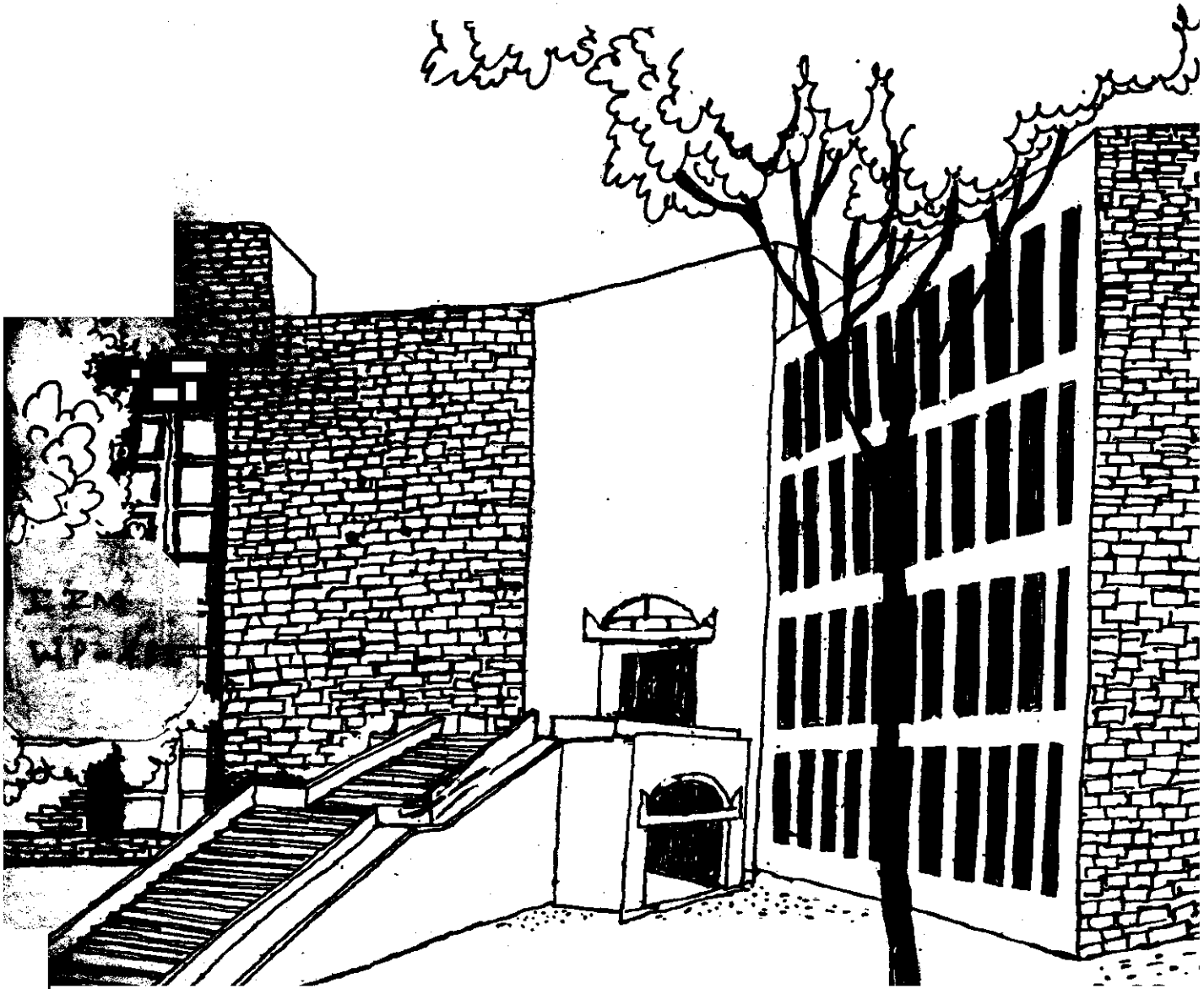




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DEVELOPMENT OF URBAN AGRICULTURE IN INDIA:
PUBLIC POLICY OPTIONS

By

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DEVELOPMENT OF URBAN AGRICULTURE IN INDIA: PUBLIC POLICY OPTIONS

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Abstract

The cities in India are rapidly growing and the manifestation of urban crisis in a variety of areas viz., environment, food, energy etc, can be directly traced to the unbridled growth of cities. Urban landuse patterns are changing dramatically due to the pressure of population and the role of urban fringe in supplying food, fuel, forage and industrial forest products, has declined considerably. Urban areas in India have emerged as the centres of impoverishing peripheral regions. The environmental crisis of the urban region has become acute and interlinked in complex ways to urban energy, landuse and the political economy of urban development. This paper looks at the nature of this crisis and the potential of urban agriculture in ameliorating the crisis. It develops an analysis of the nature of the crisis, reviews the different possibilities that exist in urban agriculture, discusses the constraints for effective implementation of agricultural programmes through institutional structures and finally develops policy options and strategies for promoting urban agriculture.

INTRODUCTION

The cities in India are rapidly growing and the manifestation of urban crisis in a variety of areas viz., environment, food, energy etc, can be directly traced to the unbridled growth of cities. Urban landuse patterns are changing dramatically due to the pressure of population and the role of urban fringe in supplying food, fuel, forage and industrial forest products, has declined considerably. Urban areas in India have emerged as the centres of impoverishing peripheral regions. The environmental crisis of the urban region has become acute and interlinked in complex ways to urban energy, landuse and the political economy of urban development. This paper looks at the nature of this crisis and the potential of urban agriculture in ameliorating the crisis. It develops an analysis of the nature of the crisis, reviews the different possibilities that exist in urban agriculture, discusses the constraints for effective implementation of agricultural programmes through institutional structures and finally develops policy options and strategies for promoting urban agriculture.

