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THE URBAN TILLER:

AN INVESTIGATION INTO THE URBAN AGRICULTURAL SYSTEM OF KATHMANDU, NEPAL

presented by

DAVID ZURICK

has been accepted towards fulfillment of the requirements for

M.A. degree in <u>GEOGRAPHY</u>

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THE URBAN TILLER: AN INVESTIGATION INTO THE URBAN AGRICULTURAL SYSTEM OF KATHMANDU, NEPAL

By

David Norman Zurick

A THESIS

Submitted to Michigan State University in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

Department of Geography

ABSTRACT

THE URBAN TILLER: AN INVESTIGATION INTO THE URBAN AGRICULTURAL SYSTEM OF KATHMANDU, NEPAL

By

David Norman Zurick

This study concerns the activities and land uses devoted to food production within the urban environment of Kathmandu, Nepal. Marginal opportunities for agriculture do exist within the city, utilizing available open spaces. The persons most actively involved in farming activities within the city are the Jyapu peoples. Jyapu household food production is directed primarily toward subsistence. A significant amount, however, does enter the marketplace and becomes a significant source of cash income. In addition to crop cultivation, the urban farming system incorporates animal husbandry activities and the production of a variety of animal products.

The production and marketing of both plant and animal products involve a wide variety of inputs, techniques and activities which lie mainly outside of the formal urban economy. Due to the heavy reliance upon traditional measures, the urban farm system is often neglected as a potential candidate for serious agricultural resource appraisal. To my parents and to my younger sister, Linda with love - it's never too late and it's never too early.

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ACKNOWLEDGEMENTS

It is generally appropriate at this time to acknowledge the assistance rendered, advice given and criticisms presented by various persons during the duration of one's academic preparation for the Master's degree. In my particular case, such a task would be all-consuming. There are those I would thank for their professional assistance. Others I am indebted to on a very personal level. I believe that you all know who you are. From the depths of my heart - I thank you all.

A very special recognition must go to Mr. Indus Shrestra, who will probably never read this.

THE URBAN TILLER:

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AN INVESTIGATION INTO THE URBAN AGRICULTURAL SYSTEM OF KATHMANDU, NEPAL

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CONVERSIONS

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Nepal Rupee (rps) - approx. \$.09 U.S. ropani - 5625 square feet dharni - approx. 5 pounds

CHAPTER I

INTRODUCTION

Statement of Purpose:

This study is an investigation into the agricultural activities which are taking place within the urban environment of Kathmandu, Nepal. Land is currently available for agricultural pursuits within the city in the form of 'open spaces'. Moreover, a significant proportion of this available land is being utilized for food production by urban residents of Kathmandu. Such agricultural production plays an important role in the food intake of those individuals and households that are directly involved in the production activities. In addition, a part of this production is directed to a marketing system which operates outside of the formal sector of the urban economy, vis-a-vis 'mobile street vendors' and impromptu roadside markets. The future role of such activities and the associated land uses depends, in part, on the direction of future urban growth and development.

Because of the distributional patterns of open lands and the nature of landholdings, as well as the relative location of open spaces, their continued use for agriculture as opposed to other urban uses is viewed as being

favorable. The expanding nature of the city is occurring in a radial fashion outward onto surrounding agricultural lands; as well as implosively - resulting in a greater stress being placed upon open lands within the city. However, the land parcels currently being used for food production purposes are characterized by fragmented, scattered and often questionable ownership, small size and often are located in direct relation to other, primary land uses which are not threatened with elimination by building and construction patterns. These characteristics serve to provide a good amount of security and assurance for the continued existence of agricultural land use within the city. It is to these parcels of land - already an integral component of the city land surface area, and not the urban fringe area, that this study will address itself.

Organization:

In this first chapter I will develop a wider context for considering the notion of urban agriculture. This will include a description of past as well as contemporary attempts at introducing and developing the concept of a viable urban structure which incorporates an agricultural component. It will also include an introduction to the physical and cultural geography of Kathmandu most revelant to the subject of agriculture and agricultural production.

In Chapter II, I will provide a brief social and economic geography of Kathmandu which emphasizes those factors which relate most directly to the food-producing activities which are being carried out within the city. Chapters III to VI will develop further the characteristics of this urban agricultural system focusing on ecological issues, spatial patterns of land use, the social and cultural dimension, and production and productivity, as well as discuss those processes of change which will directly affect the continuation of this system.

Up to this point, the emphasis will lie primarily with the production of crops and plant products. In Chapter VII, I will address the issue of animal husbandry and the production of animal products within the city. It is argued here that such activities are an important function of the urban food production system and thus warrant inclusion into the study of urban agriculture.

Finally, in Chapter VIII, I will present a brief summary of those points deemed most salient for an understanding of agriculture as a viable component of the urban system. I intend to conclude this investigation with some personal comments which address the question of why agricultural opportunities within the city have received so little attention.

"The Broader Context"

". . . A kind of Country within a City. . ." - Howard Saalman (1968, p.25)

The above phrase was applied to a description of the Medieval City of Europe; a planned urban environment, Saalman notes, that is in a distinct ecological harmony with its immediate natural environment. The emerging pattern of such cities is described as having allowed for the incorporation of small agricultural fields and vegetable gardens into the city center. The agricultural produce derived from such a land use went toward the urban market and provided a substantial percentage of the food needs of that urban population. (Saalman, Howard, 1968; Ch.2)

The presence of a significant agricultural system within the confines of a large city will no doubt seem questionable to many. Yet, as Thomas Blair points out, a common trait of the world's first cities, dating back to 3500 B.C. in the fertile Tigris Euphrates Valley and in the Indus Valley of present-day Pakistan, was the presence of cereal grains and vegetable production within these cities' environments. (Blair, Thomas, 1974; Ch. 2 and 3)

Descriptions of ancient cities and world-empires does little for an argument centered around the validity of (or even the presence of) agricultural systems within contemporary urban systems. Circumstances have altered, greatly since such a phenomenon was widespread, and a consideration

of the notion of a viable agricultural system may be just so much wishful thinking. The elaborate vegetable gardens noted around the majestic palaces of Angkor, the capital of the ancient Khmer empire, would find little acceptance among the administrative and commercial complexes of modern day urban megapolises. . . Or would they?

In looking back through the literature, references to urban-based agriculture becomes much more numerous than one might initially expect. Within those countries comprising the contemporary 'Western World', we can find a historical legacy of (somewhat) utopian movements aimed toward establishing a more ecologically-sound, subsistence-directed city plan. The "New Towns" of post-1945 Britain, the "Greenbelt" communities of Franklin D. Roosevelt's Resettlement Administration, and the 'model city' of Leclair envisaged by the prominent industrialist/social reformer Nelson O. Nelson, are a few examples of urban systems which have incorporated a very visible agricultural component. (McQuaid, Kim, 1975)

A major objective in each of these was to establish a 'liveable city'; one which negated the adverse affects of dense populations and 'seas of concrete' by utilizing land in such a way that the urban population would feel the freedom of open spaces. Moreover, such open spaces would be directed toward providing land resources for the cultivation of various crops. In this manner, the populations of such

cities would be directly aiding in achieving a degree of food self-sufficiency; the end result being a decreased stress exerted by the city onto the surrounding rural area.

The notion of urban agriculture was championed in the early 1900's by Ebenezer Howard with his somewhat idealistic concept of "Garden Cities". (Howard, Ebenezer, 1965) In arguing for the planning and development of such decentralized garden cities, he embraces the notion that ". . . town and country must be married, and out of this joyous union will spring a new hope, a new life, a new civilization. . ." (Howard, Ebenezer, 1965; p. 48).* The agricultural component of such cities would be the essential feature, and would, in fact, create a "city of gardens" as well as a "city in a garden". (Howard, Ebenezer)

Frank Lloyd Wright also envisioned a decentralized urban environment incorporating a concept of 'organic unity'. His 'Broadacre City' was one in which homesteading is the practice of all and ". . . everyone is at least a part-time farmer. . ." (Fishman, Robert, 1977) Like Howard, he did not consider the idea of urbanism and agriculture as being

^{*}In Howard's conceptualization, 'garden cities' would involve a planned, concentric zonation of agricultural development vegetable gardens occupying the center-most position, with increasing extensive agriculture radiating outward amidst residential, commercial and manufacturing land uses. Though not specifically cited as such, this sort of planning suggests an application of a Von-Thunen-type analysis.

mutually exclusive. Rather, they should be combined into a cohesive strategy of development.

The idea of an integrated urban center and agricultural system is not restricted to the utopian visions of futuristic thinkers such as Howard and Wright, either.* Jacobs, in writing on The Economy of Cities, presents the hypothesis that agriculture originated in the city. Her hypothetical city of 'New Obsidian' emerges as a center for the hybridization and cultivation of plants, which were then dispersed outward onto the surrounding rural areas. ** (Jacobs, Jane, 1970; Ch. 3-5)

^{*}The ideas set forth by these two men have never been effectively followed through. In fact, their concepts and ideas centered around the ideal city have been met more with raised eyebrows and incredulous scoffing than any realistic appraisal or objective consideration.

^{**} In developing her hypothesis, Jacobs refutes the notion that cities evolve out of rural villages. Rather, she views that a priori development of cities as being essential to the development of domestic grains and thus allowing for the growth of rural/agriculturally-based villages. This was because, according to Jacobs, city markets were necessary as the medium for exchange of seeds collected by the sowers of wild grains. These seeds became mixed in the market places and hybrid varieties were developed which became the forerunners of domestic grain varieties. Gardens established within the city facilitated the growing and experimentation of new grains; the results of which were then gradually disseminated onto the countryside. Livestock, too, were involved in Jacob's scheme. The production of fodder is argued to be the function of the urban area, and the initial keeping of livestock a city phenomenon.

While being, in their own way interesting, such historical examples of the concept of urban agriculture can serve best as a springboard for launching into an investigation of contemporary urban agricultural systems. Here, the existing literature becomes much less expansive. In fact, beyond passing references, the role of urban agricultural systems has had little serious inquiry. Part of the reason may lie in the small-scale, 'grassroots' nature of such a system and its associated activities. Its relative importance becomes lost when the level of resolution at which most urban studies takes place is considered. (King, Leslie J. and Reginald G. Golledge, 1978) The problems and issues involved in urban studies consist so often of the negative or adverse conditions which arise out of urbanization and which become very visible problems. The less-obvious, small-scale elements of an urban system (and which are not necessarily a 'problem' - in the larger meaning of the term are often overlooked. Urban agriculture may occupy the latter position.

In addition, and perhaps most important, we tend to apply western categories and concepts of employment and land use to the Third World city and thus miss the potential (and realized) opportunities which exist for food production activities within the urban environment. The fact that such a phenomenon is not a part of the western urban planner's experential background tends to obscure its role in the

non-western context and thus often becomes excluded from studies by concerned scholars with a western orientation.

What literature that does exist in which this notion of urban-based agriculture in the contemporary city is considered, generally limits itself to a rather cursory examination. Fazle Khan, a lecturer in Geography at the University of Dacca, completed a study in the early 1960's in which he examined the role of vegetable production in and around Dacca. The rapidly growing population of Dacca had resulted in an increased demand for vegetables. Such a demand was being met, in part, by a resurgence of vegetable growing on small landholdings having a scattered distribution throughout the city. He notes the fact that the proximity of growing areas facilitated easier (and more economical) transportation, care and protection of these products. Furthermore, the continued expansion of urban housing development and other building activities threatened the continued existence of such a system. The recommendation he presents is one calling for a careful planning strategy to insure the preservation of vegetable growing areas in close proximity to the city's population. (Khan, Fazle K., 1961)

^{*}This sort of plan would be in keeping with the agricultural land use theory proposed by Von-Thunen and which establishes a zonation of agricultural activities and associated land use directed outward from the city center in accordance with costs of transportation and the economics of land rent. This theory and its applications to the agricultural system of Kathmandu will be discussed in detail in Chapter V.

In the course of this study, we shall consider the interworkings of the urban agricultural system which is to be found within the urban setting of Kathmandu, Nepal. While not nearly as large in size and population as a city such as Dacca; Kathmandu, nonetheless, embodies many of the essential characteristics common to most cities of the developing world. Its rapidly increasing population, the increased intensity of development it exhibits, and the growing need for food resources for its residents all contribute toward making it a worthy site for investigating the 'urban agricultural system'.

PHYSICAL CHARACTERISTICS OF KATHMANDU

Relative Location

The city of Kathmandu is situated in the western portion of the Kathmandu Valley (sometimes referred to as the Nepal Valley). It is the largest valley of the Inner Himalaya of Nepal and is entirely enclosed by the Mahabharat Lekh Range.^{*} The city lies at an elevation of 4500 feet above sea level - at a longitude of 85° 20' East and a latitude of 27° 42' North. (Rajbhandary, K.B., 1968) The Valley encompasses a total land area of 209 square miles;

^{*}This mountain range is included in the Central region of Nepal, generally referred to as the 'hill area'. This region is approximately sixty miles in width, ranges from 3000 to 12,000 feet above sea level, and accounts for about sixty percent of the total land area of Nepal.

however the land surface area comprising the central urban environment of Kathmandu is only approximately 5 square miles.*

To the west of Kathmandu flows the Vishnumati River, a silt-laden tributary, flowing in a southerly direction and merging with the Bagmati River at a point southwest of the city center. The Bagmati is the primary river of the Valley, a small section of which forms the approximate southern boundary of Kathmandu. To the East lies the Dhobi Khola River; a small, gently twisting waterway which is marked by numerous 'sandbars' and low-lying islands during periods of high water and which runs dry during much of the year. The northern part of Kathmandu extends into a somewhat amorphous fringe area, eventually enclosed by the northernmost arc of the newly-constructed ring road.

Physiography

According to Newari legend; ". . . The valley of Kathmandu was once a very large, very deep lake. On one auspicious day, Manjushree, the god of learning, swung his mighty sword and cut a deep cleft in the encircling mountains - the Chobar Gorge. The waters of the lake gushed swiftly through this narrow rift in the southern flanking mountains and spent themselves on the Terai below. The exposed Valley was then given as a gift to the King of Nepal. . ." (Personal Conversation, Indus Shreshtra)

Computed from areal measurement based on <u>Kathmandu City Map</u> (Pub: Mahdab Lal Maharjan, Kathmandu).





