

SUBJECT II
URBANISATION AND ITS IMPACT ON FARM SECTOR

**Does Urbanisation Influence Agricultural Activities?
A Case Study of Andhra Pradesh**

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I

INTRODUCTION

Urban and peri-urban population in India is growing rapidly. Between 1981 and 2005 the urban population grew at an annual rate of 2.9 per cent, higher than the growth in total population (2.0 per cent). The rapid increase in urban population is the outcome of both pull and push factors. For example, better employment opportunities and higher wages in urban labour market, slow growth in rural non-farm sector and continuously declining land holding size are causing rural to urban migration. In 2005 about 29 per cent of the country's total population was urban; and it is estimated that by 2030 the urban population will account for 41 per cent of the total population (FAOSTAT, 2009).

The expanding urbanisation together with higher economic growth and changes in the tastes and preferences are causing a shift in the food basket in favour of high-value food commodities like fruits, vegetables, milk, meat, egg and fish (Kumar *et al.*, 2007). These changes in the food basket are leading to transformation of the agricultural production portfolio away from foodgrains towards high-value food commodities (Joshi *et al.*, 2004; Birthal *et al.*, 2007). This process is likely to continue as the trends in the factors (urbanisation and economic growth) underlying this process have been quite strong in the recent past, and are unlikely to subside in the near future (Pingali and Khwaja, 2004).

In recent years, some studies have examined the role of urbanisation in augmenting agricultural diversification at the national level (Joshi *et al.*, 2004, Parthasarathy Rao *et al.*, 2006). However, the influence of urbanisation on agriculture can be better understood if examined at a disaggregated level that is meso/micro level. In this paper we examine the effect of urbanisation on composition of

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agricultural sector in Andhra Pradesh, where 27 per cent of the total population lives in urban areas. Specifically, the paper (i) compares the differences in agricultural activities between urban and hinterland districts, and (ii) identifies key factors, in addition to urbanisation, responsible for the spatial differences in agricultural activities. Farmers living in urban and urban-surrounded districts have an easy access to markets for high-value commodities, information, technology, inputs and services and hence face lower transaction and transportation costs. Thus we hypothesise that agriculture is more diversified towards high-value food commodities in urban and peri-urban districts. To test this hypothesis we use district level data on key agricultural activities and socio-economic and demographic parameters for Andhra Pradesh.

The paper is organised into four sections. The following section describes the methodology and database for the study, Section III provides a brief overview of the changes in food basket and agricultural production portfolio in Andhra Pradesh. Section IV examines the influence of urbanisation on agricultural activities; and concluding remarks are made in the final section.

II

METHODOLOGY

This study uses the district level database for Andhra Pradesh from 1980 to 2003. The database includes all relevant and key variables related to crops, livestock, fisheries, land use, input use, infrastructure, agro-climate, socio economy and demography. For this analysis the districts were divided into two groups: urban and urban surrounded districts and hinterland districts. The shares of different commodities in the total value of agricultural output were compared between these two groups to examine the influence of urbanisation on agricultural activities. Besides, multivariate analysis was carried out using cross section district level data for the year 2000-2001, to further substantiate the role of urbanisation in determining the composition of agricultural activities. We regressed the value share of an activity on urban population, and other demand and supply side factors such as farm size, wages, credit and infrastructure. Ordinary least squares (OLS), Tobit,¹ and Seemingly Unrelated Regression Estimates (SURE) techniques were used.

III

CHANGES IN FOOD BASKET AND PRODUCTION PORTFOLIO

During the last three decades, food basket of urban as well as rural consumers in Andhra Pradesh has undergone a significant change away from cereals towards horticultural and animal products. While the share of foodgrains in urban food expenditure declined from 49 per cent in 1977-78 to 35 per cent in 2004-05, the share

of high-value food commodities (fruits, vegetables, dairy products, meat, egg and fish) increased from 27 to 34 per cent (Table 1). Similar changes are also observed in the rural consumption pattern. The share of high-value food commodities in rural food expenditure increased from 20 per cent to 30 per cent during this period. Nonetheless, urban consumers spend more on high-value food commodities than do the rural consumers.

