suffered during the past few years due to continuous increase in feed stock (mainly soya and maize) prices and oversupply of poultry products, coupled with untimely rains and drought in various parts of the Telangana. At present, urban markets account for about 80% of demand, but analysts and industry players project rural demand to pick up significantly, thanks to lower chicken prices, improving prosperity and changing lifestyles, helping the sector post at least 8-10% expansion. Chicken sales in Hyderabad are reported to be down as much as 80 per cent as consumers are fearful of recent outbreaks of bird flu in the surrounding area of Telangana state. The major solace is that the outbreak of bird flu did not have any adverse effect on sale of chicken and eggs in the rural markets." weekends account for nearly two-thirds of the poultry industry's sales. Venkateshwara Hatcheries with its associates including Sneha Farms controls about 80 per cent of Telangana's poultry market. In 2015, Telangana poultry breeders association revealed that there has been 20-25% fall in consumption due to bird flu. But, it is not a remarkable drop. The poultry industry in Telangana records an annual Rs.10,000 crore turnover. Telangana consumes around 40 million kg broiler chicken each month. The per capita consumption of eggs had been increased. But still miles to go to catch the world figure of 188 as against our 65 to 70 eggs. Anticipating live bird prices to remain at Rs 65-75 a kg and help the industry grow 8-10%, he said: "The rural demand is picking up, which can also support the overall demand in the coming years. Lower prices would support demand expansion."

Dairy / Milk production:

Peri-urban and urban dairy production system is becoming an important supplier of milk products to urban centre's, where the demand for milk and milk products is remarkably high. As a result of this, peri-urban and urban dairying is being intensified through the use of cross bred dairy cows, purchased and conserved feed and stall-feeding. The system is favored due to the proximity of the production sites to centre's of high fresh milk demand, easy access to agro-industrial by- products, veterinary services and supplies. Nonetheless, the existing dairy farming practices in peri-urban and urban areas of the Hyderabad are largely characterized by modern dairy farming practices covering a range of intensive management practices and zero grazing. This production system also involves the use of exotic crossbred animals. The natural resources are thus under increased pressure due to the mushroom growth of peri-urban and urban dairying. The livelihoods of the poorest inhabitants of the rural-urban fringes of Hyderabad area are adversely affected by the associated problems of land and water degradation. Intensive livestock production in peri-urban areas, if not carried out properly, may pose new threats to public and environment with the consequences of emerging zoonotic diseases since intensified and poorly guarded human-animal interface establish common route of disease transmission. In the areas in and around Hyderabad City, dairy is taken up as a specialized farming on commercial lines, with the rapidly expanding urban population combined with urban consumers' increased purchasing

power; it is inevitable that milk production and consumption are also rising rapidly. Milk is an important dietary requirement for children and young people and plays an important role in the Indian cuisine. Some preliminary estimates by IRDAS reveal that, of the 1.8 million litres per day of milk consumed by the Hyderabad city dwellers, 100,000 liters per day are supplied by private vendors within Hyderabad Urban Development Authority (HUDA) area.

Land Use Pattern:

To encourage foreign investment many existing laws were modified and new introduced. Provisions to buy land for processing, storage, marketing, transportation etc. have been made. Agricultural and forest land was acquired for industrial houses. Special Economic Zones with a number of concessions were allowed. Provisions were made for removal of ceilings on land. Contract farming and possession of agricultural land for captive production was permitted. Conversion of land to non-agricultural uses has been made easier. Consequently, demand for land has been steadily going up which results in prices of land going up exponentially. The farmers in expectation of further rise in land prices and also due to lack of alternative sources of livelihood are reluctant to part with their land rights.

In Hyderabad vast agricultural land once with lush green crops has been converted in the North to godowns and residential complexes, in the South to farm houses, in the east to industrial and residential uses and in the west to residential complexes. The result is not only area under agriculture has gone down but also the forest cover has diminished.