THE NATURE OF URBAN CRISIS

Rapid population increases in urban areas in India (in the last 10 years, the growth of urban population is over 60 %) has resulted in a tremendous demand for land, which is becoming scarce. As the built up areas increase, there is a destruction of agricultural cover, poor drainage facilities, higher import of food from villages and uneven development. The process of urban development has differentially affected various income groups in the city and the relative position of poor is becoming worse. Air and water pollution, inadequate disposal of solid wastes, and noise pollution have affected the local climate and the quality of life. Technological solutions and modernisation have not solved the problems of Indian cities. The urban crisis in energy, food, transportation, housing, environment and social unrest seem to be interactive and synergistic and can be understood only in a holistic and systemic sense.

Such a crisis is not to be seen as something undesirable but rather an indicator of new social and political practice. The urban crisis provides a turning point for a social struggle and social integration. It must be formulated in promotion of what has been made to happen and what can be made to happen rather than in promotion of what has happened or what would probably happen.

Complex changes in urban systems can not be understood by an analysis of different subsystems as our units of explanation. The nature of our research efforts now is informed largely by atomistic efforts to understand subsystem characteristics and our efforts are thus dominated by the philosophy of Cartesian reductionism, which is a major barrier to our understanding. Hence, holism and ecology must be the watchwords of the new paradigm that is needed to understand the urban crisis. One must caution however, that holism or ecology does not imply harmony among all the constituents of the system. Conflicts among them are very real and need to be resolved. Urban agriculture may have the potential to solve this crisis, if it is developed within the broader understanding of the ecological and social structure of the city. Admittedly, this task involves a normative perspective. We would, presently look at the role of urban agriculture in addressing this crisis.