TABLE 1. COMPOSITION OF FOOD BASKET IN ANDHRA PRADESH

Food items (1)	<i>(per cent share of food expenditure)</i>			
	Urban		Rural	
	1977-78 (2)	2004-05 (3)	1977-78 (4)	2004-05 (5)
All cereals	42.7	29.5	55.9	35.2
Pulses	5.8	5.4	4.9	6.0
Milk, milk products	11.2	14.0	7.2	10.6
Edible oils	6.4	7.6	5.2	8.7
Meat, eggs, fish	7.0	7.4	6.3	7.8
Vegetables, fruits	8.4	13.0	6.7	13.4
Other food items	18.5	23.1	13.8	18.4
Total food	100	100	100	100

Source: Various NSS Rounds on Consumer Expenditure Surveys published by the National Sample Survey Organisation, Government of India.

The tendency of shift in food basket in favour of high-value commodities is likely to be stronger in the years ahead. Income elasticity of demand for high-value food commodities is higher than for staple foodgrains (Kumar *et al.*, 2007), implying faster growth in demand for these commodities with sustained rise in per capita income. The growing demand will have to be met through domestic production and/or imports from other states or countries.

These changes in the food basket have been accompanied by a gradual change in agricultural production portfolio towards high-value food commodities. Table 2 presents changes in the agricultural production portfolio in Andhra Pradesh. The share of high-value food commodities in total value of agricultural output increased from 29.1 per cent in TE (triennium ending) 1981-83 to 50.3 per cent in TE 2002-03, while the share of foodgrains declined from 37.6 to 25.1 per cent.

Changes in the production portfolio were more pronounced during 1990s. Amongst high-value food commodities, the share of animal products (including fish) experienced a substantial increase in their share, from 17.7 per cent in TE 1982-83 to 24.5 per cent in TE 1992-93 and further to 40.7 per cent in TE 2002-03. The growth during 1990s was driven by poultry and fish production. The performance of horticultural crops however was not as bright; the share of fruits and vegetables in the total value of agricultural sector has remained around 10 per cent during this period.

TABLE 2. COMPOSITION OF THE AGRICULTURAL SECTOR OF ANDHRA PRADESH

Commodities (1)	<i>(per cent share of total value of agricultural commodities at 1993-94 prices)</i>		
	TE 1982-83 (2)	TE 1992-93 (3)	TE 2002-03 (4)
Cereals	34.4	28.5	21.4
Pulses	3.2	3.5	3.7
Commercial crops ^a	22.6	27.9	19.5
Fruits and vegetables	11.3	8.7	9.6
Milk	8.9	9.5	12.9
Meat	4.3	7.1	12.1
Eggs	1.2	1.5	3.6
Fish	3.3	3.8	10
Other animal products	Neg.	2.6	2.1
High value commodities ^b	29.1	33.1	50.3
Total value (in million Rs.)	1,45,827	2,02,421	2,96,334

Source: Government of India, 2006.

a. Commercial crops include oilseeds, cotton, chillies, turmeric, and sugar.

b. High value commodities include fruits, vegetables, milk, meat, eggs, fish and other animal products.

IV

URBANISATION AND AGRICULTURAL ACTIVITIES

We expect agricultural production portfolio to be more diversified towards high-value food commodities in urban and urban-surrounded districts because most high-value commodities are perishable and require immediate transportation to the demand centres, and the urban and urban-surrounded districts have better transportation and infrastructure facilities. In order to probe this hypothesis we examine and compare the composition of agricultural sector in urban and urban-surrounded group of districts, and hinterland districts. A district with more than one million urban population was classified as *urban* district; and districts surrounding urban district were classified as *urban-surrounded* districts. Rest of the districts were classified as *hinterland* districts. The physical output of the agricultural sector of each of the district was converted into monetary value by multiplying the production of commodities with their respective prices.

Table 3 presents the shares of different agricultural activities in the total value of agricultural sector of the urban and urban-surrounded, and the hinterland districts. The average share of high-value commodities in the total value of agricultural production is higher in the urban and urban-surrounded districts (39 per cent) than in hinterland districts (27 per cent).