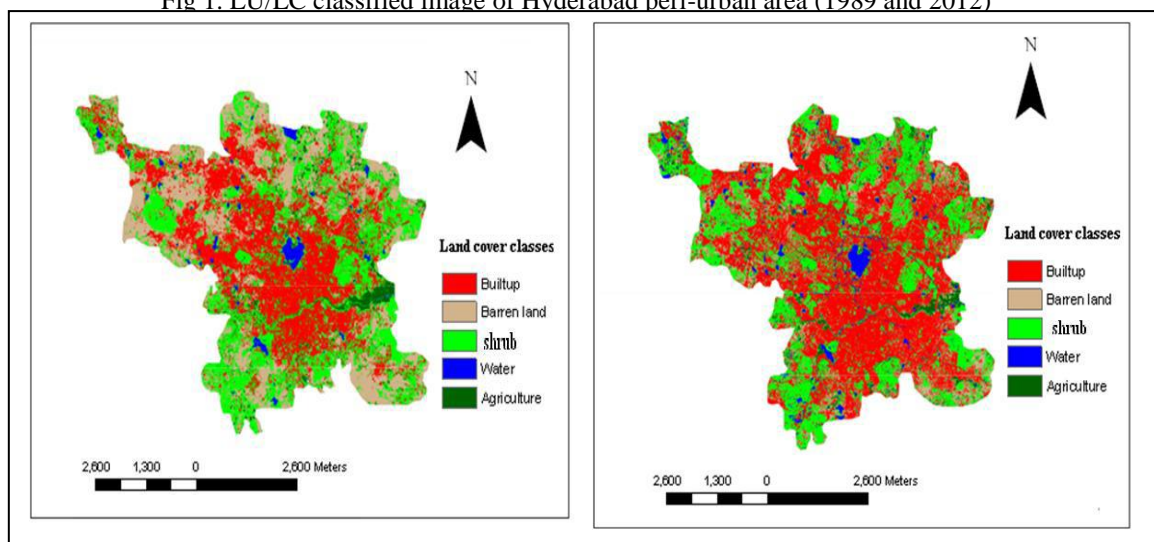
Land use and land cover (LU/LC):

There is no doubt that human activities have profoundly changed land cover in the three areas during the past years. Land is one of the most important natural resources. All agricultural, animal and forestry productions depend on the productivity of the land. The entire eco-system of the land, which comprises of soil, water and plant, meets the community demand for food, energy and other needs of livelihood. Viewing the Earth from space is now crucial to the understanding of the influence of man's activities on his natural resource base over time. In situations of rapid and often undocumented and unrecorded land use change, observations of the earth from space provide objective information of human activities and utilization of the landscape. The classified images provide all the information to understand the land use and land cover of the study area.

Land Use/Land Cover (LU/LC) images:

The classified images obtained after preprocessing and supervised classification which are showing the land use and land cover of the Hyderabad city given in the following figures viz., Fig 1. The given images provide the information about the land use pattern of the study area. The red color represents the urban built-up area, dark green color shows the agricultural area, blue color shows the water bodies tan color shows the barren land and light green color shows the vegetation like shrubs and grassland.

Fig 1. LU/LC classified image of Hyderabad peri-urban area (1989 and 2012)



Land use and land cover change detection:

The built-up area has been changed drastically from 1989 to 2012. Built-up area has been increased by 15.14%, agricultural area as also increased by 0.69%, vegetation and barren land area has been reduced by 3.2% and 14.45%. The increase in built-up area has many reasons. Hyderabad is famous for industrial, educational institutions, large numbers of institutions are coming in to existence and corresponding infrastructure development leads to the increase of built-up area.

