

## LINKAGE MECHANISM OF PERI-URBAN AGRICULTURE : A CASE STUDY

A. K. Singh<sup>1</sup> & R. Roy Burman<sup>2</sup>

### ABSTRACT

Peri-Urban Agriculture (PUA) occurs surrounding the cities partly on urban and mostly on adjoining rural land. It includes various production systems such as crops, horticulture, livestock, aquaculture and the related ones mainly to meet daily demands of consumers in the city. In peri-urban areas, pressure on land is high and intensive production methods are applied using and reusing natural resources and urban wastes to yield a diversity of agricultural products. The proximity of peri-urban agriculture to central markets and consumer centres confers to this type of agriculture specific opportunities that often set in apart from rural agricultural production. Such opportunities include lower transportation and handling charges on route, enhanced capabilities for capitalization on land, stronger trend towards resource use, cropping patterns intensification and proximity to inputs and services such as waste treatment facilities, waste recycling and reuse possibilities. There are concerns as well typical to these areas as competition with other users over scarce resources, environment pollution of higher degree and reduced labour availability and higher wages. Sensing the importance of the issue, the present study was conducted at peri-urban Kanpur area as a part of Food & Agriculture organization (FAO) funded case study project entitled "An Appraisal of Profitability and Sustainability of Farm Enterprises and related Technologies in Peri-Urban Kanpur". In order to support the peri-urban agriculture, the state government officers viz. Deputy Director Agriculture, District Agriculture Officer, plant Protection officer, Sub-Divisional Agricultural Extension Officer (exclusively for peri-urban farmers) and Assistant Development Officer and multipurpose worker (Farmer Assistant/Kisan Sahayak) are entrusted the responsibilities for agricultural development in the area jurisdiction. There is good network of banks spreading in the peri-urban areas of Kanpur. However, farmers require more monetary assistance for the establishment of productive units. The government has started credit card scheme for facilitation of easy credit access. In the peri-urban Kanpur (Kalyanpur, Sarsaul and Bidhnu blocks) this scheme started in 2000-2001 with 2472 credit card holders, which doubled in 2001-2002. This scheme may prove as boon for the illiterate, innocent and distantly located farmers. There are three main technical agricultural institutions viz. Chandra Shekhar Azad University of Agriculture and Technology (CSAUA&T), Indian Institute of pulses Research (IIPR) and National Sugar Institute (NSI) for state government/central government engaged in providing technical information and advisory services to the farmers. The number of seed and fertiliser sale centres has increased manifold from 10 in 1989 to 1983 in 2002. Similarly, the number of insecticide sale depots has gone up to 32 in 2002 as compared to 2 in 1989. Recent trends show that private shops have become the major supplier of agro-chemicals. There are many NGOs in the peri-urban Kanpur engaged in education, health and community upliftment programme.

**Key Words :** Peri-Urban, Linkage, Extension, Farming.

### INTRODUCTION :

Peri-Urban Agriculture (PUA) occurs surrounding the cities partly on urban and mostly on adjoining rural land. It includes various production systems such as crops, horticulture, livestock, aquaculture and the related ones mainly to meet daily demands of consumers in the city. In peri-urban areas, pressure on land is high and intensive production methods are applied using and reusing natural resources and urban wastes to yield a diversity of agricultural products. The proximity of peri-urban agriculture to central markets and consumer centres confers to this type of agriculture specific opportunities that often set in apart from rural agricultural production. Such opportunities include lower transportation and handling charges on route, enhanced capabilities for capitalization on land, stronger trend towards resource use, cropping patterns intensification and proximity to inputs and services such as waste treatment facilities, waste recycling and reuse possibilities. There are concerns as well typical to these areas as competition with other users over scarce resources, environment pollution of higher degree and reduced labour availability and higher wages. In In-

dia, the concerns of PUA have not been addressed separately though as mentioned above the farming systems and the conditions in these areas are quite different from distant rural areas. There is need to analyse the resource use, the technologies practised as well as the linkage mechanism between the different development departments both governmental and non-governmental and the farmers so as to identify the gaps and suggest a strategy for more effective and efficient functioning of the extension system in Peri-Urban agriculture. Sensing the importance of the issue, the present study was conducted at peri-urban Kanpur area as a part of Food & Agriculture organization (FAO) funded case study project entitled "An Appraisal of Profitability and Sustainability of Farm Enterprises and related Technologies in Peri-Urban Kanpur" with the objective-To outline the forward and backward linkages existing and potential of the farm enterprises, as well as existing and required support systems with specific attention to input supply, marketing arrangements, post harvest and processing facilities, finance, farmer advisory and training services and other support system aspects.