At the commodity level, the share of fruits and vegetables in the total value of agricultural production is 14 per cent in the urban and urban surrounded districts, which is almost twice their share in the hinterland districts. The share of animal products in higher in the urban and urban surrounded districts, the difference is not as large as for fruits and vegetables. Together, milk, meat and eggs comprise 24 per cent of the agricultural output in the urban and urban-surrounded districts as compared to

20 per cent in the hinterland districts. In the hinterland districts, commercial crops like oilseeds, pulses, coarse cereals and paddy account for a larger share. Paddy accounts for a larger share in the urban and urban-surrounded districts also, which is an indication of the fact that farmers rarely compromise their household staple foods security. Nonetheless, the results clearly reveal that compared to farmers in remote locations, the farmers in urban and peri-urban locations allocate relatively a larger share of their resources to high-value perishable commodities because of their proximity to consumption centres, market infrastructure and support services.

TABLE 3. SHARE OF COMMODITIES IN THE VALUE OF AGRICULTURAL COMMODITIES BY LEVEL OF URBANISATION, 1999-2001(AT 1980-82 PRICES)*

Commodity (1)	District group	
	Urban and urban-surrounded	Hinterland
	(2)	(3)
Paddy	28.5	25.1
Coarse cereals	2.6	7.4
Pulses	4.3	3.2
Oilseeds	4.2	13.0
Sugarcane	5.4	2.1
Cotton	2.9	7.8
Chillies	5.3	5.2
Turmeric	0.9	7.6
Tobacco	2.8	0.4
Foodgrains and commercial crops	61.0	72.8
Fruits	11.9	6.2
Vegetables	2.2	1.2
Horticulture crops	14.1	7.4
Milk	15.4	11.2
Bovine meat	0.6	0.8
Ovine meat	1.1	1.8
Pig, poultry meat, eggs	7.7	6.0
Livestock	24.9	19.8
High-value commodities	39.0	27.2
Total value (million Rs.)	68,973	19,408

a. Value of fisheries sector is not included.

Although a simple comparison of the values of shares of different agricultural activities between urban and urban surrounded, and hinterland districts indicates that urbanisation is an important factor in land allocation to different agricultural activities, there are other factors related to agro-ecological and socio-economic environment that exert considerable influence on the choice of crops. To further probe the role of urbanisation vis-à-vis other factors we estimate Tobit and SURE regression with share of high value food commodities in the total value of agricultural production as dependent variable and urbanisation together with other factors important in crop choice as explanatory variables. These regressions were estimated for fruits, vegetables, monogastric meat (poultry and pig) and for combined high-value commodities.

Table 4 presents the results of the Tobit and SURE regressions. For all high-value commodities combined together we find a significantly positive effect of urbanisation on the concentration of high-value food commodities. Other variables that have a positive and significant influence on the concentration of high-value commodities are rainfed area covered under watershed programme, and higher incidence of smallholders.