THE NATURE OF URBAN AGRICULTURE

Presently, urban agriculture is on the decline in cities as the pressure for land and scarcity of water have become acute problems. In the urban land market, agriculture represents probably the least remunerative use. However, market is not always the right place to determine the longterm value of agriculture. The experience of cities that have significant urban agriculture, has been positive, though they may not be justifiable by conventional economic analysis. Here, we are using the term urban agriculture to include formal cultivation of crops, fruits and vegetables, forestry, parks, gardens, orchards, animal husbandry, fuel wood plantation, aquaculture and related activities. Such a broad definition of urban agriculture is

necessary because many of these activities are complementary and cannot be looked at in isolation . Given the shortage of land, the need for integrated planning of multiple use space is obvious. Let us, for example, look at the present pattern of land use in Ahmedabad, a city of three million people.

Table 1

Land Use in Ahmedabad city* 1978.

<u>Use Category</u>	<u>Percentage of Land</u>
Residential	42%
Commercial	2%
Hotels	1%
Industry	9%
Institutions (education, culture hospitals, religion, public administration, prisons)	4%
Parks and recreation (palygrounds, public parks, zoo etc.)	9%
Transportation (roads, railways, airport, bus terminals, parking space)	20%
Agriculture (vegetables, fruits, gardens, animal husbandry, farms, trees)	5%
Undeveloped, vacant and marginal land	8%

*Based on preliminary analysis of Ahmedabad Urban Development Authority and Ahmedabad Municipal Corporation data and subjective estimates.

This table indicates that land devoted to agriculture is quite low considering the needs of the city. If you consider the city as an ecosystem, it is obvious that we need to maintain a balance among various types of activities and

land use so that the city's ecological condition is sustainable.

Let us presently look at some of the benefits of urban agriculture :

- i) Moderation of the climate through trees and vegetation by decrease of temperature and increase of humidity;
- ii) Purification of air through oxygenation of trees and dilution of polluted air with fresh air;
- iii) Protection of the soil through prevention of soil erosion and run off;
- iv) Improvement of ground water supply through retention of soil moisture and recharging;
- v) Entrapment of dust particles to prevent sand storms and soil instability;
- vi) Reduction of noise pollution by absorption, deflection and masking of sounds;
- vii) Improvement of food supply (vegetables, fruits, milk, poultry, fish etc) in a city from local sources, thus increasing reliability of supply at lower transportation costs;
- viii) Meeting the local needs for animal fodder.

Many of these benefits are highly tangible and have long term economic benefits. However, as conventional economic analysis considers, many of these benefits as 'externalities', investment in urban agriculture has been very low. Practically, none of the master plans of metropolitan areas and other towns in India have any component plan for urban agriculture. In fact, urban agriculture as defined in this paper is considered 'backward' in these development plans and is sought to be minimised by urban development programmes.

Urban agriculture, while being neglected by official

policies, continues to survive through kitchen gardens, trees which produce fruits, vegetables and flower plants, grassland that produces fodder for animals and gardens and parks. The terms of trade between urban agriculture and other economic activities in the city are adverse to agriculture (FAO, 1984). Hence, it is in slow decline in the cities. There are certain types of urban agriculture which are not very productive nor meet the local needs of the population. In cities like Delhi vast amount of lands are devoted to cultivation of lawns. These lawns, while aesthetically pleasant to the eyes have no productive value. They consume enormous amount of water and are mainly for the benefit of the rich. This passion for lawns in urban landscape planning has its origin in the English Colonial tradition of development of lawns. The same space can well be used for many other agricultural activities which are highly productive.

We find agriculture in urban areas does not help in meeting the urban needs in food, fuel, fodder, fruits and flowers. Its role is maintaining ecological stability and sustainability is gradually decreasing. Its ability to generate and retain employment of the poor is low. Government sponsored urban development programmes systematically ignore urban agriculture. The control of land is with the speculators, developers and official agencies, rather than with the urban poor. The potential for urban agriculture, however, seems to be high and we would like to explore what ought to be the goals in this area and how they may be realised.

GOALS OF URBAN AGRICULTURE

The goals of urban agriculture in order of priority ought to be:

- a) Meeting basic needs of urban people for food, fuel
- b) Protection of environment and ecological balance

fodder etc

- c. Democratic control of agricultural resources including land
- d. Production for industrial needs (e.g. timber)
- e. Production of goods for exchange in the market place

This order of priority is essential if we want to develop a sustainable urban agriculture in the present socio economic context. The intended main beneficiaries of these goals are the urban poor who will be employed and who will benefit from the output of urban agriculture.