Such a creation myth as this holds at least a kernel of truth to it. The Valley was at one time a lake - formed from the damming of the Baghmati River near Chobar by the uplifting of the Southern mountain range. A swath in the crystalline limestone of this range was created by the cutting action of the river - to form the Chobar Gorge. Through this gorge drained the Baghmati River. The now-dry lake bed exhibits a heavy deposit of lacustrine soils - drained by the Baghmati and its tributaries.

The lake bottom deposits are found throughout the Valley as terraces of gravel, sand and clay (Bose, S.C., 1972; pp. 36, 167 and Harris, G.L., 1973; p. 35) It is upon one such terrace that the city of Kathmandu has arisen. Layers of sand in these terraces contain water. At the junction of the sand layers and a clay layer below, a series of springs will occur. Kathmandu host numerous such springs which provide an important water source during the dry season. The level topography and fertile soils associated with this basin support the most dense population concentrations to be found in Nepal.

Soils

The soils upon which Kathmandu has been built reflect the origins of the Valley. They are primarily Lacustrine Soil with a top clay soil. In isolated, patchy areas along

river beds of the Vishnumati and Baghmati Rivers, this gives way to loose sands and alluvial soils. From an agricultural perspective, these lacustrine soils are the second most important soil group in Nepal - behind only those alluvial soils of the fertile Terai belt to the South. The principal crops associated with Lacustrine Soil are paddy, wheat, maize, potato, and vegetables. These soils, in fact, are the only group in Nepal associated with vegetable production of any significance (apart from the glacial soils of the High Himalayan region). (Rajbhandary, K.B., 1968; p. 16)

Climate

The Kathmandu Valley is marked by a monsoon climate, somewhat modified by the ten to twelve thousand foot high mountains flanking its southern exposure. The weather pattern which emerges is one of alternating wet and dry seasons. In addition, it exhibits a distinctively colder winter season (December through March) which is accentuated by the elevation of the Valley. The climate of Kathmandu can be divided into three seasons: rainy, hot-dry and colddry.

Temperature:

The minimum and maximum temperatures for both the rainy season (June-September) and the hot season (April-May) roughly correspond and range from 50⁰ Farenheit to



Source: Rajbhandary, 1968

Figure 1.2: Kathmandu Valley - Temperature and Precipitation

75° Farenheit. Temperature <u>is</u> a limiting factor in the agricultural sector during the winter months. (Harris, G.L. and Rajbhandary; pp. 9-10)

Precipitation:

Rains usually begin in June and extend into the early part of October (and sometimes, longer). Annual rainfall receipts range from 40-60 inches. June and July are the months in which the monsoon rains are strongest. December is the month with the lowest receipts (only 9.3% of the receipts of January, the next lowest month). (Computed from Table 3, in Rajbhandary, 1968)

> ". . . And the world is still wondrous large Seven Seas from marge to marge And it holds a vast of various kinds of man and the wildest dreams of Kew Are the facts of Kathmandu. . ."

> > - Rudyard Kipling

THE CULTURAL MILIEU OF KATHMANDU

An Overview

The population of urban Kathmandu is approximately 200,000; resulting in a density measure of 48,000 persons per square mile.^{*} This concentration of persons embraces an ethnic, linguistic and religious mix seen nowhere else

[&]quot;Compare with the surrounding Valley (2000 persons per square mile) and Nepal, in general (500-600 persons per square mile). Karan, P.P.: The Himalayan Kingdoms: Bhutan, Sikkim, and Nepal (Princeton; D. Van Nostrand Company, Inc. 1973), pg. 98.

in Nepal. Such a large amount of heterogeneity apparent on the cultural landscape of Kathmandu becomes most readily apparent to the casual observor in the material and economic diversity contained within the city center. The tremendous variety to be found in architecture, in styles and types of eating places and shopping areas, in occupations, personal interaction and religious structures, and in all the other components which make up the 'rhythm of city life' in Kathmandu reflect the mix of Hindu and Buddhist, Tibetan and Indian, mountain and valley - all of which come together to create the very diverse cultural milieu of Kathmandu City.

An elaboration on this diversity of culture to be found in Kathmandu should involve a measure of detail which this study will not attempt to cover. It would need to include a discussion of, among others, the Burmo-Tibetan speaking Sherpas from the Buddhist regions of the High Himalayas; the Brahmins and Chetris from the western Hills; the Kirant from East Nepal; the Limbu, Magars and Gurungs from the Middle Hills and Valleys; the assorted peoples from the Terai as well as the host of others who have contributed to the cultural make-up of Kathmandu City.

There is, however, a distinct cultural group which does play the major role in agricultural activities being carried out within the city; and it is to this group that some attention must be paid.

Newars

The Newar people are the indigenous inhabitants of Kathmandu Valley. They are also the most urbanized group in Nepal and account for 68 percent of the population of Kathmandu. (Nepali, Gopal S., 1965; p. 24) In addition, it is this group who are the traditional agriculturalists of Nepal and farming, in fact, is the major occupation of the Newar people.

The 'conflict of interest' (if you will) between the above-noted relative importance of urban living and their traditional occupation of farming and agriculture is dealt with in a variety of ways. Perhaps the most intuitively obvious would be a recognition of the fact that many who choose to live in the city also choose to discard the Newari traditions toward agricultural occupations and assume new roles as laborers, shopkeepers, artisans, etc. And many do just that.

> ". . . They are the people seen in the greatest numbers in the capital city . . . They are small shopkeepers, big businessmen, importers, exporters, farmers, craftsmen and so on. Among them you will find artisans and caste groups ranging from the highest to the lowest, from sweepers to priest, both Buddhist and Hindu. . . The term 'Newar' embraces people of both Mongoloid and Mediterranean physical types who speak both Nepali, an Indo-Aryan language, and Newari, a Tibeto-Burman language which includes some half a dozen dialects. . . They are a unique and interesting people and are of the oldest known groups in Nepal. . .". (Bista, Dor B., 1972; p.16)

From such a description as this, one can see the tremendous complexity which lies in even a singular group of peoples residing in Kathmandu. For our purposes here, though, we can extract from this description the notion of the Newar as a farmer. That component retaining the occupation of farming and which, in addition, finds itself living within urban Kathmandu becomes the most important human element of the agricultural system of Kathmandu.

The Jyapu

". . . Babai ra jyu gahiri khet pani hai chhiruwa Hataima lioon ki Mathaima laun babari biruwa Rimi ra jhimi pani hai paryo rujheu ki rujhinau Ankhi ko san le bolayen maile bujhiu ki bujhinau..."

(Water on this field belonging to them is deep. I do not know whether to continue holding these seedlings in my hands or decorate my head with them.)

- A song sung while transplanting paddy seedlings. - (Nepal: An Introduction to Nepalese Culture, 1975; p. 18).

Within the Newar caste-hierarchy, the <u>Jyapu</u> occupy the Upper Lower Caste; that is, the <u>cultivator caste</u>. They are the peasants and the farmers of the Kathmandu Valley; and in many cases, the peasants and the farmers of Kathmandu City. Over the centuries, these people have developed an almost purely urban mode of living; and, as one Nepalese scholar puts it, ". . . Even those who are strictly farmers . . . are town dwellers. . .". (Bista, D.B.; p. 28)

The name of this group, itself, indicates its occupation - 'jya' meaning work, and 'pu' referring to paddy. The Jyapus are also less-commonly referred to as 'Kisani', another term denoting an agricultural affiliation. (Nepali, Gopal S., 1965; p. 150 and Swaminathan, C.R., 1972; Ch. VI). The most important feature of the Jyapu is their almost exclusive dependance upon agriculture for food and for cash income. In the urban setting, this can be modified somewhat for some segments of the Jyapu population by resorting to other forms of wage labor - primarily work as porters or construction-laborers. But even in this urban setting, one finds a very large component of the Jyapus involved in agricultural activities. (Nepali, G.S.; 1965) During the following discussion, I will restrict my reference to Jyapu to mean only that segment which is residing within the urban environment of Kathmandu.


Figure 1.3: Jyapu Woman - Urban Resident and Farmer



Figure 1.4: Urban Farm Lands

CHAPTER II

SOME SOCIAL AND ECONOMIC ASPECTS OF AGRICULTURAL ACTIVITIES IN KATHMANDU

Formal versus Informal Sectors

In considering the agricultural role the Jyapu farmer plays within the larger context of Kathmandu's socioeconomic sphere it becomes convenient to employ the concept of a segregated economy. One can think in very general terms of a division between the organized, modernized, more affluent economic system revolving around established commercial enterprises and public services; and the much less cohesive, marginal employment opportunities characterized by the generally poorer sector which exhibits little organization, a traditional orientation and often radically fluctuating employment activity.

These two somewhat parallel sectors of the economy are often referred to as the 'formal' and the 'informal' sectors, respectively.

[&]quot;For a much more detailed discussion of this, see among others, Sethuraman, S.V. "The Informal Urban Sector in Developing Countries; Some Policy Implications," in de Souza, Alfred, ed.; <u>The Indian City: Poverty, Ecology and Urban</u> <u>Development</u> (Delhi, Monahar Publications, 1978).

The informal sector is that which is marked by an inadequate business or commercial base, little or no credit and growth potential, and a small volume of investment and output. The Jyapu agriculturalist of Kathmandu finds himself, in many ways, a member of this informal sector. However, in considering such a relationship between the Jyapu and this theoretical construct of a division between economic sectors, several points must be made clear.

The Jyapu are not <u>necessarily</u> involved in intensive wage employment. A large share of the agricultural production goes toward household consumption; with only that portion considered surplus being directed toward sale for cash income.^{*} Thus if the premise for such a division lies in terms of wage employment only, as William Bartsch suggests when he considers the differentiation between 'stable' employment and 'unstable' employment, then the role of the Jyapu becomes one exclusive of either sector. (Batsch, W.H., 1974) In this discussion, I shall make use of the broader definition of the 'informal sector' offered by Sethuraman, and which includes a whole range of goods and services offered by and carried out within the unregulated economy of the informal sector. Within this definition, then, the Jyapu do assert their position, albeit tenuously.

^{*}See Chapters 3 and 4 for a much more detailed discussion of this.

A second important point to consider is that, as one progresses through the varying stages involved in the Jyapu's agricultural activities (i.e. production and consumption of production, or transportation and marketing of surplus), it is found that the notion of a clear distinction between sectors becomes questionable. In fact, as Sethuraman points out, ". . the enterprises in the economy do not fall neatly into two sectors, for there are always enterprises which fall somewhere in between the two. . ." (Sethuraman, C.R.; p. 3).

In the case of the Jyapu, this continuum between the formal and the informal sectors is often transgressed; at times out of necessity (for instance, when inputs such as seed, fertilizer, etc. are sought after during the planting season and require him to approach the <u>formal</u> sector) and at times out of choice (such as in the case of surplus sales that take place in an unregulated (i.e. informal) environment). The relationship which the Jyapus hold with the differing sectors of the economy can best be seen by considering the three essential activities of the Jyapu - production, transportation and marketing separately.

Production

In this section the concern is placed on production - in the sense of the assorted activities and inputs that are devoted to the planting and harvesting of agricultural

products. More specifically, the focus will be placed upon the relationship of those inputs to these two major categories of the economy - that is, the informal vs. the formal sectors. The most necessary input of an agricultural production system is land. I do not wish to play down the validity of such a basic notion as this. However, the subject of landholdings and relationships which exist between the Jyapu and any pertinent land use is a topic in and of itself and will be considered in some detail in Chapters III and IV. It is worthwhile to note here, though, that this issue of land ownership and land utilization is perhaps the most important factor in bringing the Jyapu within what may be considered the formal sector. The position a Jyapu farmer finds himself in, either as a landowner or as a tenant farmer (which is, by far, the most common situation) ties him most directly into the larger system. It is this larger system that brings to bear certain requirements and obligations (i.e. rent or taxes, etc.) which serve to link him to some organized element functioning within the formal sector.

Before considering the inputs involved in the production system, it is useful to note some broad characteristics of the farming system in Kathmandu. The persons involved are primarily tenant farmers cultivating several small plots of land. Such plots are usually less than one ropani (75 feet x 75 feet) in size and a single farmer may work plots widely scattered about the city.

Using traditional methods, he harvests a mixed vegetable crop; part of which is consumed by the household and the remainder marketed within the city to provide a cash income. With this income grain, other foodstuffs, and basic necessities such as kerosine, utensils and clothing are purchased in the marketplace.

There is little opportunity to store surplus due to a lack of facilities and the perishability of the vegetable crop. The income generated from the sale of part of the vegetable crop allows only enough cash to purchase needed goods - with little or none left for savings. The result of these two factors is a situation in which the Jyapu agriculturalist in Kathmandu has little or no resources which would allow him to participate in the use of non-traditional inputs.

As mentioned above, the most important crop type for the Jyapu farmer is vegetables.* Von Thunen suggested in his analysis that the zone nearest the city center would be devoted to the production of vegetables and fresh milk.** (Brodford, M.G., 1978; p.33) The farming system under investigation here occupies this innermost zone and in fact reflects a distribution of cultivated lands

^{*} The various types of crops being cultivated in this farming system will be discussed in Chapter V.

^{**} Milk production is an important activity in the city. The role of livestock keeping and milk production will be discussed in Chapter VII.

occurring <u>within</u> what von Thunen refers to as the city center. It is in the cultivation of vegetables that the Jyapu farmer finds the greatest need for inputs. As Von Thunen and others note, vegetable production requires very intensive care and generally a much heavier reliance on non-traditional inputs such as fertilizer, insecticides and elaborate implements. (Gopi, K.N., 1978; p. 62) For a great many Jyapu farmers, such inputs are out of reach. A major problem noted in the sample of farmers surveyed during the period of field research undertaken by the author was the high cost of fertilizer and insecticide and the resulting exclusion of such inputs from the production cycle.

The Central Horticultural Research Station in Kirtipur, Kathmandu has been established with one goal in mind being the dissemination of information, seeds, fertilizers and pesticides to the small farmers in and around Kathmandu. This government-sponsored program failed to reach the majority of the small farmers I had spoken with. One reason cited was the relative inaccessibility of the program. Kirtipur is located some ten kilometers outside of Kathmandu and thus was inconvenient or expensive to get to. Secondly, many of those who could have possibly benefitted from it, simply were unaware of its existence. Thirdly, the program it is trying to push in establishing kitchen gardens and so forth is dependent upon heavy use

of the various non-traditional inputs. These are, for the most part, beyond the reach of the type of person who is doing the majority of cultivating in Kathmandu (i.e. the poor).