1. Zonal Coordinator, ZCU, Zone-IV,(ICAR), CSAUA&T, Kanpur. 2. Scientist, Agricultural Extension, IIPR, Kanpur.

**METHODOLOGY :**

Delineation of peri-urban area: A criterion was laid down for identifying the peri-urban area of Kanpur. The area around outskirts of Kanpur city, within a periphery of 30-35 Km having the production systems to meet out the demands of urban people, was characterized as peri-urban area of Kanpur.

**Identification of institutions, department supporting peri-urban agriculture**—Three kinds of departments/institutions were identified based on their association with peri-urban agriculture. Following departments having close linkages with agricultural development were identified for the analysis.

## (i) Development Departments :

- Department of Agriculture
- Department of Animal Husbandry
- Department of Horticulture
- Department of Fisheries
- Input Agencies (Private and Public)

## (ii) Technical Institutions :

- Chandra Shekhar Azad University of Agriculture & Technology, Kanpur
- Indian Institute of Pulses Research, Kanpur
- National Sugar Institute, Kanpur

## (iii) Farmers' Organization and NGOs :

- Chandra Shekhar Krishak Samiti
- Shramik Bharti
- Society for Management of Agricultural Rural Projects

Primary data was collected from different departments through survey of different departments, consultations and discussions with concerned persons. Review of records and published literature were the source of collecting secondary data.

**RESULTS AND DISCUSSION :**

The development programmes in the area are basically taken up by various State Departments such as agriculture, horticulture, livestock, fisheries, irrigation, marketing etc. Research and knowledge support is provided by institutions like C. S. Azad university of Agriculture & Technology, Indian Institute of pulse Research and National Sugar Institute, all located in Kanpur city. Credit services are provided by banks and cooperative societies. NGOs have recently come up mostly with community organization tasks. Private agencies play pivotal role in input supply. Marketing is partly organized through Mandi Samiti and rest through private channels. Policies and activities of some of the departments/institutions serving the area are briefly described here.

**(A) Agricultural Support Services**—Department of Agriculture is mainly responsible for agricultural input management (seed, fertiliser and pesticides) and dissemination of related technologies to the farmers. Before introduction of training & Visit Extension System in the

state of Uttar Pradesh in 1985 -'86, the Department of Agriculture was primarily engaged in input management and little in technology dissemination with limited staff posted at district level. T & V system facilitated posting of specialists at different levels i.e. district, sub-division, block and village level. Thus, T & V system strengthened research - extension linkages, regular training of farmers through fortnightly visits of village extension worker, regular feed back etc. T & V system continued in full swing till 1996 - '97 and later on the Government found it difficult to run such a large structured system and it was restructured. At present the structure of Department of Agriculture I peri-urban Kanpur existing is as depicted below.

Deputy Director Agriculture (with DAO + PPO + SCO)	District Level	Responsible for 10 blocks of the district
Sub-Divisional Agricultural Extension Officer	Sub-Division Level	Responsible exclusively for 3 blocks i.e. peri-urban area
Assistant Development Officer (with one plant protection supervisor)	Block Level	One ADO posted at each block
Multi Purpose Worker	Village Level	One MPW for each village

The multi-purpose worker is working as link worker at the village level for 6 departments. Multi-purpose worker is not necessary an agricultural graduate and is working under the administrative control of other department (Rural Development). Thus, the linkage of Department of Agriculture from the village has weakened.

The details of on-going schemes and activities of the Department of Agriculture is given in Table 1.

**(B) Horticultural Support Services**—There is one Government plant nursery and one vegetable seed production farm in peri-urban Kanpur. Besides these, there is one registered private nursery and plenty of unregistered private nurseries. Marketing of vegetable seeds in the area is mainly done by the private companies. The role of state departments is very limited. The department does not distribute or market the hybrid seeds which are at present in demand by the farmers. There are only three persons of the level of gardener and nursery in-charge responsible for horticultural technology transfer in the area. The efforts of Department of Horticulture are very limited. A description of the on-going schemes and activities is being given in Table 2.