A CONCEPTUAL FRAMEWORK FOR THE DEVELOPMENT OF URBAN AGRICULTURE

It is very clear that if urban agriculture has to be developed through the market place, it will fail in a very short time. Market based policies for resource allocation, distribution and production in urban agriculture involving the use of demand/supply logic, efficiency criterion and regulation by the price mechanism will not be viable for urban agriculture. The market, as is structured now, is based on a division of labour and comparative advantage of specialisation. Urban agricultural products will always be at a disadvantage in a market place. Given the land price and competition for space in the city and high cost of conventional agricultural inputs, urban agriculture can never be economical on a large scale. Demonstration projects in urban agriculture are possible, though many of them need expensive resources and are not replicable on a large scale. Profitability, expansion, growth and diversification which are essential for the survival of private enterprise in the market place will not be viable goals for urban agriculture. Urban agriculture is territorial and if it must meet the basic needs of urban poor (that cannot be satisfied by the market place) it must be based upon a needs-use logic, local control of resources including land, social participation

based on non economic motivation and production of goods that will be consumed locally rather than sold in a market for exchange. Hence, the role of the market should be considerably restricted as far as urban agriculture is concerned.

The experiments in Addis Ababa, Lae, Shanghai, Hong Kong, and Lusaka indicate that state intervention through public investment, promotion and extension can create a viable urban agriculture sector (Wage, 1981 Newcombe, 1977). Through the use of voluntary organisations, cooperatives and public sector, a low energy-intensive, regenerative agriculture producing goods which are within the access of the poor, is shown to be possible in many of these places. The extensive growth of eucalyptus in Addis Ababa, firewood in Lae, vegetables in Shanghai, livestock in Hong Kong and social forestry in many other cities shows that significant proportion of urban food and fuel requirements can be met by urban agriculture. The demand for export of food and fuel on the rural areas will correspondingly be reduced, thus enabling them to reduce their environmental degradation as well as to improve the access, of rural poor to food and fuel produced in rural areas. The environmental benefits indicate that such products planned with state support can be highly productive. State support for research and development, extension, provision of inputs and encouragement of local planning can be thus very useful in urban agriculture. The State can also be a arbitor between conflicting uses of urban space. As a lot of land is owned by municipal corporations and state governments, it can be used for urban agriculture and thus creating significant impacts.

Experience in socialist countries indicates that some form of nationally organised system of joint production and distribution in agriculture is equitable and effective (IDS, 1982). The collective form of such organisation as contrasted with private enterprises can be cooperatives, collectives or communes. Such collective organisation does speed up the

growth of the output, encourage more rational use of land and labour, facilitates capital accumulation, research and training which are possible on a broader scale production and also result in reasonable amount of equality and welfare (particularly for women and children). It promotes modernisation and participation of the workers. There are limits to collective agriculture due to waste of resources, centralisation and bureaucracy. The experience of socialistic countries clearly shows that agriculture cannot be planned centrally in all its aspects. Decentralisation, local control and commitment are essential. Greater incentives for producers are necessary. Small work groups and house holds, should have significant responsibility for agriculture. Such experience indicates that the State alone is not sufficient to promote urban agriculture. Community (neighbourhood and local associations and community norms) is thus very important in urban agriculture (D'Ath, 1983). In many cities of the third world, strong sense of such community based on class, caste and ethnic identity already exists. The modern city has been found to privatise and alienate people through their occupational structure, fragmentation in space and the market place. Urban agriculture can counteract this tendency and can strengthen urban communities. The Urban Community Development projects in various Indian cities which attempt to improve the quality of life in low income neighbourhoods, demonstrate very clearly the power of the community in bringing about social change. Thus, an important policy goal in urban agriculture is to develop a contextually relevant optimal balance of power between community, state and the market place. Such balance does not exist anywhere in the world today, although interesting experiments are ongoing.