Fertilizers

The prices for fertilizer during the months that the field work was undertaken were: rps. 122.00 per 50 kg. of Ammonium Sulfate and rps. 130 per 50 kg. of Urea - the two recommended fertilizers. This represents more than a month's income for many of these farmers. Since such a cash allotment cannot be made, the only rec ourse is to resort to the more traditional inputs which are available to the small farmer and which exist outside of the formal distribution system. The principle source of fertilizer for the Jyapu is human and animal excrement. Cattle manure is not readily available to all the farming households and so a good deal of importance is still attached to manure supplied by the human population.* The human waste is

[&]quot;The keeping of livestock in Kathmandu is quite widespread. They are housed in stalls near the living compounds of those persons owning them and are fed plant wastes and grasses collected from nearby lawns and fields. Meat is used and the slaughtering of animals may take place either in governmentregulated butchering shops or in "street-side operations". The slaughter of livestock (primarily buffalo) is greatest during festivals, and the Dasain Festival held during nine days in late September-early October marks a time of peak slaughter activity. More importantly, though, is the use of cows and buffalo for milk production. For a more detailed discussion of this please refer to Chapter VII.

collected by persons (the Chyame group) who supply it to the fields as requisitioned by the Jyapu farmer. A small fee is collected upon delivery.^{*} (Personal Conversation, Indus Shrestra)

Pesticides:

The government program based in Kirtipur also encourages the application of chemicals to control pests and diseases afflicting the crops. Recommended chemicals include Dieldrin, Aldrin, and Chlordane - to be applied to the soil for effective killing of cut worms, ants, termites, etc. In addition, during the growing season it is suggested that crops be sprayed regularly with Malthinu and Demacron. (Kitchen Gardening in Kathmandu Valley (Horticultural Bulletin)

None of the farmers I talked with had used these or any other type of pesticide. Both the distribution of pesticides and information on their use originates with the Horticultural Station in Kirtipur. In addition to this source, the sale of pesticides can be found to some extent in the shops of Kathmandu. This is generally of questionable quality, though, and was not mentioned by the individuals I

There is currently a German Technical Aid Program in the works which is developing a small-scale composting project to make more efficient use of natural fertilizers. As of Fall, 1980 it was not yet available.

conversed with as being an important source of supply. Due to the efforts of the Horticultural Station and the very active 'grapevine' operating between the various individual farmers, the value of pesticide usage was generally recognized. A desire was expressed to make use of them, but financial resources were not available for their procurement.

Seeds:

Seeds, seedlings and fruit plants are made available from the Horticultural Research Station in Kirtipur on a first come-first serve basis for those farmers who wish to purchase them. Again, the cost is the major factor prohibiting their effective distribution to the small farmer of Kathmandu. Most of the Jyapu agriculturalists in the city that I had surveyed could not make use of this service. They utilized dried, stored seeds from their own plants. Some anxiety was expressed over the constant threat of a bad harvest which would result in a low seed-supply for the coming year.

Water:

The Jyapu farmers in Kathmandu depend almost exclusively upon the monsoon rains for their water needs. During particularly dry seasons, it is possible for them to secure some water from communal wells to apply to the fields.

This is, however, very limited by nature and cannot be relied upon. For many, during seasons of limited rain, the only hope is the god Machendra Nath - the guardian deity of Nepal who looks after the agricultural prosperity of its people.

Tools:

The Jyapu relies on very traditional methods of agriculture - using implements which he or a member of his household can produce. Most important are the <u>Kuki-cha</u> (a large digging hoe), the <u>In</u> (sickle), the <u>Khumu</u> (a wicker basket used for carrying) and the <u>Pa</u> (hatchet). The <u>Pa</u> is generally the only tool which must be secured from the shops. (Nepali, Gopal S.; pp. 42-43)

According to an estimate derived by the Ministry of Agriculture, the cost for production using such nontraditional inputs as are encouraged by the Horticultural Research Station amounts to approximately rps. 850.00 for a one year period. This expenditure represents purchases which would have to be made by the farmer in the formal sector of Kathmandu's economy. By making do without many of these inputs and by restricting himself to <u>traditional</u> inputs achieved primarily through the informal sector, the Jyapu's expenditure is much less. This becomes a major factor and allows him to remain in his traditional (and precarious) role as agriculturalist, while still residing in the city.

Labor:

A final consideration in discussing the inputs directly involved in production leads us to the question of labor. For the Jyapu, this is really no question at all. The household is the supplier of labor needs.^{*} For those (rather rare) occasions when additional hands are needed, the person is pulled from those operating within the informal sector who are usually either unemployed or at best underemployed.^{**} (Hoselitz, B.F., 1974)

The need for additional field labor, when it arises, is associated with the farm calendar - a seasonal division of labor recognized by the Jyapu. Summer vegetables are planted during the months of April and May and harvested from late August to October. Winter vegetables are sown primarily in October and harvested in late December and early January. In addition to these two

^{*}A further discussion of this will be presented in Chapter III in describing the composition and functions of the Jyapu farming household in Kathmandu city.

^{**} Of those surveyed, when this question was put to them, there was no question but that they could not afford a great deal of extra labor. For short durations, if it was absolutely necessary, they would hire someone whom they knew and who happened to be out of work. Other times they would 'trade' labor; that is, the exchange of manhours for manhours was much more readily accepted than manhours for rupees.

seasonally-defined crops; there are numerous crops which are staggered throughout the year and harvested as they ripen.^{*} It is, however, during the major planting and harvesting seasons (for Winter and Spring vegetables) that labor needs would be most intense.

TRANSPORTATION

The lack of adequate transportation facilities is often cited as being one of the major constraints to the development of Nepal's agricultural economy and provides a very real impediment to the mobilization of resources. (Hagan, Albert R., The Agricultural Development of Nepal (University of Missouri, Columbia; Agricultural Experiment Station, 1976 Special Report 189)). The consideration of the role of transportation is generally directed toward the remote areas of the country. Kathmandu, however, can be seen to have its own problems of transportation. Within the formal sector, there does exist a public transport system, using the much-crowded, irregular 'mini-bus service' which plies between established bus stands; or in the case of the more affluent, the modern taxi.

For the Jyapu farmer, neither of these is of very great importance. Taxis are prohibitively expensive and the mini-buses cannot be used for travel between specific

^{*}See Table 2.1 for the farm calendar.

destinations that do not happen to coincide with the established pick-up points. A third mode of travel becomes somewhat more important to him - the bicycle. This is by far the most common form of vehicular travel but assumes the potential for generating enough income to make the initial purchase. ^{*} For the farmer working the fields in Kathmandu and residing on a very marginal basis in the city, this assumption can rarely be made.

A fourth means of getting around - by foot - plays the most important role in the Jyapu's daily travels. Often a farmer will work fields that are situated quite far apart - scattered around the city. Travel back and forth between these fields is by foot almost exclusively.

When produce is offered for sale, the geographic point of sale (i.e. roadside markets) is usually in close proximity to the fields. This eliminates the need for hiring the services of a porter or laborer to transport the produce to a centralized market if the cultivator cannot transport it himself. While wages paid to laborers are low - rps. 10 to 20 per day, it is a cost which the marginal urban farmer can hardly accomodate.

Another way to get around the need of relying on an organized transportation network is by relying on the

^{*} There are quite a number of shops which rent out bicycles for from 3 to 5 rupees per day. On limited occasions, these will be utilized by a farmer. Most often, though, these bike rentals are geared to the tourist.

household to bear the transport costs. Children are used widely to carry bundles and baskets of produce to the point of sale - usually on a day to day basis. The cumulative effect of resorting to roadside marketing on a day by day basis, and using the labor to be found within the household is that the small-scale urban agriculturalist can effectively deal with a transportation problem which would prove prohibitive and constraining could he not resort to those alternatives available to him outside of the formalized sector.

MARKETING

Kathmandu hosts a central market area for agricultural produce sales - the Ganderbahl Market, situated southeast of the city center. The produce hawked in the crowded stalls located within the marketplace originate, for the most part, in market-gardening areas outside the city. The most important of these, the <u>Thimi</u> agricultural area, provides the residents of Kathmandu with much of their vegetable needs. Grains, too, find their way into this market from outlying fields. Trucks are used to transport the produce from Thimi and adjacent areas via the Bhaktapur Road. In addition, fruit and other produce originating as far south as India, make their way into

Kathmandu and eventually wind up in the Ganderbahl Market.

The advantages of this marketplace lie in the fact that it is centralized and stationary. It attracts a regular clientele and boasts permanent stalls which are protected from inclement weather by a low, metalled roof. Prices are fairly standardized; competition is restricted, by and large, to the variances in the quality of goods and to the sales ability of the individual hawkers.

The Jyapu farmers of Kathmandu who are in a position to sell some of their produce do not generally make use of the Ganderbahl Market as a medium for their sales. The stalls inside the market must be rented - something he cannot afford to do. In order to effectively utilize a marketplace such as this, a grower must have a large quantity of produce available for sale. Such is not usually the case with the Jyapu farmer of Kathmandu. His sales volumes are low and are conducted on generally a day-to-day basis.

Aside from the Ganderbahl Market, there exists in Kathmandu a great many 'impromptu markets'. Busy intersections, well-travelled roadways, significant buildings

^{*} Goods shipped from India are transported across the southern mountains by truck (since 1956 when a road link was established between India and Kathmandu) and, more importantly, by an electrically-powered aerial cableway. Nearly 60 tons of goods a day are transported via this ropeway in baskets from Amlekhganj railhead to Kathmandu. (Hoselitz, B.F., 1974)



Figure 2.1: Roadside Market

(i.e. temples) - all mark a likely spot for the rise of the colorful, bustling markets described by J. Beaujeau-Garnier and G. Chabot in their study of markets in the cities of the Developing World. (Beaujeau-Garner, J. and G. Chabot; 1967)

These 'impromptu markets' operating outside of the formal economy sector, become a primary destination for the produce achieved by the cultivating efforts of Kathmandu's agriculturalists. Such markets are numerous and widely scattered - thus attractive from the point of view of transportation. There is usually one to be found nearby.

In addition to this type of marketing, the farmer in Kathmandu often relies on hawking his produce door to door, or by approaching passers-by just about anywhere. These vendors on the move, hawking the produce achieved through their efforts and that of their households by working the small landholdings within Kathmandu, are a very visible component of Kathmandu's street life.

In the following chapters we can begin to look more closely at the agricultural system at work in Kathmandu. Such a system is not to be equated with the market gardens one may observe with a good deal of regularity on the urban fringe areas of many expanding cities. (Gopi, K.N.; Process of Urban Fringe Development: A Model (Delhi, Concept Publishing House, 1978) 119pp. This study provides a very good analysis of the urban fringe area of an expanding large city.) Rather, it involves the use of open lands

which are fully incorporated in the urban area. The production, the transportation needs, and the marketing strategies are all operative <u>within</u> the city. While such a system, if broken down into its component parts, takes on the appearance of marginality and small-scale; it nonetheless is significant to many who are functioning within such a system. Furthermore it provides additional inputs into the food supplies of the city as a whole via informal marketing strategies; and as such should be considered in the light of its <u>potential</u> role as well as its <u>actual</u> role.

THE FARM CALENDAR

The cultivation which occurs on agricultural lands within the city of Kathmandu represents a very intensive use of land resources. Vegetables are the most important crop type in this system and are harvested on a more or less continuous basis throughout the year. The sowing and harvesting times will vary in accordance with the type of crops being cultivated by a particular household.

Therefore, there does not exist within Kathmandu's agricultural system a clearly-defined pattern of planting and harvesting such as what one might observe among the paddy cultivators in the surrounding valley. If we define our level of resolution, however, to that of the household, we can observe specific points in the agricultural cycle

when household activity is at its peak and the need for farm labor is greatest. Since these times are staggered both throughout the calendar year and among the various households, the system <u>as a whole</u> does not experience crucial shortages or surpluses of labor as might be encountered in other, more integrated systems. Instead, one finds a situation in which there is a continuous need for agricultural labor on a somewhat steady basis throughout the year, with less distinguishable times arising when the labor needs are felt the greatest. It is during the sewing and harvesting times that a particular household might find itself in a position of having to resort to outside labor. The rest of the year labor originating from within the household is usually sufficient.

If we look at this from the standpoint of a landless laborer, we can see a rather unique situation emerging. First of all, there is a comparatively small demand for outside labor and thus this system does not provide employment for <u>large</u> numbers of individuals, even for very limited periods of time. However, this system does provide employment for a <u>smaller</u> number of laborers the <u>year round</u>. If an individual is fortunate enough to find work from a number of different households cultivating a variety of vegetable crops, he is enabled to work on a much more steady basis. By establishing a 'web' of employers, such cultivating different crops which reflect varying cycles of

agricultural activity, the landless labor is assured of a rather steady source of employment.

The scheme provided below is based primarily on two sources; first, recommendations as set forth by the Horticultural Research Station in Kirtipur and presented in pamphlet form by the Department of Horticulture, Harihan Bhawan, Kathmandu, and secondly, from openended discussions within individual farmers.