TABLE 4. FACTORS INFLUENCING SPATIAL DISTRIBUTION OF HIGH VALUE AGRICULTURAL COMMODITIES, 2000-01

Variable (Units) (1)	HVCs	Fruits		Vegetables		Poultry, pig meat, eggs	
	Tobit	Tobit	SURE	Tobit	SURE	Tobit	SURE
	Elasticity coefficient (t-ratio) (2)	Elasticity coefficient (t-ratio) (3)	Elasticity coefficient (t-ratio) (4)	Elasticity coefficient (t-ratio) (5)	Elasticity coefficient (t-ratio) (6)	Elasticity coefficient (t-ratio) (7)	Elasticity coefficient (t-ratio) (8)
Urban population (per cent)	0.16* (2.56)	-0.7** (-3.11)	-0.9** (-3.11)	0.7** (3.69)	1.0** (3.46)	1.1** (7.89)	1.2** (7.26)
Small and marginal farms (per cent)	0.85* (2.23)						
Male wages (Rs./day)	-0.46 (-1.04)	-1.5 (-1.64)	-3.1** (-3.75)	-4.1** (-2.8)	-3.5** (-3.09)	-0.1 (-0.07)	0.3 (0.41)
Rainfed land covered by watershed programs (per cent)	0.19** (3.80)						
Agriculture term loans (Rs./ha)		0.4 (1.37)	0.0 (-0.35)				
Processing and cold storage units (number)		0.5** (5.93)	0.6** (6.65)	0.1 (1.17)	-0.1 (-0.77)		
Improved poultry (per cent)						0.7** (3.58)	0.6** (3.32)
Number of poor (per cent)	-0.09 (-1.02)	-0.7** (-2.78)	-1.0* (-2.59)	0.0 (-0.01)	0.3 (0.78)	0.2 (1.16)	0.3 (1.35)
Normal rainfall (cm)		1.3 (1.65)	1.7* (2.35)*	-0.4 (-0.58)	-0.2 (-0.26)	0.4 (0.66)	0.6 (1.27)
Agricultural credit (Rs./ha)						-0.4** (-4.87)	-0.6** (-4.97)
Irrigated area (per cent of gross cropped area)		-0.6* (-2.28)	-1.0* (-2.73)	-0.3 (-1.17)	-0.2 (-0.44)	-0.4 (-1.68)	-0.1 (-0.61)
Road density (km/sq. km of geographical area)						1.2 (1.79)	1.0 (1.86)
Number of observations	20	20	20	20	20	20	20
R ²	0.58	0.49		0.70		0.83	

Note: * and ** Significant at 5 and 1 per cent, respectively.

Table 4 also contains the results of the individual commodities or commodity groups. Urbanisation is observed to have a significantly negative effect on the concentration of fruit production. Fruit production is positively associated with rainfall, and negatively with irrigation. This is because fruits find niches in high-rainfall regions, but away from districts having intensive agricultural systems under irrigation. Availability of an agro-processing facility is an important factor driving fruit production. Fruit production is negatively associated with wages since its production is labor intensive. Vegetable production on the other hand is positively associated with urbanisation, and like for fruits negatively with farm wages. For vegetables, rainfall and irrigation do not have significant influence on their regional spread, indicating that these are grown in all types of agro-climatic situations.

Poultry and pig meat production is largely driven by urbanisation, infrastructure and technology. Credit has a significantly negative influence on concentration of poultry and pig activity. This is somewhat surprising. One possible explanation for this could be that pig meat production is concentrated in less endowed regions, while much of the credit is directed towards better-endowed regions. For poultry it is the increasing incidence of contract farming arrangements which provide all critical inputs to farmers. BIRTHAL *et al.* (2005) found contracting firms sharing as much as 90 per cent of the variable cost in broiler production.

V

CONCLUSIONS

In this paper we have examined the influence of urbanisation on agricultural activities in Andhra Pradesh. Our findings indicate a larger concentration of high-value food commodities in the urban and peri-urban areas than in hinterlands/rural areas. Growing urbanisation, both in terms of population and income, generates demand for agricultural commodities. For perishable commodities whose markets are not spatially integrated due to high transportation costs, the growing demand is largely met by urban and urban-surrounded districts, while other agricultural products can be procured from locations farther away from urban centres. Besides urban demand, a well-developed infrastructure (roads, electricity, cold storage, processing, input markets, information sources, etc.) in urban areas encourages farmers to diversify towards high-value perishable food commodities.

The results have some important implications. First, high-value commodities generate larger returns to land, labour and capital; and an easy market access enables farmers, especially small farmers to enhance their income and employment in high-value agriculture. Second, high-value commodities have considerable potential for value addition, and therefore can generate further employment and income opportunities in processing and marketing of value added products for rural as well as urban poor. Third, farmers in remote locations however may remain deprived of the benefits of urbanisation-induced growth in high-value agriculture due to transport and

infrastructure bottlenecks. Hence, to enable them to benefit from the growing demand for high-value food commodities it is imperative to invest in infrastructure such as roads, cold storages and processing facilities in areas farther away from urban centres that have considerable potential for production of high-value food commodities.

NOTE

1. The Tobit model is best suited to deal with a truncated dependent variable that is bound between given maximum and minimum values (Gujarati, 1995). In the model used for this study, the dependent variable is the share of an activity in the total value of agricultural production that ranges between 0 and 1.

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