The technology for urban agriculture is fairly well known. Local research, however is needed to generate new knowledge about multiple production cycles (fuelwood, livestock aquaculture, biogas etc) using new spaces like roofs,

balconies and backyards. The high productivity of small and marginal spaces in agriculture has been well established. A recent study indicate that 6 square metres space can produce all the vegetable needs for a family of four for a year. In the experience of Bangalore where a large number of street trees are grown by the city's well known Department of Horticulture, 25 % of the trees bear fruits and many of them provide food for the animals as well. The potential of many Indian trees like Eucalyptus, Subabul, Mahua, Neem, Mango, Jamun and Tamarind for providing multiple products in urban areas is very well known (Govt. of India, 1976). These trees provide food, fuel, raw materials for industry and forage for animals. However, there should not be any reliance on a technological fix for urban agriculture. Technology can help in encouraging urban agriculture but there should be a corresponding change in the social organisation of production and distribution as well. Hence, the role of professionals like agricultural engineers, plant breeders and agronomists should be limited in urban agriculture. The knowledge of the urban poor should have primacy in promoting urban agriculture and their active participation in decision making right from the design/research stage is crucial.

Among the new technologies, remote sensing appears to be of great potential for developing urban agriculture (Govt. of India, 1983). While the detailed information needed for large scale mapping of all categories of land use, land forms, characteristics in urban areas cannot be interpreted with satellite imagery, changes over time can easily be detected. With the development of better resolution imagery, remote sensing may become more useful over the next few years. Remote sensing used with aerial photography and detailed land based surveys for assessing land uses can be extremely productive. The Government of India has recently started a National Natural Resources Management System of

which remote sensing data is an important part. The recently established, National Land Board and National Land Resources Conservation and Development Commission as well as the state Land Use Boards and Departments of Agriculture, can make use of this data. The land use assessment naturally has to be attempted, through a multi-stage data strategy : (a) Satellite maps (low, medium, high resolution), (b) Air craft surveys (covering sample regions) (c) Soil, land use, geomorphological and geological maps and (d) agricultural statistics. Remote Sensing data can now clearly indicate the different types of land use, climate energy features soil characteristics and the nature of agricultural practices. The impact of human intervention on urban growth can be dramatically and holistically learnt through remote sensing. The physical change of urban areas if related to socio-economic changes can provide a powerful tool for urban planning. Presently no such capability exist in India. The Municipal Corporations, the Town and Country Planning organisations, and the Urban Development Authorities have no capability to use such information. It is very important to plan for the use of this information democratically.

The remote sensing data in a study of Ahmedabad has provided valuable information of the nature of growth over the last twenty years. For example, the extent of growth has been quite rapid and the density map indicates that in several areas population has been growing rapidly. Where the poor live, the density is inequitably higher. The vegetation and trees indicated by red in the false colour composites has reduced in some areas and increased in others. The barren land indicated by yellow has not changed significantly. The settlements indicated by blue is growing indicating suburbanisation. The potentially urbanisable land (presently fallow) appear like arrows indicating that over the next few years they will become settlements. The remote sensing data was validated with ground

based surveys. Such analysis with remote sensing data can be invaluable in planning for urban agriculture. However, the high technology of remote sensing can become anti-democratic and alienating. Hence, in its design itself, the use of remote sensing information has to be necessarily included for social participation.

Historically, uneven development of urban and rural food and energy production depicts a systemic relationship of unequal exchange and dependency. If urban agricultural strategies should alter this relationship, it would mean a profound transformation of the role of the cities and structure of urban economic activities and life styles. If we have an understanding of the structural and historical processes at work, then we can realise the limits of what we can and cannot do in urban agriculture. This again is a plea for holistic approach to strategic planning in urban agriculture rather than considering urban agriculture as a series of demonstration or pilot projects. Thus, urban agriculture cannot be an 'additional programme'. Rather it should be seen as a part of the total urban development process itself. As context and participation are primary in such a vision of urban agriculture, we can understand its role through the transformation of urban community and not vice versa. In other words, we should not seek a model/theory of urban agriculture to be replicated or implemented, across contexts. Such a model can only be reinvented each time, so that endogenous capacity gets strengthened.