Table 1. Information and magnitude of land use & land cover change for Hyderabad

Year	1989		2012		Change area 1989 - 2012	
	ha	In %	ha	In %	ha	In %
Built up	221939	32.21	32633.92	47.35	+10440.02	+15.14
Agriculture	32754	4.75	3747.47	5.44	+472.07	+0.69
Shrub	27892.2	31.77	19690.78	28.57	-2201.42	-3.2
Barren Land	222078	29.32	10250.20	14.87	-9957.6	-14.45
Water	184574	1.95	2592.67	3.76	+ 1246.93	+1.81
Total	689237.2	100	68915.04	100	0	0

Table 2. Future Land use statistic can be observed

Year	2009		2029		Change area 2009 - 2029	
	ha	In %	ha	In %	ha	Per cent (%)
Built up	32633.92	47.35	38616.77	56	+5982.85	+8.65
Agriculture	3747.47	5.44	4141.29	6.01	+393.82	+0.57
Shrub	19690.78	28.57	17721.7	25.72	-1969.08	-2.85
Barren Land	10250.20	14.87	5227.6	7.58	-5022.6	-7.29
Water	2592.67	3.76	3207.69	4.65	+615.012	+0.89
Total	68915.04	100	68915.04	100	0	0

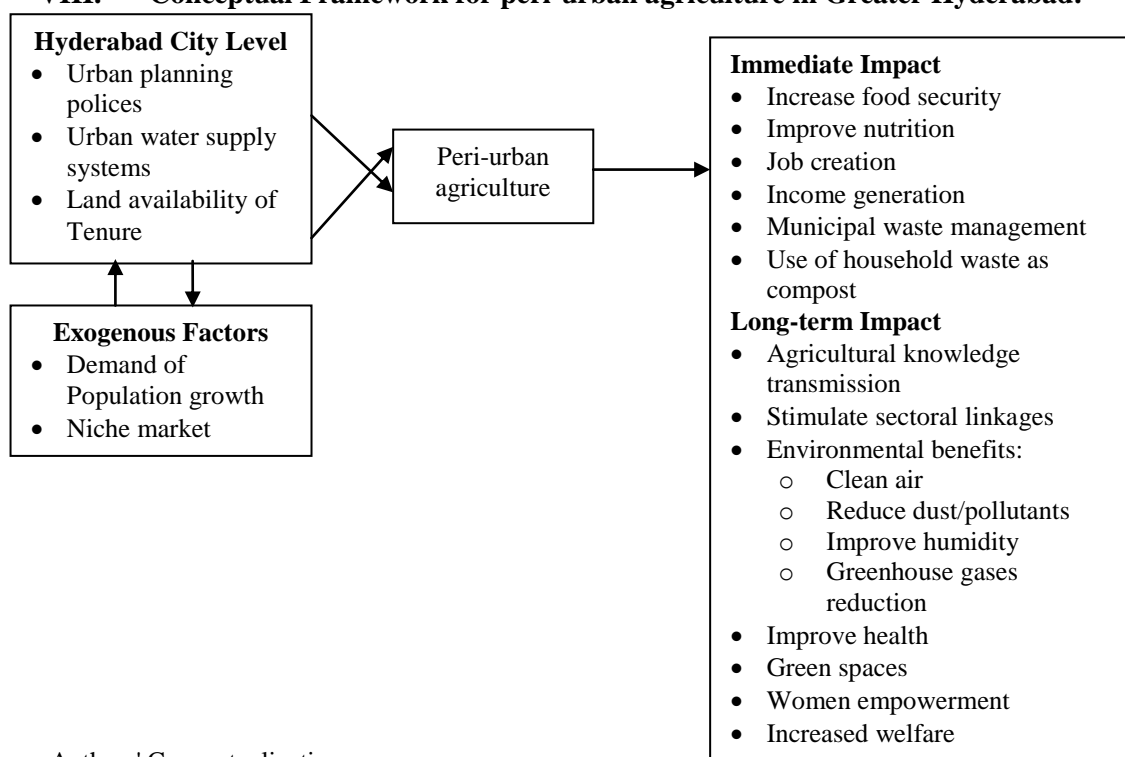
The Hyderabad is currently ranked as the sixth largest urban agglomeration in the country. The rates of growth of population experienced by Hyderabad Urban Agglomeration during 1991 and 2001 will continue in future though at a lesser rate. The projections indicate that the metropolitan area would house a population of 90.55 lakhs in 2011 and 136.44 lakhs in 2021 including the population of the city (Table 3).