**(C) Livestock Support Services**—The analysis of livestock development, health and other services indicate that there has been down sizing effect on number of such centres over the years because of financial crunch faced by the Government. Though, there has been slight rise in number of veterinary hospitals but other support services centres created by the Department of Animal husbandry have reduced in number. During 1989 - '90, there were a total number of 175616 animals in these three blocks of peri-urban Kanpur. To provide health services to such a large number of animals, there were six hospitals

**Table 1. Description of on-going schemes/programmes of Department of Agriculture in Peri-Urban Kanpur**

S. No.	Scheme	Financial Subsidy in Rs.
1.	<b>Oilseeds Production Programme</b>	
	(i) Seed Village Programme	500/quintal
	(ii) Seed Treatment	200/hectare
	(iii) Block Demonstrations	2000/hectare
	(iv) Rhizobium Culture	50/ demonstration
	(v) Farmers' Meeting	15000/meeting
	(vi) IPM	750/hectare
	(vii) Insect Pest Control	500/hectare
	(viii) Micro-nutrient Management	200/hectare
	(ix) Plant Protection Equipment	50
(x) Agricultural Implements Distribution	50	
2.	<b>Oilseeds Development Board</b>	
	(i) Soybean	
	Block Demonstration	2000/hectare
	Minikit Seed Distribution	376/kit
3.	(ii) Castor	
	Block Demonstration	1000/hectare
	Minikit Seed Distribution	100/pack
	<b>Pulses Development Programme</b>	
4.	Certified Seeds	800/quintal
	Block Demonstrations	300/unit
	Improved Technology Demonstration	1000/unit
	Sprinkler Sets	33% subsidy
	Seed Treatment	100/hectare
	Plant Protection Equipment	Up to 50% subsidy
	Rhizobium Culture	50/hectare
	Agro-chemicals	500/hectare
	<b>Macro Management Scheme</b>	
	Quality Seed Distribution	500/quintal
Certified Seed Distribution	200/quintal	
Manually Operated Implements	Up to 50% subsidy	
Power Operated Implements	Up to 50% subsidy	
Seed cum Fertiliser Drill	5000/unit	
Small Tractor (30 HP)	30000/unit	
Crop Demonstrations	2000/acre	
Hybrid Rice Demonstration	1500/acre	
Crop Protection Training	2000/training	
Bio-pesticides	500/acre	
IPM Training	2000	
IPM Demonstration	1000/acre	
5.	<b>Macro mode Technology Transfer</b>	
	Formation of Farmer Interest Group	6500/unit
	Farmers' Meeting	10000/meeting
	Cropping System Demonstrations	100%
	Training of Multi Purpose Worker	100%
	Exposure Visit of Farmers	100%
	Information and Communication	100%
	Organizing Farmers' Visit to Farmers Fair/Exhibition	33%
6.	<b>Maize Development Programme</b>	
	Promotion of Seed cum Fertiliser Drill	5000/unit
	IPM	600/unit
	Improved Agricultural Implements	Up to 50% subsidy
	Farmers' Training	5000/unit
7.	Agricultural Implements Distribution	Up to 50%
	Seed Minikit	Up to 100%
	<b>Farmer Friend Scheme</b>	
	Farmers' Meeting	5000/unit
	Agricultural Polyclinic	20000/unit
	Agricultural Technology Advisory Service	20000/unit
	Agricultural Technology Training	100/farmer
Farmers' Visits to Training Centres	100%	
Bio-Culture Distribution	200/farmer	

**Table 2. Description of on-going schemes/programmes of Department of Horticulture in Peri-Urban Kanpur**

S. No.	Schemes	Activities
1.	Vegetable and Spices Development Programme	Demonstration on hybrid vegetables with financial assistance of Rs. 1000 per demonstration
2.	Pest and Disease Management	Demonstration of fruit rot and die back in chillies with assistance of Rs. 250 per demonstration
3.	Chillies Demonstration	Financial subsidy of Rs. 750 for 0.1 hectare for promoting newly developed high yielding varieties
4.	Spices Promotion	Demonstration on coriander, menthe covering an area of 0.01 hectare with financial assistance of Rs. 375 per demonstration

**Table 3. Analysis of Livestock development, Health and Other Services in Peri-Urban Kanpur**

S. No.	Services	Block wise Number of Centres/Sub-centres		
		Bidhnu	Sarsaul	Kalyanpur
1.	Veterinary Hospitals	5	3	3
2.	Livestock Development Centres	3	5	10
3.	Sub-centres	9	6	12
<b>Total</b>		<b>17</b>	<b>14</b>	<b>25</b>

and 24 sub-centres. Thus, the ratio of veterinary hospitals versus number of livestock was 1:29269. Including veterinary hospitals and its sub-centres, service centre and livestock ratio was 1:5853. In last few years the number of livestock has increased whereas the number of veterinary service centres has reduced.

The scenario of livestock support services and the sensitiveness of the farmers towards livestock management could be understood by the fact that in case of ailment to animals, first village based local untrained quacks are called. If not cured, then animals are taken to sub-centre and in the last stage of the ailment the animals are taken to the veterinary hospitals. A brief description of on-going schemes of the Department of Animal Husbandry is given here.