There are several constraints in implementing an urban agricultural programme. Some of these are :(Di Castri et al, 1981 UNESCO, 1979).

- a. Lack of overall policies and goals
- b. Lack of information systems to collect and process information

- c. Lack of managerial skills and resource people
- d. Isolation between scientists, planners and managers
- e. Sectoral administrative structures and funding pattern
- f. Lack of multi-level coordination
- g. Lack of understanding of the aspirations of local people
- h. Lack of democratic processes of participation.

STRATEGIES FOR DEVELOPMENT OF URBAN AGRICULTURE

Given the nature of urban crisis and the potential for agriculture to address the crisis, I would like to develop a set of strategies for the development of urban agriculture. Presently there is no stated policy regarding urban agriculture in India. The strategies outlined here are exploratory in nature. Their relevance and effectiveness will have to be determined by experimenting with them. A priori, a master plan for promoting agriculture cannot be developed, as we had indicated earlier. Both structure and situation are important in determining the effectiveness of any strategy.

The State has to play an important role in the promotion of agriculture and in countervailing the market forces. Urban economic activities are highly integrated with national and international market systems. To contain the forces of the market is obviously a difficult task. But as we have noted earlier the market has only a very limited role to play in urban agriculture. Public expenditure in promoting research, education and extension, comprehensive land use planning and regulation, and development of institutional systems and organisations for production and distribution can be major state contributions.

The promotion of producers' cooperatives (like AMUL for dairy industry in Gujarat) neighbourhood associations, citizen groups voluntary organisations through financial assistance

will be an important State role. Similarly encouraging coordinated production plans would be very important. Multiple use urban agriculture can be planned only in a coordinated fashion. The experience of All India Coordinated Research Projects of the Indian Council of Agricultural Research in promoting dry land farming, oil seeds production and fruits is an important model which may be relevant for promotion of urban agriculture. Important areas for research and education seem to be genetics, development of horticultural species, strengthening and improving trees like subabul, neem, and mahua, soil conservation, multiplication of seeds and seedlings through vegetation propagation and tissue culture appropriate planting technologies, disease resistance, yield improvement and improving survival rates. The State, however, should not assume direct operation of urban agriculture by setting up a big bureaucracy. The experience of socialistic countries indicate that such endeavours will fail. Urban agriculture can be highly productive, as it needs low investment, and is sustainable and has many long-term environmental benefits. It is an important welfare strategy as it would produce the needed basic food and fuel for the urban poor. The energy consumption pattern in cities can then shift in favour of renewable sources. The destruction of rural forests for meeting the urban demand in wood and charcoal will also be considerably lessened. The city will become more self-reliant in energy as woodfuel, biogas and solar energy can increase their share of urban energy consumption. Simultaneously, the expenditure for energy embodied in imported food can be reduced.

The state also can use incentives, subsidies and tax rebates in a limited way to promote urban agriculture. Agricultural revenue is exempted from income tax regulations in India. This legal provision can be an incentive for private owners to engage in agriculture. Fruits and flower

orchards around Bangalore have come up in large number recently because of this provision (Rao and Tiwari, 1979). Other possible means are state fund, energy plantation etc. However as we have noted earlier the growth motive of private enterprises in urban agriculture has to play necessarily a limited role. A large role for private sector in urban agriculture will not result in teaching the goals mentioned earlier. However, as a large amount of land is owned by private owners, such incentives may play a role in extending urban agriculture (US-AID, 1982). Similarly regulation through zoning, prohibition of certain activities, preservation of green space and use of public land for social forestry (e.g. tree planting along railway lines, road sides, marginal land etc) can be encouraged by regulation. The current urban planning regulations, and land ceiling legislation can considerably be modified for this purpose.