	AGRICULTURAL ACTIVITIES BY MONTH	
	Crop	Туре
	Sowing	Harvesting
January	Potato, Cabbage	Cauliflower, Cabbage Lettuce, Turnip, Radish, Mustard, Onion, Garlic, Carrot, Peas
February	Potato, Celery, Peas Lettuce, Okra, Cucumber	All winter crops listed above.
March	Methi, Squash,Pumpkin, Okra, French-bean, Brinjal	All winter crops listed above plus garlic, Brussel Sprouts.
April	Polebean, Cowpea, Okra Tomato, Cauliflower, Lettuce, Brussel Sprouts Coriander.	All winter crops plus Brinjal, Capsicum and Tomato
May	Bean, Okra, Cauliflower, Cabbage, Brussel Sprouts, Tomato, Coriander	Bean, Potato, Onion, Early Cucurbits, Early Okra, Pea, Coriander, Methi, Lettuce, Celery, Tomato, Brinjal, Capsicum, Asparagus

Sowing

June	Cauliflower, Cress, Coriander	All summer crops listed above plus cabbage
July	Radish, Turnip Beet, Mustard Leaf, Carrot, Onion	Summer crops, early winter crops and asparagus
August	Summer potato, Radish, Turnip, Beet, Garlic, Carrot, Onion, Cauli- flower, Pea, Methi, Cabbage, Lettuce, Celery	All summer crops, early cauliflower and Cabbage, early winter crops, Cress Coriander and Lettuce
September	Radish, Turnip, Beet, Potato, Celery, Carrot, Garlic, Coriander, Spinach, Brinjal, Tomato, Cabbage, Methi, Lettuce	Chillies, late summer crops and early winter crops
October	Onion seed, Onion bulb, Garlic,Carrot, Pea, Radish, Cress, Spinach, Coriander, Tomato, Brinjal, and Chilly	All winter vegetables
November	Radish, Carrot, Garlic	All winter vegetables
December	Potato, Garlic, Cress, Spinach, Coriander, Radish, Carrot	Garlic and other winter vegetables

The above calendar does not include the times designated for transplanting. This is an important activity in the farming cycle of the urban system. The summer months are most important from this standpoint, especially the months of June and September. In very general terms, one can say that the spring months of May and June and the autumn months of September and October are the times when

Harvesting

agricultural activity is at its peak for most households. The remainder of the year is allotted to the daily upkeep of fields and the sowing and harvesting of particular crops as they ripen and as space becomes available.

CHAPTER III

URBAN ECOLOGY OF KATHMANDU: THE AGRICULTURAL COMPONENT

An Overview

The spatial characteristics of land use associated with the development of Kathmandu's urban area exhibits a heterogenous pattern in respect to intensity of use. In examining this pattern and relating it to the utilization of land for agricultural purposes, it becomes useful to employ certain theoretical constructs which have been offered and which deal with this issue of land use patterns which arise in the urban setting.

The sociologist, E.W. Burgess presents the idea of 'concentric zones of development'. (Bradford, M.G. and W.A. Kent; 1978, pp. 70-72) Within this analysis, one finds a decreasing intensity of land use for industrial and residential purposes as you move outward from the city center. A constant influx of persons from outlying areas into the center and an accompanying movement of people outward from this center assures the continual expansion of the city onto surrounding land areas.

Within Kathmandu, there does exist a concentrated city center, the <u>Durbar Square</u>. This traditional core area

is marked by the presence of numerous large Hindu temples. The pagoda-style roofs of these temples dominate the skyline and cast striking shadows on the busy shop-lined streets which form twisting and narrow pathways through this central bazaar district. The upper floors of the retail shops as well as interior courtyard complexes provide housing for the densely concentrated population which resides in this district. The closely-packed, multistoried housing and commercial complexes which interconnect and line the streets immediately adjacent the Durbar Square represent the highest competitions for space in Kathmandu and provides the central core for a pattern of radial expansion outward toward the fringe area. One cannot say, however, that the expansion of the city onto peripheral areas has followed a well-defined, wellestablished gradient.

In the case of Kathmandu, one finds various <u>nodes</u> of population concentrates and intensities of land use. These nodes had provided the genesis, or starting point, for more intensive development which expanded into surrounding land. This follows closely along the lines proposed by Harris and Ullman in their "multi-nuclei" model. (Bradford, M.G. and W.A. Kent; 1978, p. 76) It is their hypothesis that such nuclei represent initially segregated town centers which then become incorporated into a larger metropolitan area. In Kathmandu, this process is not

necessarily reflecting various town centers, as such. Rather, it is more closely associated with the development of segregated population clusters based upon occupation and ethno-linguistic affiliations.^{*} (Nepali, Gopal S., 1965 and Bista, Dor B.; 1972)

For purposes of this study, the consideration of this phenomenon will be restricted to the direct implications for agricultural land use; something Beaujeu-Garnier and Chabot allude to in their discussion of 'polynuclear expansion' when they comment on the fact that such nuclei ". . . are soon absorbed as the irrestible pressure of the town fills up the green space and welds them together. . ." (Beaujeu-Garnier and Chabot; 1967; p. 231)

OPEN SPACES AS A BASE FOR CULTIVATION

The variations in the levels of intensity of development and use of initially open spaces contained

[&]quot;For instance, the Poda people of Kathmandu (the fisherman and street-sweepers) occupy residential zones built up over the centuries in three distinct areas - the Kanga Temple region, the Dhobichaur riverbelt region and in the Lagan area. The washermen (those who hire out their services for clothes washing), in contrast, reside only in Chetrapati where they have lived for hundreds of years and have become exclusively associated with this area. Various Hindu originating in India also differ in their historical residences from the original inhabitants of the Valley. The end result of such historically segregated populations is the rise of nucleated concentrations of differing caste groups, ethnic groups and linguistic groups (to include the presence of the foreign population living in Kathmandu during their tenure of service with various international organizations and foreign assistance networks).

within the emergent <u>consolidated</u> urban area of Kathmandu affects the spatial aspects of contemporary uses for agricultural purposes. The temporal pattern exhibited in the non-agricultural use of such open spaces (i.e. building and construction) is by no means consummated. Some areas have felt the crux of development trends much earlier and with much more impact than others. Nor does there exist a clearly-defined pattern of use or non-use of such open areas. One can find vast differences in the amount of and the use of open land areas which are scattered about the city.

The fact there exists within even the most congested cities and towns, open areas is widely acknowledged. Hudson notes that ". . . All towns, even within their inner zones, are to some extent broken up by the occurrence of open spaces in the form of . . . private and public gardens. . . and even patches of woodland and farmland. . ." (Hudson, F.S.; 1970, p. 250)

It's interesting to note the emphasis which continually seems to be placed on the presence within cities of ". . . <u>even</u> patches of woodland and farmland. . ." (author's emphasis). Such a thing is rarely seen as a viable option for land use within the city (apart from certain utopianistic ideals mentioned earlier in Chapter I). The modern economist and land use planner are all too often divorced from the ecological reality that human life

and society is interwoven with the ecosystem upon which we depend. It would be wise to recognize this relationship and the fact that it exists within even the most congested city center. A land use option which incorporates an environmental awareness and directs development with an eye toward ecological and environmental considerations would be one in keeping with what E.F. Schumaker terms 'Buddhist Economics'. (Hudson, F.S.; 1970) In the case of Kathmandu, and more specifically for the Jyapu farmer living in Kathmandu, such an option is indeed considered viable and for many an economical necessity.

If we consider the relationship between cities and agricultural or crop lands, the importance of effective utilization of land becomes especially important. Kenneth Dahlberg considers the balance between agriculture and urbanization a precarious one and remarks on the fact that urban areas all too often take up some of the most prime farmland. (Dahlberg, Kenneth; 1979, p. 163) His views are accented by numerous investigations which inquire into the relationship between cities and agriculture.*

[&]quot;See, for example, studies by Lester R. Brown; <u>The World Loss</u> of <u>Cropland</u> (World Watch Paper 24, Oct. 1978) 48pp. He states that assuming each additional person residing in the city will need an additional .04 hectares of land, the projected additional use of crop land for urban-related purposes by the year 2000 will be 25 million acres. And most of this will be on the best lands available for cultivation.

Much of the conflict which arises between land for urban purposes versus agriculture use centers around economic considerations and usually focuses on the periphery of the city - what Hudson refers to as the 'rururban fringe'. (Hudson, F.S.; 1970, p. 251) The city center and the environmental considerations which were so important in the thinking of Howard and Wright are also an important element in the analysis of urban land use presented by Chavooshian and others when they state, ". . . We are now discovering that the wise, productive and beneficial use of open space including a vegetative component, is essential in maintaining an ecological harmony. . ." (Chavooshian, B.B.; 1977, pp. 38-39)

The scale at which most of such studies takes place offers a level of resolution at which the individual use of various elements in the larger scheme of land use becomes lost. In pondering such 'grandness of scale', the use of urban lands for agricultural purposes by persons like the Jyapu farmer seem so isolated and insignificant as to hardly be worth mentioning. It is argued here that this is not the case. The role such activities play does become significant - for those directly involved, and also in terms of the urban system of Kathmandu as seen in the land use characteristics as well as the marketing of agricultural products in the informal sector of Kathmandu's economy.

DISTRIBUTION OF CULTIVATED vs. NON-CULTIVATED LANDS

The Geographic Environment:

When I speak of 'open spaces' with the city, I am referring to integral components of the geographic environment; albeit very localized and site-specific. As such, they are wedded to the conflict which exists between society and nature; a conflict which is at its highest order within the highly-industrialized, techno-societies of contemporary civilizations. For modern man, the alternatives considered in his interaction with nature most often assume an economic orientation. Productivity is the key word, and becomes the major criteria in establishing his relationship with the natural order.

E.F. Schumacher adopts a wider view and suggests a metaphysical nature of this relationship. When discussing alternative land uses, especially agricultural land use, he argues that production is only a part of the agricultural process. It must also emphasis man's need to remain in touch with living nature as well as provide the basis for an attempt ". . . to humanize and enoble man's wider habitat . . ." (Schumacher, E.F.; 1973, p. 113).

Adopting the wider view, man's creative energies would direct him toward establishing a closer contact with his physical environment; one recognizing the interrelatedness and interdependance of all the components of nature. To become aware of this is to adopt a 'visionary' perspective.

Rene Dubos argues that this is necessary if man is to develop a future worthy of living. (Dubos, Rene, 1971)

The urban environments which have arisen within contemporary society provide the most elaborate antithesis to the concept of ecological reality. They have become, through the adaptability of industrial man, the 'new order' of organization of the factors of production. As such, they are out of step with environmental compatibility and serve to erode further the precarious balance between modern society and the natural environment.

It is argued here that the open spaces found within the urban environment can be used in such a manner as to invoke a more positive balance between the purely economic goals and the wider, philosophical argument which calls for a closer, more realistic integration of society and nature. That is, open spaces, which are allowed to remain thus and are used for agricultural purposes not only assume an economically productive role (as well as meeting some of the more basic nutritional needs of individuals), but also aid in establishing a more realistic basis of interaction between society and the integrated web of ecological components - of which all living things are a part.

Non-Cultivated Open Spaces:

Included in this classification are found those parcels of land which occupy a 'passive' position. They appear as 'open' (i.e. not used in an obvious development

sense), yet are devoid of agricultural use. Most notable are those lands found in an area North and Northwest of Durbar Square/Hanuman Dhoka area. In this area, referred to as Thanhity Tole and Chetrapati, reside those persons occupying the washerman occupation.

The washerfolk are engaged in an occupation in which they requisition laundry from the more affluent residents of Kathmandu to be hand washed and then delivered back to their houses. The traditional manner of clothes washing dictates that the clothes be spread out on the ground for drying. This process takes up large tracts of land. In this particular case the land is owned by one family. It is rented out to the washerpeople on an annual basis. Such an <u>extensive</u> use of land comes into direct conflict with a more intensive use for agricultural purposes.

Military and Parade Grounds:

The expansive land areas which are located in the eastern part of Kathmandu and which are devoted to intermittant use by the government of Nepal as parade grounds, military training areas, exhibit grounds and parks represent

[&]quot;We have to be careful here, in that because open spaces exist and are not being used for agricultural purposes, it doesn't necessarily mean that they do not have other, less obvious uses. For example in the Chetrapati area, large tracts of land are used for laundry purposes - and are found to be vacant much of the time, when not being used for clothes-drying.

very large open spaces not being used for intensive crop cultivation. This does <u>not</u> mean, however, that such land isn't utilized in a manner affecting food production in the city. On the contrary, these lands, when not in use for official purposes, find themselves to be employed as grazing pastures for livestock - goats, sheep and cattle primarily. In addition, on Saturday mornings, this area becomes a large, open-air livestock pavillion, used as a marketplace for the sale of livestock raised both in the city, itself and in the outlying region. In this sense, then such land must be included in the overall agricultural system to be found in Kathmandu.

Miscellaneous:

Apart from those larger groupings discussed above, there are scattered about Kathmandu, smaller, isolated examples of open spaces not used for cultivation of crops. These, though, are generally restricted to patches which would not be conducive to growing crops - for various reasons. They include marshy, poorly-drained areas, roadsides, steep slopeland, and very rocky soils. In addition, this group includes parcels of land which are used for storing machinery of various kinds, vehicles and supplies, etc. and which therefore, need to be left vacant (and thus available) even when such spots aren't always needed.

For the most part, though, one finds the situation in Kathmandu to be one in which land <u>not</u> being used for building or construction <u>is</u> being used for agricultural purposes.

Land for Food Production: Conflict or Compatibility?

". . . The need for space in urban areas to accomodate the vegetative component (including agriculture) and improve the quality of life grows. But new development requires undeveloped land, making the uses competitive and creating a conflict. The advantage clearly lies with development. Under development pressure, farming, an open space component that generates measurable income, has been unable to survive even though valiant efforts have been made to preserve it. . ." (Chavooshian, B.B.; 1977, p. 38)

Once we consider the role of agricultural land use within the city, we begin to notice spheres of conflict and compatibility. Most notable is the conflict which occurs between development and open spaces; a conflict which Chavooshian notes to be resolved at the expense of agriculture (whether ecologically or even economically justifiable or not). Jean-Marie Coyaud echoes this sentiment in stating, ". . . The value of the fertile land is frequently low compared to its price as a building site. . ." (Coyaud, Jean-Marie, 1975, p. 184) The future implications of this trade-off raises a foreboding note. As Coyaud states, ". . . It is highly necessary to devise a new urbanistic conception of urban development if one wants to avoid wasting of some of our best agricultural soil. . ." (Coyaud, Jean-Marie, 1975, p. 184) Kathmandu serves well to illustrate this process of land development which eats away at highly desirable agricultural land. Moreover, the city hosts a substantial population which is very actively pursuing agricultural activities, and the effects of a decreasing availability of lands for agriculture in the city takes on a distinctly human dimension.

In Kathmandu, a major emphasis of development strategies lie in the tourism industry. The large-scale building and construction which occurs is directed toward hotels and restaurants. More and more, this takes on the form of western-style hotels - a particularly extensive use of land resources. In the areas of Thamel, Lagan and Lazimpat large hotels are being constructed (as well as numerous smaller ones) which have, as a common feature, the well-manicured lawns and courtyards which the westerner has come to expect. While thus retaining an open space component, such complexes neglect to realize the potential value of these open spaces as food-producing areas. In doing so, they are putting an even greater strain on the limited land resources available.