Table 3. Hyderabad city Population Projections

Component	Area (sq.km)	Total Population (in lakhs)				Density (Population / sq. km)			
		2001	2005	2011	2021	2001	2005	2011	2021
MCH	172	36.3	39.1	43.3	51.7	21048	22733	25116	29977
Surrounding municipalities	419	17	21.8	28.9	50.9	4102	5193	6926	12151
Others	187	4	4.4	5	6.3	2147	2353	2692	3391
HUA	778	57.5	65.4	77.2	108.9	7393	8404	9923	13997
HUDA	1905	63.8	74.5	90.5	136.4	3351	3910	4753	7162

Population growth characteristics of Hyderabad Urban Agglomeration are evaluated by looking at the past growth trends. The projections indicate that the city will have a population of about 4 million in 2006, 4.5 million 2011 and expected to cross the 5 million mark in 2021.

VIII. Conceptual Framework for peri-urban agriculture in Greater Hyderabad:

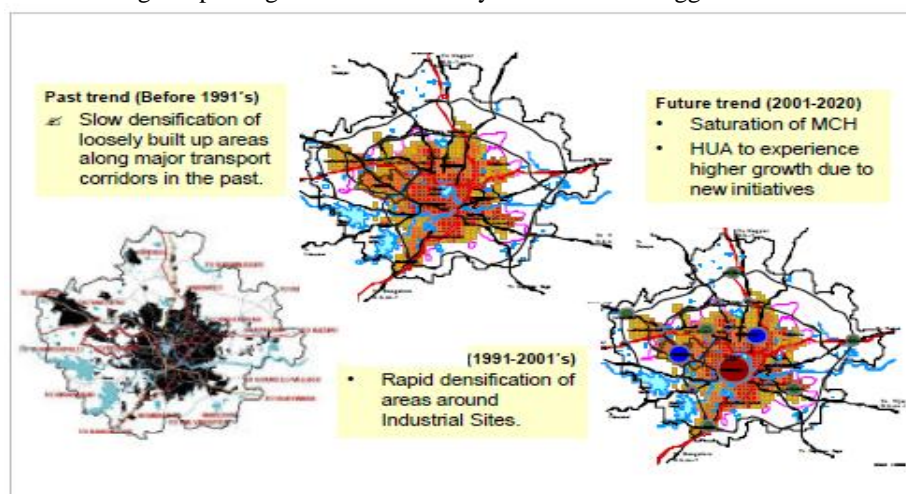


Source: Authors' Conceptualization

Hyderabad Urban Land use structure:

The land use structure has been worked out based on a survey and the activity centers present and future. The structure would help in limiting the decaying of certain areas through a conscious and judicious development of core city and the peripheral wards, which have the maximum potential to grow in future. According to the survey, residential area constitutes 44% followed by 12% under open ground and agriculture. The mixed use is around 6.2%. There is also an increase in the institutional land uses than envisaged in the Zonal Development Plans (ZDP). The area under roads is also around 7% and considering the widening initiatives, it would be slightly more than what is observed. It is quite evident from the analysis that there has been a modest increase in the mixed –land use, decreasing changes in industrial land-use than that envisaged in the ZDP. This might be due to the successive industrial policies encouraging shifting of industrial units from the city.

Fig 1. Spatial growth Pattern of Hyderabad Urban Agglomeration



However, it is to be noted that the land uses shown are only indicative, the actual can be worked if a detailed, and extensive field survey is conducted. An analysis of spatial growth patterns in the past as well as for the future indicates saturation of growth in the core area, high growth and densities in the surrounding areas along the industrial growth corridors (Fig.1). There is a need to plan the infrastructure investments corresponding to this growth pattern.