**Table 4. Description of on-going schemes/programmes of Department of Animal Husbandry in Peri-Urban Kanpur**

S. No.	Schemes	Activities
1.	Livestock Health Services	Castration, vaccination and treatment of animals
2.	Breeding and Animal Development Programme	Artificial insemination services and treatment of infertility
3.	Goat Development Programme	Natural services through improved bucks and also providing bucks to goat growers
4.	Fodder Development Programme	Distribution of fodder seeds
5.	Poultry Development	Training of farmers in poultry

**(D) Waste Land Development Programme**—During the last four years from 1997 - 98 to 1999 - 2000, a total of 4983 hectares of land was reclaimed with total investment of Rs. 17.4 million. Thus, one hectare of reclamation required an expenditure of Rs. 3500. Table 5 shows that land development, land reclamation, community organisation and trainings were conducted for waste land development.

**(E) Credit Support Services**—The network of banks is spread uniformly in all the three blocks of the peri-urban area. In last decade, there has been increase in the number of banks in two blocks where as, in one block there has been closure of two regional non-nation-

**Table 5 Activities and Year wise Physical and Financial Support under WLD in Peri-Urban Kanpur**

S. N.	Year	Land Reclamation		Community Organisation (Rs. in million)	Training (Rs. in million)	Administrative Expenditure (Rs. in million)	Total (Rs. in million)
		Area (ha)	Financial Expenditure (Rs. in million)				
1.	1997-1998	293	1.10	0.36	0.05	0.18	1.71
2.	1998-1999	1165	4.38	0.12	0.13	0.21	4.84
3.	1999-2000	1624	5.36	0.30	0.02	0.17	5.86
4.	2000-2001	1901	4.40	0.27	0.11	0.13	5.02
	<b>Total</b>	<b>4983</b>	<b>15.34</b>	<b>1.06</b>	<b>0.26</b>	<b>0.70</b>	<b>17.44</b>

**Table 6. Credit deposit Ratio of Banks in Kanpur (including peri-urban area)**

S. No.	Particulars	Year wise in 000				
		1987	1995-96	1996-97	1997-98	2000-01
1.	Deposit	428312	258598	1375530	3071819	3986560
2.	Credit	212605	85983	437391	1033743	1057311
3.	Credit - Deposit Ratio	50.0	33.0	31.0	33.0	26.0

**(F) Agricultural Credit Card Scheme**—The government has started farmers' credit card scheme for facilitation of easy credit access. Under this scheme, the farmers' credit requirements are fixed for 3 years and thus, farmers need not seek completion of formalities now and then. This system helps the farmers to avoid cumbersome procedures. Credit cards can be obtained from any bank directly through village institutions. This scheme started in 2000-2001 with 2472 credit card holders, which more than doubled in 2001-2002 (Table 7). This scheme may prove as boon for the illiterate, innocent and distantly located farmers.

**Table 7. Number of Credit Card holder Farmers in Peri-urban Kanpur**

S. N.	Blocks	Year wise Credit Card Holders		
		2000 - 01	2001 - 2002	2002-2003 (Target)
1.	Kalyanpur	802	2168	2500
2.	Bidhnu	860	2240	3300
3.	Sarsaul	810	1910	3200
	<b>Total</b>	<b>2472</b>	<b>6318</b>	<b>9000</b>

**(G) Technical Support Services**—There are three main technical agricultural institutions of Government of India and the State Government engaged in providing technical information and advisory services to farmers. The institutions are :

alised banks. The credit/deposit ratio (table 6) indicates that, it has been hovering around 30.0 per cent in most of the years and now it has gone down to 26.0 per cent in 2000-2001, though, it was 50 per cent in 1987. The analysis of the data of 2000-2001 indicates that the role of Regional Banks is more in terms of distribution of credits against deposits. The regional banks distributed 53 per cent more than the deposits. Nationalised banks distributed only about 27 - 45 per cent credit against the deposits. Overall, credit distribution is not much encouraging. Late payment of credit is one of the reasons for low credit distribution. The farmers of peri-urban area require more monetary assistance for the establishment of productive units.

- (1) C.S.A. University of Agril. & Tech., Kanpur
- (2) Indian Institute of Pulses Research, Kanpur
- (3) National Sugar Institute

**1. C.S.A. University of Agril. & Tech., Kanpur**—The farmers of peri-urban Kanpur are benefited by the following programmes of the university.