The conflicts which occur between land for development and land for agricultural use are couched primarily within an economic framework. As John Hartwick, a noted land economist, points out; ". . An efficient land use pattern is one which allocates land so as to minimize aggregate transportation costs plus the opportunity cost of land . . ." (Hartwick, John, 1980; p. 352). The trouble with

this sort of analysis is that it neglects to consider the long term effects - in ecological terms or in economic terms. As food producing areas get pushed further and further from the city, both transportation costs and opportunity costs take on new dimensions.

Von Thunen was the first to empirically substantiate the validity of having an area near the city devoted to the production of those agricultural products which are most perishable. (Bradford, M.G., 1978; pp. 32-33) His reckoning included as primary factors the locational rent and transportation costs - the two elements often cited in an argument for maximum intensity of urban development. Nepal's generally inadequate transportation infrastructure and Kathmandu's growing need for vegetable and dairy products combine to present a strong case for the need of a nearby supply of perishable foods. The agricultural activities being carried out by the Jyapu farmer within the city of Kathmandu falls in step with Von Thunen's analysis and plays a significant contributing role to this supply. The elimination of such agricultural land use by intensively developing the remaining open spaces for tourism or other goals is a direct threat to the continued stability of the supply of perishable foods into Kathmandu.

COMPATIBILITY:

Agricultural land use does not <u>have</u> to assume a position which is in conflict with other urban land uses.
Speaking in strictly aesthetic terms, the presence of gardens scattered throughout the city only heightens the visual experience of the urban area. Kathmandu's extensive cultivated areas provide a pleasant respite from the crowded, walled-in feelings one receives from most other large cities.

Beyond the aesthetic appeal, though, such agricultural areas take on a very practical role - one which does not necessarily have to hinder or prevent the development of an area for other purposes as well. In fact, the various uses (including agriculture) are very compatible. To illustrate this let me relate one situation that was occuring in an area that I had spent some time in while doing the field research.

West of the Lagan Tole area in the southern section of Kathmandu is an area exhibiting an active development in hotels and restaurants for the tourist industry. This is a high density, residential area (300-700 persons per gross residential acre). (Karan, P.P., 1973; map-Kathmandu-Batan: The Twin Cities Urban System). It is also the site of numerous gardens and cultivated open spaces. The hotel I was staying in made use of the land adjacent to it to raise a food crop to be used in preparing meals for guests at the hotel. Several other small hotels nearby were doing the same sort of thing - using adjacent open land areas for growing (mainly) vegetables for their guest's meals. Other

cultivated areas were being harvested by tenant farmers who then marketed their produce to the residents of this area early each morning on a day-to-day basis. Thus, those residents who took advantage of these door-to-door' vendors benefitted from a reliable source of very fresh vegetables.^{*} The value of such cultivated areas in this actively developing area was widely acknowledged by the residents I had spoken with. They all expressed, however, the fear that such a situation would not last for long the way building and construction was going in Kathmandu.

The notion of an agricultural land use that is compatible with a developing urban area can be best seen by citing examples of specific types of land and land use in which the agricultural component takes on a significant role.

TYPES OF LAND AREAS BEING USED FOR AGRICULTURAL PURPOSES:

PRIVATE LAND:

This group represents the most important land type to be used for agricultural purposes. It does <u>not</u> mean that those who are tilling the soil are necessarily the owners. Often the land is being worked on a tenancy basis.

^{*}This survey, undertaken in September and October of 1980, consisted of an oral and a written set of questions and was used to investigate individual households that were involved in agricultural activities within Kathmandu. It was based on a sample population of 36 households.

In a survey of farmers working land in Kathmandu, 39.4% did <u>not</u> own their own land, but rather worked on a <u>payment in kind</u> basis in a relationship with a landlord.^{*} (<u>The Food Problem in Nepal:Its Magnitude and the Require-</u> <u>ments for Solution</u> (Report of a Committee, May 26, 1967; Kathmandu). Of this group, 36.4% did own one plot of land; 9% owned two plots and 15% owned more than three. Those having several plots of land for agricultural purposes often found themselves working small land areas widely scattered about Kathmandu.

While ownership of land by the Jyapu farmer (when it exists) is generally limited to one or two plots of land; the land which he cultivates but does <u>not</u> own may take the form of numerous small parcels. Those farmers who worked <u>only</u> that land which they owned represent 31.6% of the sample surveyed. The rest were involved in cultivating plots of land which they worked as <u>tenants</u>. (This includes those individuals who not only worked the land that they owned, but also worked additional land as tenant farmers). Of this group, 26.3% worked only one plot, 39.5% worked up to three plots and 28.9% worked more than three parcels.

^{*&}lt;u>Payment in Kind</u> tenancy relationship in Kathmandu centers around a 50/50 split of production placed upon the main crop. In many instances, a landlord will require payment in <u>rice</u>. If the farmer grows no rice he may be required to sell a portion of his crop in the market so that he can then buy rice for his rental payment.

The size of the plots vary widely and may range from less than one-third of a ropani^{*} to over 2 ropani.

LAND TENURE:

The aggregation of land into the hands of a few wealthy landlords is described as being a feudal process which began with the Rana regime in the early to mid-1900s; the intent of which was to establish a ". . . centralized agrarian bureaucracy, or a society that depends upon a central authority for extracting the economic surplus from the peasantry. . ." (Regmi, C.; 1976; p. 225) Land reform under the Panchayat system since 1961 has attempted to deal with this in a way which allows for a greater earning and status for the peasant. The trend, however, has been one which serves to preclude the inclusion of the rural peasantry from becoming a significant element in the land ownership classes. (Regmi, Mahesh C.; 1963; Volume I, pp. 13-15)

Within the city of Kathmandu a significant (36.4% of the sample) portion of the agriculturalists own their own land. This is due to a number of factors. Most importantly is the emergence of forms of land tenure very much different than the traditional state-ownership form of tenure in Nepal (Raikar tenure). (Regmi, Mahesh C.; 1963; Volume I-IV.) Birka, Rakam, Jagir and Guthi are all land

^{*}One ropani equals 5.625 square feet (75' by 75') or 0.13 acres.

tenure systems which allow for private land ownership most often resulting from a 'gift' given by the state for certain services rendered or honor achieved (Birta), or from various philanthropic efforts aimed at assisting the financing of various religious, educational or charitable institutions (Guthi). A fifth form, Kipat, allows for communal ownership of land based on ethnic affiliation. *(Regmi, Mahesh C; 1963; Volume I, p. 17) Birta lands constitute the single most important form of land tenure involving the Jyapu farmers in Kathmandu. In addition, Guthi lands are also a significant part of the total land types that must be included in land resources for agricultural use.

BIRTA LANDS:

Birta lands within Kathmandu are those held under private ownership, and which are cultivated either by the owner or by a tenant farmer. For the most part, they are represented by the numerous and widely scattered parcels of land that one sees throughout the urban area and which are used for agricultural production. The fields are small, intensively used plots that are separated from each other by

^{*}The land tenure systems in Nepal are highly complex. They will be discussed here in only a very brief manner; and only as they become important in describing the role of the Jyapu farmer in Kathmandu. For a very good detailed analysis of the various systems, please refer to: Regmi, Mahesh C.; Land Tenure and Taxation in Nepal (Research Series Number 3, University of California, Berkeley, 1963). Four Volumes.

narrow walkways or small (one or two foot high) bamboo and cornstalk fences.

Birta tenure lands are also used for residential purposes. In many of the areas in Kathmandu, such residences are built up around a central courtyard. Within these inner courtyards are often small gardens planted in vegetables and fruits. These 'courtyard gardens' are found most often in the inner courts of single families' residences. The communal courtyards of residential compounds housing several families are rarely used for agricultural purposes. Rather they are being utilized as cooking areas, for clothes drying, and as social meeting grounds and playgrounds for the children.

Guthi lands:

This type represents land endowments by the state of Raikar (state-owned) land. This form of land tenure emerges ". . . when surplus agricultural production or rent is utilized for religious and charitable purposes. . ." (Regmi, Mahesh, C.; 1963; Volume IV, p. 32) Guthi lands may be those owned by temples, various service-oriented institutions, and educational complexes, the revenue of which is used to finance their operations.

Temple Lands:

Throughout Kathmandu are found temples and temple grounds - varying in size and catering to the nearby



Figure 3.1: Agricultural Land Type - Government Buildings



Figure 3.2: Agricultural Land Type - Temple Land



Figure 3.3: Agricultural Land Type - Private Lands



Figure 3.4: Agricultural Land Type - Courtyard Garden

residential area. These (primarily Hindu) temples are often used as living quarters for large numbers of families and individuals.^{*} The lands included in such temple complexes include significant amounts of open space. Much of this is cultivated by tenant farmers who may either live on the temple grounds or come from a nearby residential area. Rights of tenancy are passed on through the family. Since they are rarely sold, temple lands devoted to agriculture are virtually 'locked up' and present little potential for exploitation by newly-arrived city residents.

Smaller parcels of agricultural land are often times cultivated by the priest, either directly or through the use of hired labor. The production is used by the priest in his own diet and as a market commodity - used to generate a cash income.

School Grounds:

The other significant type of Guthi land in which a substantial part of the open spaces is devoted to agricultural production is educational institutions and facilities. Invariably, the schools have surrounding them, large plots of open land. A part of this is devoted to playing areas for the students, but a significant portion is also

For example, in the compounds of the Pachali Ghat Temple, there are over 600 persons residing. Most are very marginally employed- if at all. Others derive their income from donations.

devoted to agricultural activities. Tilled by tenant farmers, these food-producing parcels provide revenue for the institution's operation which is exacted from the production achieved by the tenant farmer.

These two groups represent the major recipients of the Guthi tenure system, but they are not the sole ones. Various charity kitchens, poorhouses, orphanages and student hostels are also beneficiaries of the Guthi system. (Regmi, Mahesh, C.; 1963; Volume IV, p. 16) These tend to be of more recent origin however, and do not constitute substantial amounts of open lands.

Raikar Lands:

The Raikar tenure form is the traditional, stateownership of land. The state owns the land and collects a revenue on it based on a taxation of those individuals who operate it. As Mahesh C. Regmi notes, ". . . Relations between the state and the cultivator are. . . essentially similar to those between a landlord and his tenant. Regularity in the payment of the land tax is the prime condition for holding land. . ." (Regmi, Mahesh C.; 1963; Volume I, p. 19). This is the third tenure system that becomes important in the study of the urban agricultural system in Kathmandu (although of less importance than the Birta and Guthi forms). While Raikar land may take on any number of different uses, those found in Kathmandu consist of essentially three types: various government and administrative complexes, the grounds of the Royal family residences, and flood plain (river's edge) lands.

Government Compounds:

There are numerous government and administrative complexes located in various sections of Kathmandu. These are of all sizes, but a feature common to most is the presence of expansive tracts of open lands adjacent to the buildings - all enclosed by a stone or brick wall. Much of this open land is cultivated - either rented out to private individuals for a fee based on production or worked by menial civil servants employed directly by the government.

In addition to direct cultivation, a part of the available open space is used for the raising of fodder for livestock - usually grasses. Livestock are allowed to graze on these walled-in 'pastures' before and after working hours. Besides allowing the animals direct access to this land, a system has developed wherein grasses are sold in bundles to individuals for fodder at a charge of 50 paisa per bundle.

Royal Family Compounds:

Near the Royal Palace in the Naxal area is a very large compound housing the residences of members of the Royal Family. Within this compound are expansive areas of open lands which are used for the cultivation of agricultural products. Vegetable gardens, grain fields and numerous

dairy and meat animals are serviced by household staff and idle military guards. The largest of these compounds that of the residences of the three sisters to the king, have developed a near self-sufficiency in foodstuffs derived from the cultivated areas situated within their walls.

Floodplain Land:

These river's edge lands are owned by the government and made available to individuals. Persons may occupy plots of land for up to three years without charge. After these three years, if substantial improvements have been made on the land, the tenant may claim legal rights to the land, hinging on payments made to the government. (Land Act 2021, Clause 26: Nepal)

OTHER:

The only other land type that is used for agricultural purposes and which is not included in the previous discussion is that type found among the various embassies scattered around the city. Kathmandu, being the country's capital city, host embassies and embassy compounds ranging in size from a single building to lavish 'country club types'. The larger compounds devote a portion of their land area to cultivation, primarily vegetable crops. Labor is generally hired from the outside to work these fields; and the produce is consumed by embassy personnel. (Personal conversation, embassy personnel)

We have discussed in this chapter the many potential opportunities which exist in Kathmandu, not only in terms of 'open space', but also in respect to the use of such open spaces. It is argued that the incorporation and continued presence of open spaces within the urban land area can serve an economic (and nutritional) function as well as an aesthetic one by providing opportunities for food production. The presence of open spaces and their use as a base for various agricultural activities strengthens the bonds between society and nature. In the case of Kathmandu, open spaces take on a variety of characteristics in terms of land tenure, relative location and size. One trait common to most is the current use of such lands in a foodproducing capacity.

CHAPTER IV

CHARACTERISTICS OF THE URBAN AGRICULTURAL HOUSEHOLD: BACKGROUND AND INPUTS

In this chapter and in the following chapter I will present a discussion of selected characteristics of urban agricultural households. The observations have been derived from a non-random sampling of thirty-five household units that are actively engaged in agricultural activities within Kathmandu.^{*} The following discussion and any generalizing remarks apply only to this selected sample. Sufficient data to generate a random sample was not available, and any attempt to extend these observations to the population of urban households in an inferential analysis would be inappropriate. (Murphy, M.N.; 1967, Chapter One)

^{*}The selection of these thirty-five households could not be obtained randomly due to the unavailability of data needed to construct a valid sample frame. A listing of all agricultural households in Kathmandu was not available. The establishment of a map frame could include all such households, but it would not be exclusive (i.e. other types of households and land uses would be included within the geographic boundaries of the map frame); thus unamenable to random sampling. (Stopher, Peter R., and A.H. Meyburg, 1979; pp.22-24) Given sufficient time and resources, a complete listing of all households in Kathmandu which are actively engaged in agriculture and food production would be possible and would provide the complete target population from which a sample could be randomly selected. Such a random selection would be necessary if statements were to be made about the population based on an inferential statistical analysis.