Urban and peri-urban agriculture:

Urbanization and industrialization affect agriculture in the peri-urban areas, as population pressure from the city results in changes in land use - from agricultural to urban land use, be it for housing, commercial, industrial or other purposes. Where the land use remains agricultural, cultivation practices change. Access to urban ready markets for agricultural produce and for seasonal labour open up the possibility of cultivating on a commercial basis high-value, highly perishable crops such as leafy vegetables, replacing storable crops such as cereals and pulses. Industries and their derivative trade and commerce offer new labour opportunities for cultivators and agricultural labourers, resulting in changing occupational structures.

Peri-urban agriculture can have a significant impact on various levels of a nation's economy. The effect can be both immediate (e.g., food security, nutrition, dietary movement, employment creation, income generation) and long term (e.g., transmission of agricultural knowledge to subsequent generations, health and environment improvements). The contribution to food security is arguably the most important asset of peri-urban agriculture, especially in India where increasing poverty levels contribute to the great concern.

The future of urban and peri-urban agriculture:

After the Industrial Revolution, urbanites became separated from nature, confined as they were to narrow indoor spaces, and prevented from feeling the soil under their feet by modern transportation and urban infrastructures. The residence and the workplace became separated. Although the urban sprawl spread to consume many formerly rural spaces, some green areas persisted inside metropolitan areas.

Urban agriculture, defined here as food and non-food production dispersed throughout urban and peri-urban areas, can certainly play an important role and occupy a considerable amount of space and people's time in the city of the future. Among the main benefits of activities of this nature is an improvement of the nutritional well-being of urbanites. For developing countries, this may be significant for food self-reliance, jobs and survival strategies.

Urban agriculture provides an opportunity for purposeful recreation and educates youngsters about health and environmental issues; it helps to develop community bonds because it intensifies cooperation between people and the sense of sharing. Urban agriculture constitutes a positive way to improve the urban environment, enhancing the wide range of benefits that people derive from public open spaces.

Food Grains production Extent of Instability:

Country as a whole, during the period -I (1990-2001), productivity variability (4.40%) had more influence on production fluctuations (4.44%) than by instability in area (0.97%) (Table 4). During the period -II (2001-12) also instability in productivity (1.78%) has more influence on production variability (2.74%) than by instability in area (1.14%). Inter period comparison revealed that instability in production and productivity during the period II was less than period I.

State as a whole, during both periods, productivity variability had more influence on production fluctuations than by instability in area. Inter period comparison revealed that instability in production and productivity during the period II was less than period I. Among the regions, during the period -I, the lowest instability in area (2.18%), production (5.02%) and productivity (4.11%) were recorded in Coastal Andhra. Highest instability in area (6.61 %) and productivity (8.88%) were recorded in Rayalaseema, while, in production (6.54%) was observed in Telangana. In all regions contribution towards production fluctuations was more by variability in productivity. During the period -II, the lowest instability in area (2.67 %), production (4.72%) and productivity (3.21%) were recorded in Coastal Andhra. Highest in area (3.85%) and production (8.98%) was noticed in Telangana and in productivity (7.64%) was recorded in Rayalaseema. Contribution towards production variability was more by productivity variability in all regions.

Among the districts, during the period -I, the lowest in area (1.53%), production (4.04%) and productivity (3.82%) were recorded in Khammam, Krishna and Guntur respectively. Highest instability in area (12.51%) and production (23.93%) were noticed in Srikakulam and in productivity (13.35%) was recorded in Vizianagaram. Highest in all variables were noticed in among the districts of Coastal Andhra. In 18 districts, out of 22, contribution of instability in productivity in relation to variability in area was more towards production fluctuations. During the period -II, the lowest instability in area (2.83%) was noticed in Medak, in production (4.66%) and productivity (3.61%) were observed in West Godavari. Highest instability in area (9.04%), production (15.68%) and productivity (12.73%) were registered respectively in and Karimnagar, Nalgonda and Kadapa. In 19 districts, out of 22, production fluctuation was more influenced by instability in productivity than variability in area.