**(a) Farmers' Fair and Exhibition**—Two farmers' fairs of 4 days duration are organised by the university in a year at the start of two main crop seasons i.e. rabi (winter) and kharif (rainy) seasons. The display of technologies, interaction among farmers-scientists, visit of farmers to farms and laboratories, sale of seed, implements and livestock, etc. are the major activities carried out for four days duration during farmers' fair.

**(b) Agricultural Helpline Service**—The university has initiated a toll free telephone service for the farmers of the university service area and the peri-urban farmers of Kanpur are the ones who are regularly accessing the service.

**(c) Agricultural Technology Information Centre**—This centre is serving the farmers by providing services like information (related to weather, market, input); diagnostic (diseases, insects, nutrient deficiencies) and testing facilities for soil, water, farm chemicals and dairy products.

**(d) Institution-Village Linkage Programme**—This programme is being run in one of the villages of block Bidhnu of the study area for assessment of latest technologies and its refinement at farmers' fields with the active participation of the farmers.

**(e) Farmers-Scientist Interaction Programme**—The programme has facilitated in identification of one farmer from each village and training him/her in management of different enterprises and technologies. The

trained farmer is further involved as contact person of the university for the village.

**(f) Agro-Meteorological Services**—Every day forecasting of weather and crop related suggestions to farmers are given through print media.

**(g) Agricultural Input Support Services**—There is a wide spread network of agricultural input services in the peri-urban area of Kanpur. Over the years, there has been marked increase in number of seed, fertiliser and pesticide sale centres. The number of seed and fertiliser sale centres has increased many folds, from 10 in 1989 to 32 in 2002. Similarly, the number of insecticide sale depots has gone up to 32 in 2002 as compared to 2 in 1989. The recent trends also indicate that private shops have become the main supplier of agrochemicals by establishing more number of outlets earlier dominated by Government/Cooperative centres. This is happening because the Government has allowed private interventions in this sector, which has earlier controlled by the Government.

**(h) Non-Government Organisations**—There are many NGOs registered in the peri-urban area of Kanpur and engaged in education, health and community upliftment programmes. There are only two NGOs engaged in land development activities whereas there is one farmers' organisation.

- (i) Shramik Bharti-NGO
- (ii) Society for Agri Rural Projects-NGO
- (iii) Chandra Shekhar Farmers' Society-FO

Shramik Bharti is working with World Bank sponsored project-UP Sodic Land Reclamation Project. This NGO is engaged in community organisation and training of farmers viz. formation of water user groups, SHGs, etc. Society for Agri Rural Projects also undertakes community organisation, implementing technical projects and conducting various impact studies.

Chandra Shekhar Azad Farmers' Society is collaborating with C. S. A. university of Agriculture and Technology, Kanpur. This is a non-profit making registered organisation organising farmer-scientist interaction every month at the university headquarters and also in different districts on a fixed date. Regular farmer-scientist interactions about new developments, ensuring farmers' participation in various organisations, etc. are the key functions of this organisation in addition to bringing out small handouts for the farmers. The nature of work of NGOs is mostly to implement community organisation

activities after receiving funds from any organisation whereas the farmers' organisation is doing it voluntarily and occasionally.

**(2) Indian Institute of Pulses Research**—This is a national institute of ICAR engaged in pulses research. The peri-urban farmers get quality seeds and timely advices on pulses production from this institute.

**(3) National Sugar Institute**—This is a central government institute providing technical know how to farmers in sugarcane cultivation. The farmers' produce is either taken by the institute for crushing or most of the cane is sold in the market for juice purpose in summer. The services of the institute are limited to a few farmers as the area under sugarcane is very less in this area.

## CONCLUSION :

As the advisory services from Government system are almost withdrawn, alternative mechanisms of advisory services need to be created. One of the alternatives may be identifying Agricultural Graduates, training them and providing soft loans for establishment of diagnostic (soil, water, chemicals etc.) and advisory centres in the village. There has to be a check through an empowered working group of scientists, extension workers and farmers to control the dissemination of technologies/products directly by private companies with the motives to make money. Advisory services also need to be tuned to provide farming system based holistic information. Presently, information is being provided in piecemeal for different commodities. Farmers are doing integration of components and technologies. As cow-buffalo number equation has changed, the policies, services and attention need to be focused on buffalo development programme. The existing Government Veterinary hospitals need to be strengthened for providing health, breeding and advisory services. Policy interventions are also required to invite private initiatives in livestock, health and development services. Para vet services through trained educated rural youth may be another option being already tested in some districts. Landless and resource poor farmers need to be picked up and trained in various income generating activities as these group of farmers were found lacking in accessing latest technological information. There is a need to develop location specific literature for different categories of farmers. The concept of agricultural communication shops needs to be initiated in villages through networking.

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