METHODOLOGY:

Sampling

The households from which observations have been drawn were selected purposively during a field survey of agricultural activities in Kathmandu undertaken during the summer and fall of 1980. The city is divided into a number of residential and commercial areas.^{*} As far as possible, all such areas that contained an agricultural component are represented in the sample. (See Figure)

Agricultural fields are not necessarily adjacent to the household's living quarters. Questionnaires were presented directly to individuals observed to be out working a field or plot of land, irregardless of the location of residence. That person then became the spokesperson for the household. The questionnaire was presented to each individual verbally, enlisting the aid of Mr. Indus Shrestra who acted as interpreter and guide. Responses were recorded in the appropriate answer space on the questionnaire sheet. (See Appendix at end of this chapter for a copy of the questionnaire used.) The majority of interviews took place in the early mornings. This was the time of day when farmers were observed to be most active in the

^{*}A generally accepted figure is twenty-four distinct areas. However, many such areas overlap or have ambiguous borders, thus negating somewhat the validity of such a division.



Sources R P KARAN, 1973

Figure 4.1

fields. Of all those farmers approached for possible interviewing, only one declined. Most were more than receptive to being questioned about their agricultural activities. The interviews generally lasted about twenty minutes. This included time for answering the specific questions listed in the questionnaire as well as short, open-ended discussions about their particular situation.

In developing the survey and presenting the questionnaire to individual farmers, several points were considered significant. Information on household composition and family origin was obtained to provide background considerations. Various aspects of land ownership and land tenure patterns were to be investigated and were considered important in establishing a better understanding of the relationships between the household and food production capabilities. Production and production usage, including crop and animal types, was examined in an attempt to discern the relative importance of agricultural activities for household food intake and/or cash income. Finally, farmers were asked to report any problems which they perceived as being important factors affecting the food-producing capabilities of their household. These range from the obvious limitations of land shortages to less obvious problems such as theft and natural calamities.

ANALYSIS:

The data obtained in the questionnaire is analyzed using descriptive statistics. The median, mean and standard deviation was computed for both singular and grouped data having numerical values. (Blalock, Hubert M., 1972) Percentages have been derived for those response groups which are not amenable to analysis using measures of central tendency, and are treated within a comparative analysis.

Information contained in the central tendency measures will be considered in detail during the course of the following discussion, as will a comparison of the various characteristics summarized in percent-based relative values. In addition, the discussion will include several case studies of individual farming households useful in exemplifying both the average or 'typical' urban agriculturalist as well as more extreme cases.

DISCUSSION:

The discussion of the data is divided into two main parts. In this chapter I will address selected characteristics of individual farmers and farming households emphasizing background characteristics, land relationships, and

time and energy requirements associated with agricultural activities. Features associated with production and production usage will be examined in Chapter V.

URBANIZATION AND RURAL-URBAN MIGRATION IN NEPAL

In investigating the contemporary role of urban households that are engaged in agricultural activities. it becomes important to consider their position in the historical growth of Kathmandu. Urbanization is a recent phenomenon in Nepal. It is estimated that the urban population accounted for only 2.1 percent of the total population of the country in 1941. (Joshi, T.R., 1974; pp. 236-265) The urban proportion did not increase significantly until the late 1950s and 1960s. By 1971, the proportion of Nepal's total population residing in the urban areas had grown to over 4.0 percent. (Tuladhar, Jayanti M., 1977; p. 8) In addition, the urban population is not at all evenly distributed throughout Nepal, but is concentrated most heavily in Kathmandu Valley. The city of Kathmandu demonstrates the largest proportion of this urban population. As noted in the following table, the relative role of Kathmandu's urban population has decreased in the past two decades. This is due primarily to the increase in population of other

^{*}The towns of Kathmandu Valley account for 54 percent of the total urban population of Nepal. (Tuladhar, 1977)

	1952/54	1961	1971	Annual Gro 1952/54- 1961	wth Rate 1961- 1971
Nepal Total Population	8,473,478	9,412,996	11,555,983	1.4	2.3
Nepal Urban Population	238,275	336,222	461,938	5.1	3.7
Kathmandu	106,579	121,019	150,402	1.9	2.4
The Population Kathmandu as a percent of the Total Urban Population of Nepal	of 52.8	43.4	38.7		

TABLE 4. . The Role of Kathmandu in Nepal's Urban Growth Pattern.

SOURCE: The data presented in this table has been extracted from computations by T.R. Joshi in 'Urbanization in Nepal'' <u>Demography India</u> 3(2) 1974, pp. 236-265, and from Gurung, Harka; 'The Population Aspect of Development'', <u>Population</u> and <u>Development in Nepal</u> edited by D.C. Upadhaya and Jose V. Akyeva (Kathmandu: CEDA, 1974, pp. 23-42).

urban centers in Nepal, most notably Pokhara, Birgunj and Bhaktapur. In the east of Kathmandu, much of the population growth has taken place outside of the traditional city center and into surrounding consolidated or unconsolidated areas. (Joshi T.R., 1974; p. 243) It is this outer city area that becomes an important factor in the discussion of urban agricultural activities, as well as the central core area

T.R. Joshi notes that since 1950, Kathmandu has been the destination for much of the increasing rural-tourban migration occurring in Nepal. (Joshi, T.R., 1974; p. 242) This phenomenon, widespread throughout the developing world, has only just recently taken on importance in Nepal and has not generally been considered a significant factor in Nepal's migration patterns.^{*} The importance of rural-to-urban migration as a factor in the growth of Kathmandu is associated with its role as the political and administrative center for Nepal, as well as an economic and industrial focus.

One factor serving to reduce the effectiveness of rural-to-urban migration in Nepal is a labor force which is characterized almost entirely by the agrarian economy of the country, and the limited availability of cultivated land in and around the urban settlement. ** (Weiner, M., 1973; p. 622) To better understand the contemporary urban

^{*}See for example, studies by Tuladhar, 1977; Conway Dennis, Shrestra M.N. and Bal Kamar K.C.; <u>Causes and Consequences</u> of Rural-to-rural Migration in Nepal (unpublished abstract); Seddon D.; <u>Peasants and Workers in Nepal</u> (Aris and Phillips Ltd., Warminster, England, 1979); Thapa Y.S. and P.N. Tiwari; Immigration Pattern in Kathmandu Urban Areas (Kathmandu CEDA, 1977); and Weiner, M.: "The Political Demography of Nepal" <u>Asian Survey</u> 13(6) 1973, pp. 617-629.

^{**} Other factors include the availability of agricultural lands in the Terai which attracts migrants in that direction, the lack of well-developed secondary and tertiary employment opportunities which could accomodate an influx of labor, lack of education and skills on the part of rural inhabitants which would serve as inducements to migrate to the city.

agricultural household, it becomes necessary to investigate patterns of urban residency as illustrated by the households surveyed and also to examine past employment activities of the household members (most significantly the head of household).

The majority of respondents (88.9%) reported that they were lifetime occupants of their place of residence. Due to the expansion of Kathmandu onto surrounding agricultural areas, many of this group have been witness to their 'gradual incorporation' into the urban environment of Kathmandu. The city has essentially 'enveloped' such households that had at one time been in close proximity to the city center but were still in a basically rural setting (i.e. outer fringe area). All of the remaining respondents have been residents of Kathmandu for greater than five years.

While the individual himself may either have resided in Kathmandu all of his life or may be an immigrant with more than five years of urban residency, his family originated for the most part from areas outside of Kathmandu. The largest number of respondents (80%) reported that their families had originally inhabited areas within the Middle Hills region. This supports the contention that the hills areas of Nepal are feeling the greatest burdens of population pressure and are the point of origin for most of the out-migration occurring in Nepal. (Analysis of the Population Statistics of Nepal, 1977 and Tuladhar, 1977)

	Percent Response
Greater Himalaya	1.1
Terai	3.8
Middle Hills Areas	80.0
Urban Areas	2.8
No Response	12.3

TABLE 4.2. Family Origins of Selected Urban Agricultural Households

Employment Patterns

Past employment characteristics of families which originated in the rural areas of Nepal (including the Hill areas as well as the Terai) reflect the agrarian economy of those areas. Of the sample surveyed, almost all (97.0%) listed their families as being the owners of agricultural lands. In addition, 56.3% listed agriculture as being their families' traditional occupation. A significant proportion (25.0%) listed previous occupations as being in government. For those persons, Kathmandu's growing importance in political and administrative affairs served as an inducement to migrate into the city. (Joshi, 1974; p. 242)

The data clearly shows that the occupations which had proved most important in the places of origin serve to be equally important in Kathmandu (See Table 4.3). Reflecting on those factors involved in a 'push-pull' mechanism which results in a rural-to-urban migration process; educational level, skills attainment, and the opportunities to use these, would suggest that those most qualified individuals would be most attracted to the city. (Brigg, P. 1971) The data gathered from the sample in this study supports this notion to the extent that skills relating to non-agricultural occupations are accomodated in the urban economy.

Occupations listed as being sole or primary	Percent o Before	f Responses After
Trader/Merchant	18.8	13.3
Agricultural	56.3*	50.0*
Government	25.0	28.3
Laborer	00.0	8.3
Other	0.0	0.0

TABLE 4.3. Employment Patterns for Selected Migrants

* This figure is low when compared with the statistical representation of Nepal's economy which lists over 93% of the country's residents employed in agriculture. This further reflects a situation in which the most highly educated or skilled workers are the ones most apt to move to the city.

The in-migration to Kathmandu consists primarily of individuals of the Brahmin and Kshatriya castes. These are persons who generally have some type of skill or enterprise, are better educated, and are socio-economically better off and who have come to Kathmandu for the greater opportunities it presents. They represent what T.R. Joshi refers to as 'selective migrants'. (Joshi, 1974)

A factor that also becomes important in the case of Kathmandu is that property rights are firmly established and preclude (generally) poor people from constructing houses or shacks randomly throughout the city environment. This situation, while effectively preventing the establishment of squatter settlements in and around the city, also serves to remove residence opportunities for those of lesser-means who cannot afford to pay the speculative prices which are associated with developing Kathmandu.

For those individuals involved in non-agricultural employment activities, food production activities represent secondary or tertiary economic functions. Most of their time and energy geared toward productive goals is directed toward occupations and careers carried out within the formal sector of the economy, frequently as government workers. A smaller (and declining proportion relative to traditional/ rural occupations) are businessmen and/or traders. A small proportion (8.3%) find work as wage-earning laborers. For many, though, (50.0%) agriculture remains the chief occupation and main source of livelihood.

THE HOUSEHOLD:

Land Ownership Patterns

I have discussed in the previous chapter selected characteristics of land tenure patterns which are especially pertinent to a discussion of urban agricultural activities. Birta, Rakam, Jagir and Guthi lands described in Chapter III are all forms of land tenure which allow for the private ownership of land. (Regmi, M.C., 1965) The households surveyed in this study represent a mix of landowners, tenant farmers and agricultural laborers. Some may assume more than one role. That is, there are cases in which an individual may own (and till) his own plot(s) of land and assume a tenancy role on another's land as well. Of those individuals surveyed, most (64.1%) owned at least one plot of land which they use for agriculture. Less than one-fourth (24.0%) owned more than one plot but of this group it was not uncommon for some individuals to own (and work) up to four or five plots of land. These were oftentimes scattered widely throughout Kathmandu. The size of agricultural landholdings ranged from .25 ropani to 4.0 ropani, with an average size of 1.06 ropani.*

The pattern of land ownership which emerges within the urban area of Kathmandu and which is integrated into

^{*}This figure includes <u>all</u> plots of land, however many there might be and however dispersed they may be.

TABLE 4.4. Landholding Characteristics

	Md.	x	SD.
Size (in ropani)*	1.00	1.06	0.85
No. of cultivated plots owned	2.50	1.06	1.20
No. of plots worked but <u>not</u> owned	2.50	1.77	1.96
Distance from place of residence to agricultural field (in feet)	67.3	1180.0	2539.5

*One ropani equals 5,625 square feet (75' x 75')

** This figure may represent more than one field. In such cases, this reflects an 'average' distance an individual farmer perceives he must travel to his field(s).

what E.A.J. Johnson refers to as the "agro-urban functional area" reflects a stage in a process of land ownership and land tenure development which stretches back to the Rana regime of the early to mid-1900s, and extends to the Land Reform Acts of the 1960s. (Johnson, E.A.J., 1970, p. 199) The consolidation of lands into the hands of a very small minority during Rana rule was mitigated by the 1964 Lands Act in which ceilings were placed upon individual landholdings. In cases where landholdings exceeded the set limits, the land was distributed under the auspices of the local ruling panchayat body.^{*} In Kathmandu Valley (to include the city of Kathmandu), the ceiling is set at <u>10 ropani</u>, which includes land set aside for residential purposes. (Regmi, 1976; p. 201)

In those cases when a farmer is working land on a tenancy basis, in addition to land that he owns and cultivates (70% of the respondents are so engaged), this ceiling remains applicable. To prevent an exacerbation of land fragmentation processes which have plagued much of Nepal, steps are being taken to legislate the succession of landownership along <u>household</u> lines rather than let the division take place between various members of a household. (Regmi, 1976; Chapter 4)

For those agriculturalists who are involved in a tenancy relationship with another landowner, the Land Acts of 1964 represents an added measure of security. Rent is to be fixed based on production of the main crop. This would thus create a greater incentive on the part of the tenant farmer to increase his productivity by ensuring that he would be the recipient of the benefits of the

The organization of Nepal's administrative structure is based on locally-elected councils, the members of which serve for two years. These councils, or <u>panchayats</u>, serve to link the people at a grassroots level with the centralized government which takes the form of a constitutional monarchy.

increased levels of productivity. (Report of National Seminar on Land Reform (Kathmandu, 1970), p. 91) In addition, tenancy rights, since passage of the Land Acts, extend to the point of sale. Should the landlord sell that land which a tenant occupies for agricultural purposes, the tenant is entitled to twenty-five percent of the sale value.