Table 4. Coppock's Instability Indices (CII) of area, production and productivity of food grains in India and Andhra Pradesh during period - I and II (Values in percentages)

Districts, Regions & State	Period -I			Period -II		
	Area	Production	Productivity	Area	Production	Productivity
Srikakulam	12.51	23.93	10.66	3.60	8.61	5.58
Vizianagaram	7.93	21.97	13.35	5.18	12.35	8.10
Visakhapatnam	3.78	11.06	7.62	5.41	9.30	6.43
East Godavari	2.74	7.73	6.31	3.57	6.37	5.98
West Godavari	2.52	8.37	8.66	3.30	4.66	3.61
Krishna	1.72	4.04	4.37	4.17	10.78	6.79
Guntur	2.43	5.85	3.82	4.02	8.12	6.92
Prakasam	4.87	7.15	8.79	5.53	14.16	11.68
Nellore	2.16	5.35	5.60	5.85	9.27	5.27
Coastal Andhra	2.18	5.02	4.11	2.67	4.72	3.21
Kurnool	6.50	6.08	10.45	3.93	10.51	8.15
Ananthapur	9.81	8.53	8.28	4.08	9.98	10.02
Kadapa	10.55	7.10	9.32	3.94	12.01	12.73
Chittoor	5.72	12.78	8.29	8.66	14.17	6.75
Rayalaseema	6.61	6.35	8.88	2.87	8.61	7.64
Ranga Reddy	2.13	5.51	4.79	6.11	6.32	8.45
Nizamabad	4.00	6.00	5.73	6.50	11.70	5.98
Medak	2.67	10.44	9.31	2.83	6.25	5.41
Mahaboob Nagar	9.52	13.24	7.11	4.02	9.09	8.41
Nalgonda	5.12	7.42	8.76	7.26	15.68	8.19
Warangal	7.31	11.33	11.68	4.73	9.43	6.52
Khammam	1.53	7.81	7.94	5.65	13.51	8.47
Karim Nagar	5.94	7.84	5.96	9.04	15.09	5.73
Adilabad	2.95	11.75	12.92	4.21	8.36	6.93
Telangana	4.28	6.54	6.94	3.85	8.98	5.91
Andhra Pradesh	2.59	4.88	5.49	2.86	5.86	3.93
INDIA	0.97	4.44	4.40	1.14	2.74	1.78

IX. Recommendations:

1. Formal inclusion of peri-urban agriculture in the planning process; 2. Sustainable use of wetlands used for urban and peri-urban agriculture; 3. Increasing (community) knowledge of peri-urban soil fertility and contamination; 4. Safe use and application of compost; 5. Safe agricultural production with water-quality control and certification. 6. Promote legislation to control speculative industrial, residential and commercial land development. 7. Use of advanced tools, such as Geographical Information Systems (GIS), for city development/planning and Security of land tenure and participatory land-use planning. 8. Use behavior studies of people's attitudes and expectations regarding areas of natural vegetation to inform policy development. 9. Recognizing peri-urban areas as a key environmental science issue, with a specific focus on the critical gender issues relating to land use; 10. Link science to policy-makers at all levels to develop policy changes and new management structures.

X. Acknowledgment:

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XI. Conclusion:

The land problem has become compounded due to urbanization and industrialization. The rise in land prices have attracted brokers and agents, still is insufficient to move to urban area for the small plot holders. On the contrary, the wealthy people in urban area have begun seeking for plots for their recreational activity which have resulted in a number of farm houses and resort hotels all along the highways in Hyderabad. Landlessness also risks potential conflict among landless and landowners in the community. Even if the a aforementioned problems such landlessness, small farm size, and uncertain ownership encourage urban-rural linkages in terms of the flow of people, they weaken them in terms of the flow of agricultural produce from rural to urban areas and the potential of farmers to purchase industrial goods from urban areas. Thus, land shortages can have both positive and negative effects on urban-rural linkages. The traditional modes of securing livelihood have been changing rapidly. It was observed that the increased urbanization in Hyderabad may have several impacts on infrastructure, energy use and economy of the country.

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