The State should support decision making regarding urban agriculture, primarily by the cooperatives or local organisations. Social ownership of land as well as land acquisition for urban agriculture under existing legislation, will be very helpful. Resistance to such redistribution of land ownership in the city will be extremely high as land is a major source of profit in the city. There is also a need to recognise the tension between decentralised urban agriculture and the need to coordinate from the urban/regional perspective. These conflicts should not be brushed aside but rather should be tackled by negotiations. Combining individual, decentralised responsiveness and collective norms of a community is a major challenge. The State needs to play a supportive, catalytic role to encourage community building. This is clearly a non-dirigist view of the state, and is ^{inconsistent} with present day reality. However it is possible to conceive of such a role for the state.

The existing structure of the Indian cities, as we have noted earlier, has grown along with growing peripheralisation of the neighbouring region and marginalisation of the poor. If urban agriculture is to grow significantly in this structure and spatial pattern, a mere demonstration approach will not suffice. We also observe that in Indian cities, the process of urban development is not simply one of the modernisation but one of the greater modernisation combined with greater tradition. It is the coexistence of traditional and modern, urban and rural, rich and poor that characterise the growth of Indian cities. The physical growth of natural areas and their social position are highly related to one another. Such physical and social growth occurs by accretion and accommodation rather than by replacement (Tewari et al, 1983). Thus urban life is characterised by history, density, complexity and heterogeneity. Urban agriculture in such cities needs to be very carefully planned and must be socially acceptable. Any effort in urban agriculture must be preceded by such understanding. The State can facilitate such understanding through its research and survey organisations.

There are many other aspects of urban agriculture which the State can promote. Vegetables and fruits can be cultivated with recycled sewage water, grass and fodder can be grown in marginal lands for the animals. Land can be allotted in various parts for dairying cooperatives in the city. The dairy farmers and small growers of vegetables who are now leading a precarious existence can be encouraged. Given the Indian religious tradition of the use of flowers, there is a great scope for the growth of flowers in cities. Nectar bearing flowers can be propagated for proliferation of bee fauna. Lotus which is India's national flower has both food and ornamental value. Its growth can be encouraged in the many ponds and lakes in the cities. Medicinal and aromatic plants like sandal, palmarosa and lemon grass, mint and fruits like mango, bananas,

citrus can be grown in the urban environment. The groups in each city need to undertake experiments and to grow plants that are consistent with local geographical, climatic, social and soil conditions (Goodman and Love, 1982). Indian experience in rural agriculture suggests that monoculture is undesirable and multiple cropping is needed to maintain an ecological balance in the long run. Such a decision can be taken only on nonmarket considerations. The focus in urban agriculture should be primarily that of agricultural production for local needs of food, fuel and fodder and secondarily that of environmental improvement. The Municipal Corporations should encourage the development of botanical gardens within the city areas to preserve the species, to develop nurseries and seed giving programmes as well as places for recreation. Again the excellent gardens of Bangalore come to our mind as an example. It is not easy to replicate the Bangalore experience of land use because historically, the importance of agriculture in Bangalore has been very high even prior to the British colonial days. The use of ornamental trees like gulmohur are very important and a few Indian cities have taken up their cultivation as roadside trees. The Delhi experience in creating urban forestry for natural learning is another example of enlightened urban agriculture policy.

As there is a variety of owners of urban land, each one pursues his own interest. In the present structure, Municipal Corporations have some authority over private land use. However, because there is no specified urban policy regarding agriculture, one finds usually a hodgepodge of species, ages, sizes, and conditions varying from lot to lot, neighbourhood to neighbourhood. Some advice and regulation regarding what can be grown in which area, seem necessary.

There are three management needs in urban agriculture.
(Gray and Deneke 1978)

a. Planting; b. Maintenance; c. Removal.