FARM LABOR

In addition to the direct ownership of cultivated land or an established tenancy relationship, a situation which arises among those farmers for which data has been obtained is one in which a landowner or tenant farmer may also work as a laborer on another person's land. This has been mentioned in the previous section but I would like to add that this is not to be confused with those persons who act as wage laborers in the non-agricultural urban economy. Rather than working for a strictly cash wage, agricultural labor is often <u>exchanged</u> between farmers. This system, referred to as <u>parma</u>, involves a direct relationship between individual farming households. (Seddon, D., 1979, p. 105)

During periods of peak activity, such as during planting and harvesting seasons, this form of exchange is most heavily relied upon. In those instances in which this exchange system is inadequate, labor will be hired on a cash or in-kind basis from persons living in the city.

Most often the individual hired is someone directly acquainted with the farmer.

For the most part, though, the largest, and in many instances the entire share of labor devoted to food production originates from within the household. The average size household includes over six members (See Table 4.5) and in the majority of cases (65.8%), the labor is divided among members of the household.

	Md.	x	SD.
Size of household	6.5	6.43	1.79
No. of Males	3.5	3.34	1.06
No. of Females	3.0	3.31	1.51

TABLE 4.5. Household Composition

It is significant to note that the female members of the household contribute a substantial amount of the labor used in agriculture. This becomes especially important in those households in which the male head of households and other economically-active males are involved in other types of non-agricultural employment. This situation reflects the traditional structuring of household economies in Nepal in which females generally exhibit proportionally low rates of literacy and education and assume roles as unpaid family workers in the household enterprise. The agricultural households surveyed in this study are urban and thus the role of the female is altered somewhat when compared to rural agricultural households. The generally higher literacy rates and education levels which prevail among urban women (and males) allows a greater proportion of the female population to become active in non-urban agricultural employment within the city. Agricultural labor supplied by the women in the household may in fact represent only a small portion of their time. (The Analysis of Population Statistics of Nepal, 1977, Part V)

			1.4660			01 0411
		in percent				
		Rural	Urba	n	<u>Total</u>	
Male		22.9	62.4	4	24.72	
Female	2	02.7	28.0	0	03.66	

TABLE 4.6. Proportional Literacy Rates: Rural Versus Urban

SOURCE: Data appearing in this table has been extracted from the 1971 Population Census, Vol. I as cited in <u>The Analysis of the Population Statistics of Nepal</u> (Kathmandu: Central Bureau of Statistics, 1977).

TIME REQUIREMENTS

The amount of time devoted to food production activities among the households surveyed varies widely from one to another. This reflects not only the size of cultivated landholdings, but also the intensity of farming practices and the availability (either exchanged or hired) of outside labor. The greatest number of respondents (31.4%) reported that their household members contributed from one to three hours of labor each day to agricultural activities. A significant number (28.6%) put in less than one hour each day, and the third greatest response group (20.0%) reported that they spent from four to six hours each day in food-production activities (See Table 4.1. Section C). The most important time of day for such activities was cited to be the mornings (34.8%), with the rest dividing their time between midday hours and the evenings. No data was obtained which would allow a correlation to be established, but discussion with farmers indicate that those who are involved in non-agricultural employment and for whom household agricultural activities are supplemental in nature, tend to put less time into agricultural labor and would tend to structure that time around their other employment (i.e. early mornings or evenings).

SUMMARY

In the preceeding pages I have presented selected characteristics of urban agricultural households which are considered significant in the investigation of their agricultural activities. By focusing on the household unit, a clearer understanding of the basic human element involved in the agricultural system of Kathmandu can be achieved.

The basic unit of production within this system is the household. Varying characteristics of such households affect their respective capacities in terms of food production. Most important among these is the size of landholdings and the availability of time and resources (to include labor). In the following Chapter I will continue this discussion of the household unit and will consider production and production usage.

CHAPTER V

CHARACTERISTICS OF THE URBAN AGRICULTURAL HOUSEHOLD: PRODUCTION AND PRODUCTION USAGE

In this chapter, I shall continue the discussion of the urban farming household, based on data which has been obtained through field interviews. Emphasis is placed on various characteristics of production and production usage. The data derived from questionnaire responses indicate what types of crops are being grown as well as how they are being used by the household. While absolute measures of productivity were not obtained for individual households in terms of gross yields, the relative effectiveness of household production in meeting the domestic food needs of the household, as perceived by household members, was measured. The data also provides a measure of that portion of production which is directed toward usages other than household consumption. Finally, the intensity of agricultural land use in this urban system is investigated in respect to crop types and cultivation practices.

PRODUCTION CAPABILITIES OF THE URBAN HOUSEHOLD

The average amount of land resources available to a single farming household in the Hills area of Nepal is

between 0.3 and 0.4 hectares.^{1*} In the case of the urban faring household in Kathmandu, the average landholding is 1.06 ropani (See Table 4.4). This is equivalent to .05 ha. (.14 acres); much lower than the average landholding size in this Hills area. This small size leads to the question of how effective such land resources can be in producing an agricultural yield.

Dr. Franklin Martin** has devised an agricultural land use model designed for the individual subsistence household which would prove especially amenable to an urban farming household. (Martin, Franklin W. and R.M. Ruberte; 1980) This design based on research done in the tropics and developed by the Samaka Service Center in 1962, requires a land area of less than one-seventh of an acre, and incorporates vegetable and fruit production as well as animal rearing. The intense utilization of land represented

** Dr. Martin is a horticulturalist for the Science and Education Administration, U.S. Department of Agriculture. Refer to the <u>Notes</u> page at the end of this chapter for references to his work.

¹Hagan, Albert R.; <u>The Agricultural Development of Nepal</u>; <u>Analysis of the Agricultural Sector (Columbia: Agricultural Experiment Station, University of Missouri; International Series II, August, 1976; Special Report 189).</u>

^{*}This area exhibits the most intense pressures being placed upon land resources by the population. According to general survey of landholdings after Land Reform, the average cultivated landholding throughout Nepal is 1.23 ha.

in this garden design could accomodate most, if not all of the nutrient requirements of the household. As we shall see in this discussion, the approach taken by many of the farming households in Kathmandu closely follows such a design. Discussions with individuals indicate that none of the Jyapu farmers surveyed in this study had access to or had been exposed to Dr. Martin's work.

For many of the households which had reported the smallest size landholdings, agricultural enterprise represents only a supplemental activity. Food production which is generated by the efforts of the members of the household does contribute to the food resources of the household, but they are not dependent on this source. There are those cases, however, in which a household's production represents the major, if not sole, source of foodstuffs.^{*} These households average landholdings well below what is generally considered essential (less than 1.5 ha.).

Moreover, the land itself is often of poor quality. Table 5.1 shows the types of cultivated land which are found in Kathmandu, as compared with the two other major city districts in the Valley. The predominance of gravel and sandy soils in Kathmandu reflect the position of the city in respect to the alluvial terraces of the Valley

^{*}This may be either by direct consumption of household production or by the purchase of staple foods with income generated through the sale of non-staple foods grown on their parcels of land.
<u>District</u>	Land Type					
	Low Land:	ABAL	DOYAM	SIM		
Kathmandu		1971.14	3811.63	5562.34		
Bhaktapur		1652.89	1551.05	1985.21		
Lalitpur		2305.47	1755.40	1980.71		

TABLE 5.1	. Area	of Cu	ıltivat	ed La	and (t	y t	type)	in	the
	Kath	nandu	Valley	(in	ha.)	-			

	Up Land:	CHAHAR	ABAL	DOYAM
Kathmandu		1303.15	3456.53	8779.01
Bhaktapur		374.53	960.11	2053.55
Lalitpur		40.87	4292.69	4777.77

EXPLANATION:

- Low land:
- <u>ABAL</u> Land which receives year-round irrigation and is considered highly suited to agricultural purposes.
- <u>DOYAM</u>- Land on which cultivation depends on precipitation during the rainy season and irrigation during the dry season.
- <u>SIM</u> Land on which cultivation totally depends upon rainfall.
- Up land:
- <u>CHAHAR</u> Sand and gravel soils; intermittant irrigation employed to provide potential year-round cultivation.
- <u>ABAL</u> Alluvial soils, not conducive to growing paddy but is considered to be suitable for vegetables and fruit production.
- <u>DOYAM</u>- Sand and gravel mixed slope land on which year-round cultivation is generally not possible.
- SOURCE: Shresta, J.K.; <u>Production, Consumption and Distribu-</u> <u>tion of Wheat and Wheat Flours in Kathmandu Valley</u> (Kathmandu, 1970-71)

floor. The city is perched slightly above the base of the valley floor and consists primarily of those soil types associated with the upland Chahar, Abal and Doyam lands described in Table 5.1. Most of the cultivation which occurs is dependent upon rainfall receipts, however, there is some limited irrigation which does take place. This is primarily hand-carried water, brought from cumunal wells and other water sources in earthen jars and applied directly to the fields by hand. There is a very limited amount of channeled irrigation water delivered to the fields, restricted to only those parcels of land which are very near to existing drainage canals.^{*}

PRODUCTION MEASURES

No comprehensive measures of productivity were obtained from the household survey which would allow a quantified rendering of absolute volumes and market values generated. Production figures, however, are available for the Kathmandu area for selected crop types. These figures represent production for the administrative district of Kathmandu. This district encompasses an area that is

Another factor which becomes significant is the relative location of the agricultural fields in Kathmandu. They are interspersed with a variety of other types of development, most reflecting an urban emphasis. The channeling of water resources via canals and aqueducts is hampered by roadways, building development, etc.

larger than the land area taken up by the city proper and thus cannot be considered as a measure of the productivity of solely urban farming enterprises. They do however, indicate the levels of productivity to be found in and around Kathmandu. Table 5.2 provides area and production figures for selected staple crops.

TABLE 5.2. Area Under Cultivation and Production ofSelected Crop Types for Kathmandu District

A - Are	A - Area in Hectares						
P - Pro	P - Production in Metric Tons						
Year		Paddy	Maize	Wheat	Millet	Barley	Potato
1970-71	A -	14,000	8300	10,000	1700	25	1200
	P -	46,200	15,272	10,000	1530	22	7872
71-72	A -	14,000	8300	9,640	1700	25	1300
	P -	46,480	14,940	12,532	2090	6	10296
72-73	A -	14,000	8300	7800	1500	25	1300
	P -	47,880	16,185	8865	1387	21	10280
73-74	A -	14,000	8300	10,000	1700	25	1340
	P -	48,300	16,185	13,000	1573	22	10280
74-75	A -	14,000	8300	10,000	1700	25	1340
	P -	48,300	15,977	13,000	1572	22	10729
75 - 76	A -	13,000	8590	10,127	1700	30	1240
	P -	46,800	16,490	12,152	1570	26	10720
76-77	A -	12,101	8590	11,263	1530	100	620
	P -	43,563	14,603	18,550	1410	78	5360

SOURCE: Agricultural Statistics of Nepal, 1977.

This table illustrates some fluctuation over the years 1970/71 - 1976/77 in terms of absolute land area under cultivation. However, when converting this change to an average number of individual fields represented in these figures, the decline does not seem so significant. The acreage included in the 1970/71 figures accomodates 50,321 individual farm holdings, based on an average of .5 hectares per farm worker (Hagan, 1976). In 1976/77, this number drops to 48862; a decrease of 2.9 percent. This decline, as well as the occurring fluctuation in total cultivated area over the seven year span, cannot be explained solely in terms of decreasing land resources made available to agriculture. It may also reflect a change in amounts of fallow land incorporated within the crop rotation cycle.

DISTRICT FOR SELECTED CROPS (t/ha.) Crop Type 1970-71 1976-77 Net Change Paddy 3.30 3.60 plus .30 Maize 1.84 1.70 minus .17 Wheat 1.00 1.65 plus .65 Millet .90 .92 plus .02 Barley .88 .78 minus .10 Potato 6.56 8.65 plus 2.09					
Crop Type1970-711976-77Net ChangePaddy3.303.60plus .30Maize1.841.70minus .17Wheat1.001.65plus .65Millet.90.92plus .02Barley.88.78minus .10Potato6.568.65plus 2.09		DISTRICT F	OR SELECTED CROPS	(t/ha.)	
Paddy 3.30 3.60 plus .30 Maize 1.84 1.70 minus .17 Wheat 1.00 1.65 plus .65 Millet .90 .92 plus .02 Barley .88 .78 minus .10 Potato 6.56 8.65 plus 2.09	Crop Type	<u> 1970-71</u>	<u>1976-77</u>	Net Change	
Maize1.841.70minus .17Wheat1.001.65plus .65Millet.90.92plus .02Barley.88.78minus .10Potato6.568.65plus 2.09	Paddy	3.30	3.60	plus .30	
Wheat 1.00 1.65 plus .65 Millet .90 .92 plus .02 Barley .88 .78 minus .10 Potato 6.56 8.65 plus 2.09	Maize	1.84	1.70	minus .17	
Millet.90.92plus .02Barley.88.78minus .10Potato6.568.65plus 2.09	Wheat	1.00	1.65	plus .65	
Barley.88.78minus .10Potato6.568.65plus 2.09	Millet	.90	.92	plus .02	
Potato 6.56 8.65 plus 2.09	Barley	.88	.78	minus .10	
	Potato	6.56	8.65	plus 2.09	

TABLE 5.3. Productivity of Agricultural Land in Kathmandu

SOURCE: Computed from Table 5.2.

Levels of productivity for the cultivation of paddy, wheat, and potatoes have increased during the seven year span of time represented in Table 5.3. Maize and barley productivity, however, showed a decline and Millet remained little changed. In comparing these yields with others registered in different parts of the tropic and subtropic latitudes one finds a number of different situations. Paddy cultivation in the Kathmandu Valley is much higher than other areas within Nepal where irrigated wet-rice cultivation is carried on (i.e. the Lumle district reports yields of 2.20 t/ha.); Table 5.4 demonstrates the relative productivity for those crops listed in Table 5.3 compared with yields from other regions.

	(1970-1971) (t/ha.)					
	Paddy	Maize	Wheat	Millet	Barley	Potato
Kathmandu District	3.30	1.84	1.00	.90	.88	6.56
India (Hissar Dist)	-	3.56	3.43	2.85	-	-
India (U.P.)	1.21	1.81	-	-	-	-
Bangladesh	3.70	-	-	-	-	-

TABLE 5.4. Yields for Selected Crops (irrigated holdings)

SOURCE: Ruthenberg, H.; Farming Systems in the Tropics (Oxford: Clarendon Press, 1980).

For the purpose of this chapter, I wish to focus on the role of the urban agricultural households in the production of crops in the Kathmandu District.