The Indian experience of Vanamahotsave is worth recalling where millions of trees were planted all over the country but later 90 % of them died for want of proper maintenance. This suggests that planting must be planned alongwith the maintenance. For example, while the city governments usually maintain parks, they do not take clear responsibility for the maintenance of road-side trees. Similarly location of trees and crops with reference to roads, housing developments, intersections etc need to be planned very carefully. The form, size, texture and colour of trees and their blooming seasons have to be clearly kept in mind. Their growth needs to be managed by providing irrigation and fertilisation and control of competing vegetables. The removal of trees (including their utilisation and disposal) are generally ignored in cities. The removal must be authorised, planned and funded properly. Urban agriculture can be a sustainable yield system. It has been estimated that an average urban tree is worth about Rs.800. Hence, the return from urban forests can be quite significant. An important part of the maintenance strategy should be to have a city-wide agricultural inventory.

The city government needs to provide an annual budget for the management plan. Local groups and neighbourhoods can also generate resources for urban agricultural development. The importance of public education and creation of public awareness about urban agriculture through formal and nonformal programmes, access to horticultural and agricultural department, media and information surveys are very important. Employment in urban agriculture can be quite significant as it is a labour intensive activity. One cannot overemphasise the importance of the institutional mechanism for citizen participation in urban agriculture. Many urban governments in India are decentralised and zonal/ward committees do look at local issues. These committees can be activated and enabled to deal with local urban agricultural problems. Maintenance can be significantly of high quality if handled locally.

Urban agricultural projects cannot be planned independently of each other using a compartmentalised project appraisal approach. The production of food, biofuel, animal food etc may have to be planned jointly because they are linked to each other, through the flow of material or energy. Single purpose agricultural projects evaluated on mainly economic basis, would be irrelevant for urban agriculture. Food, energy and environmental effects should be considered together on a specific site, based on the ecological complementarity of various activities. Clearly an 'ecodevelopment' strategy is needed for urban agriculture planning. Only then, a study of urban agriculture will lead us to questions of urban energy and use, structure of economic activities, history and culture, ecology, environmental sustainability, transportation, land ownership, the production and distribution systems, the social relations in the community etc. All these are somewhat autonomous questions, but at the same time, inter-dependant and interactive among themselves and with the external environment. To do such planning appropriately, we have to rely on many sources of information. Census data, empirical observations, surveys remote sensing data and citizen data generated through processes like workshops and community meetings-all will be necessary. Here again, the importance of community based organisations and collective institutions are vital. It is possible to model urban agriculture, based on such data, as a dynamic simulation model to analyse the impacts for policy alternatives. Such efforts however have not been done so far in India.

CONCLUSION

The experience of green & revolution and 'scientific' forestry in India enables us to learn about the uneven nature of our development process. The choice of goals, technology, production mix indicate that certain types of decisions :

were taken that affected the rights of rural poor and tribal population. Their impoverishment over time can be directly related to the choices made and the interests currently dominant in agriculture and forestry. Local basic needs were ignored as being not profitable. To recognise that urban agriculture cannot become commercial in the existing socio-economic context is vital. Urban agricultural science and technology cannot function in a 'historical' vacuum in social relations. Nor it is universal or valuefree. It has to be developed in each context with specific interests of urban poor in mind. The use/abuse model of agricultural science and technology is not relevant for urban agricultural development. From the very design/research phase, such a normative perspective is essential. Meeting the basic needs must become an important objective rather than growth, expansion and diversification. Hence the argument, that urban agriculture should not rely on the market for allocation of resources or distribution of output. The profound transformation in cities that is needed for such urban agriculture to succeed appears to be a formidable goal but I do believe that urban agriculture so practised can influence and shape our future where such transformation is **indeed** possible. The conflicts and trade offs in this approach are to be directly faced with resolutions attempted. The strategies that are described here are presented in the hope (paraphrasing Paolo Fraire) that urban agriculture becomes a vehicle for the transformation of urban poor so that they can read their own reality and write their own future.

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