CROP TYPES*

In examining Table 5.2 it becomes apparent that the primary emphasis of cultivation within the Kathmandu District lies with the production of foodgrains. These crops represent the staple of the Nepalese diet and are the predominate form of agricultural land use in the outer fringe area around Kathmandu. Within the city, though, quite a different type of cultivation takes place. Data obtained during the course of field work indicate that the production of vegetables is the most important type of land use associated with the urban agricultural system. All households surveyed reported that this crop type is the most important feature in their cultivation activities. (Table 5.5 lists those vegetables reported as being most significant by the households surveyed.)

For a very good discussion of the food crop types which would prove most amenable to the urban farming system and would represent the best use of limited land resources, see: Martin, F.W. and R.M. Ruberte; <u>Techniques and Plants for the Tropical</u> <u>Subsistence Farm</u> (U.S. Department of Agricultural, July 1980) 56pp. Also The Round Garden: Plans for a Simple Intensive Vegetable Garden for Year Round Production in the Tropics (Mayaguez Institute of Tropical Agriculture, Mayaguez, Puerto Rico); and Patio Farming: Landscaping the Tropical Home for Food Production.

1) \$	Squash	7)	Cauliflower
2) (Green Beans	8)	Spinach
3) 1	Potato	9)	Cabbage
4) (mion	10)	Coweline
		11)	Cowsiips
5) (Jucumber	11)	Kadisnes
6)]	lomato	12)	Lady's Finger

TABLE 5.5. Household Vegetable Crop

Listed in order of relative importance as determined by the number of households reporting it to be a significant component of their production.

Second in importance to vegetables, is the production of various kinds of fruit, primarily those that are tree crops. Lemon, Pomello and goa are being grown by many (34.5%) of the households surveyed. In addition to these, some households reported that they had crops of oranges, bananas, and limes. The prices of fruit in the marketplaces in Kathmandu are very high. Most is imported from India on a seasonal basis. There is an area to the northwest of Kathmandu, in the higher elevations around the village of Jomson, where apples are grown, but due to the poor transportation and high trucking costs, the prices of these products are also beyond the means of most families. Those households that do grow fruit most often take advantage of the high market price and sell their produce, rather than directing it to household consumption.

The addition of fruit trees to the production system reflects the intensity with which these parcels of land are being used. They are planted in the same areas that are devoted to vegetable crop production and represent the top canopy of what is often an intense utilization of the land in a 'layered' fashion. Crops which sprout and grow to different heights are planted very close together. A low lying, creeping vegetable such as cucumbers will represent the bottom layer. Above it, there may be a number of other crops which grow in such a fashion as to utilization of different canopy heights and shade tolerances, as well as varying soil nutrient requirements.

A third important crop type is spices. Nepalese cooking relies heavily on the use of various spices, which, if not produced by the household, must be obtained in the market. Those spices reported to be grown in greatest frequency are garlic, mustard, dunya, and various chilis. After harvesting, the spices are allowed to dry atop buildings and courtyard walls and then stored within the household residence, to be used as needed.

Finally, a last crop which plays a prominent role in the gardens and cultivated lands in Kathmandu is flowers. While these do not provide a direct supplementation to the household diet, their production is significant in terms of reducing the expenditure a household must make in the marketplace. The Nepalese observe a great many festivals for

which flowers become a necessity. They are used primarily as <u>puja</u>, or offerings, and adorn the statues and edifices of various gods and goddesses within the religious pantheon. If a household does not produce them directly, and thus have them available throughout the year, then during festival times they must be purchased from other growers.

AGRICULTURAL LAND USE: THEORETICAL CONSIDERATIONS

I have mentioned the fact that vegetable production constitutes the single most important crop type involved in the production system in Kathmandu. In questioning why this is so, it becomes useful to employ certain theoretical considerations. Most important in terms of this discussion is the analysis of agricultural land use offered by Von Thunen. (Thunen, Johann Heinrich von; <u>Isolated State</u>; an English edition of <u>Der isolierte Staat</u> translated by Carla M. Wartenberg (Oxford, New York: Pergamon Press, 1977) 304pp. edited by Peter Holl)

His concepts and analyses emphasize, as a determinate factor, the location of agricultural land use in relation to the commercial market. Several assumptions are made which serve to simplify the complexities of real world situations. Briefly, the analysis assumes an 'isolated state' with one central city serving as the sole market for surplus production. In addition, the agricultural area is a uniform plain and the costs of transport across this area is directly proportional

to the distance of the fields from the market. (Bradford, M.G. and W.A. Kent; 1977; pp. 28-29)

The basic underlying principle is the concept of economic rent, or locational rent. These terms have an equivalent meaning, and refer to ". . . the difference between the total revenue received by a farmer for a crop grown on a parcel of land and the total cost of production and transport of that crop. . ." (Bradford, M.G. and W.A. Kent, 1977; p. 29). Economic or locational rent takes into account such factors as market price, production costs and crop yields, as well as transport costs which may vary with the bulk of a product and the perishability of the product. In an expansion of Von Thunen's analysis, Theodore Brinkman argues that ". . . districts near the market - that is, districts with favorable economic locations - are. . . districts of intensive methods of farming. . ." (Benedict, M.R., ed.; Theodore Brinkman's Economies of the Farm Business (Berkeley, 1935), as cited in Peet, J.Richard; "The Spatial Expansion of Commercial Agriculture in the Nineteenth Century: A Von Thunen Interpretation" Economic Geography 45 (4) 1969 pp. 283-301)

Von Thunen suggests that vegetable production, representing a perishable commodity and intense production methods, would be concentrated in a zone nearest the city. Zones of decreasing intensity of farming methods would radiate outwards, with meat-oriented animal production occupying

that zone furthest from the city. In addition, a rise in demand by the urban market center in association with decreasing transportation cost would result in an outward expansion of these zones.

THE APPLICATION OF VON THUNEN'S THEORY IN KATHMANDU

As has already been mentioned, vegetable production is the major emphasis of the urban agricultural system in Kathmandu. By employing certain aspects of Von Thunen's theory, the reasons for this become easier to understand. There are, however, limitations to the applicability of this sort of analysis. These will be dealt with as I proceed with the discussion.

The lands that are incorporated into the urban agricultural system occupy a position which would be included in Von Thunen's innermost zone of agricultural land use. These lands, located within the city are devoted primarily to vegetable crop production. This represents an intensive use of land resources as well as being an enterprise producing highly perishable foodstuffs. Both of these aspects are incorporated as determining factors in Von Thunen's innermost zone of agricultural land use. In this respect, the system under investigation here is closely aligned to the features of such an analysis.

The intensity with which the land resources are utilized can be subjectively examined by visual observation of farming techniques. I have alluded to the 'layered'

fashion of cultivation used by many farmers. By planting crops which are complementary in terms of soil nutrient requirements and which also grow in such a manner as to utilize maximum available surface area. the limited land is used to its fullest potential. In addition, one can consider the frequency with which farmers harvest their crops as being indicative of the levels of intensity of land use. (Gopi, K.N., 1978) Kathmandu's climate allows for the cultivation and harvesting of vegetables on a year round basis, given adequate soil fertility. The majority of farmers surveyed (68.6%) do harvest their crop on a continual basis. The remainder reported that they harvest at least two or three times each year. While these represent the major. or most important harvest times, they also grow some crops which are staggered in their planting times and are harvested periodically throughout the calendar year.

In addition to plant production, animals are kept for meat and dairy purposes. This will be examined in detail later, but it is worthwhile to note that such a situation does exist and points to a further intensity of farming methods and land use. It also lends itself to a partial

^{*}The methods of soil fertilization was discussed in Chapter II. Animal manures are relied upon for the most part due to the high cost of chemical fertilizers. This study did not determine the mechanism by which the farmer decides which crop types should be grown with each other, but the nature of the farming techniques and use of land indicate a general awareness on the part of the farmer of differing plant requirements in terms of nutrients and spacing.

explanation using concepts inherent in Von Thunen's theory in which he suggests that dairy production and the associated land use will be found nearest the city.

Von Thunen, however, addresses his theory of the location of agricultural lands use primarily to commercial agricultural production. As J. Richard Peet notes, ". . . Farmers were assumed to be interested only in maximizing economic rent. . ." (Peet, 1969; p. 284) The farmers of Kathmandu are not so much interested in maximizing economic rent as they are in maximizing household food resources. As is illustrated in Table 5.6, the majority of foods produced through the efforts of the household is consumed by the household.

 $\frac{1}{\text{md. } \overline{x}} \qquad \text{S.D.}$ Percent of plant food production 76.0 72.0 30.2 consumed directly by household

Percent of animal food production

consumed directly by household

74.7

86.0

29.0

TABLE 5.6. Reported Utilization of Agricultural Production

How effective the household production is in meeting the needs of the members of the household varies from one to another, based on available resources. No data was obtained on specific quantities of production or on empirically established nutrient requirements of selected households. Thus an absolute measure of nutrient needs that are being met by household production is unavailable. However, this study does provide an indication of the value of household production in terms of meeting the <u>perceived</u> food needs of that particular household.

Table 5.7 illustrates this for both plant food needs and for animal food needs. I wish to emphasis that these are merely perceived needs which are met, as reported by individual households surveyed. They do not represent actual caloric, vitamin or protein requirements as determined by established standards. No attempt is being made here to evaluate the adequacy of the urban Nepalese dietary intake. However, the relative role that household production plays in contributing to that diet (sufficient or not) can be seen in the first two lines of Table 5.7. The last line of this table demonstrates the role of household production as a part of the total food intake. As shown in this table, over forty percent of the food consumed by a household originates from that household's own agricultural efforts.

It is that portion of the agricultural production which is not consumed by the household that becomes an important element in the commercial marketing of vegetable products in Kathmandu.

	Md.	x	S.D.
Percent of <u>perceived</u> plant food needs met by household production	32.7	37.5	33.3
Percent of <u>perceived</u> animal food needs met by household production	25.0	11.4	19.5
Percent of daily total food intake derived from household production	38.5	40.7	25.6

TABLE 5.7. Reported Effectiveness of Production

COMMERCIAL MARKETING OF VEGETABLE PRODUCTS

In approaching the topic of commercial sales of vegetable production in Kathmandu, it is significant to be aware of the fact that a major part of the commercial vegetable production that enters the Kathmandu market originates in the Thimi area, approximately ten miles from the city. A horticultural research station is located here to aid in the future development of this area as a vegetable-producing region, geared toward the urban market. The produce grown in this area is directed primarily to the Ganderbahl market located in the southeast part of Kathmandu.

Produce coming from Thimi is transported the ten-mile distance via the hard-topped Bhaktapur Road. While trucks are used by the larger enterprises to make this haul, smaller operations still depend to a great amount on the labors of individual porters. In the early hours of the day, one can observe an almost steady stream of persons coming into the Ganderbahl market area laden with large wicker baskets filled with produce. As has been mentioned, the prices of vegetables in Kathmandu are quite high.^{*} This reflects both the costs of transportation into the city as well as the relatively limited supply of the product. Outside of the Thimi area, few areas in the outlying valley district, are devoted to an agricultural land use which emphasizes vegetable production, beyond kitchen garden cultivation which is subsistencedirected. As we shall see, the vegetable production which occurs within the city assumes a role which ameliorates this situation.

TABLE 5.8. Market Prices for Selected Vegetables in Kathmandu (September 1980)

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	Cuambara	$\frac{rps}{2}$ 50 /kg
	Cucumbers	2. JU/ Kg
	Potatoes	7.50/kg
	Tomatoes	1.50/200gr
	Onions	.90/200gr
	Carrots	7.50/kg
	Cabbage	7.50/kg
	Pumpkin	2.50/kg
	Squash	1.00/kg

These are average prices based on spot checks of Ganderbahl Market during September, 1980.

Transportation is cited as being a major problem throughout Nepal. This becomes especially true in the remote areas

^{*}It also indicates a growing demand for this production by the growing urban population, many of whom are relatively wealthy and can accomodate the 'luxury' of having a diet rich in a variety of foodstuffs.

of the hills and mountain regions where there are little or no possibilities for vehicular traffic and the movement of goods and people is restricted to foot travel. It is also the case in the less developed areas within the Kathmandu Valley itself. (The Agricultural Development of Nepal: Analysis of the Agricultural Sector (Columbia: Agricultural Experiment Station, University of Missouri, International Series II, August 1976, Special Report 189), 73pp.) In the case of Kathmandu city, agricultural goods that are transported from Thimi are received regularly, with only minor disruptions due to difficulties incurred while transporting the products. The road between Kathmandu and the Thimi area is fairly well maintained and stays open throughout the year. For those transporting goods by porter, the journey will take about three to four hours, minimum (at a wage of rps. 15.00 per full day).

However, the transportation and distribution of these products <u>within</u> the city is regularly curtailed due to the almost total lack of intra-city transportation. The Ganderbahl Market assumes a prominent role in the marketing of produce from Thimi and other areas outside of the city partly because of its accessibility as a dropping off point for supplies of goods. Other market areas around the city simply cannot be reached with any ease by enterprises wishing to distribute their goods to other, smaller market areas scattered around the city.

The vegetable production which occurs within the urban based agricultural system represents a land use which reflects the market value of that crop type as well as the marketing strategy employed. The city farmer who wishes to sell a portion of his crop is in the unique position of being located directly adjacent to his market area. Transportation costs are kept at a minimum because of the short distances he needs to travel to sell his produce and because he relies on household labor to carry the goods to the point of sale. The urban agricultural household is able to take advantage of a dispersed marketing structure in which goods are sold, often alongside of the streets and pathways and in central courtyards, in areas of the city which cannot be effectively reached by larger operations originating outside of the city. Moreover, because of the minimal transportation costs and because the labor costs of production are met by members of the household, the urban farmer can sell his produce at a price generally lower than that found in the Ganderbahl Market. Several of the farmers interviewed reported that they sold their produce up to twenty percent lower than the prices observed at Ganderbahl.

SIZE OF LANDHOLDINGS AS A DETERMINING FACTOR IN CROP PRODUCTION

In discussions with individual farmers, it became apparent that there is another reason why vegetables are grown on urban agricultural lands rather than some other crop type. It has to do with the size of landholdings. Rice is the

staple food of most Nepalese living in the Kathmandu Valley. (Swaminathan, C.R. et al., 1972) Why are the urban agriculturalists not emphasizing its cultivation? Many of them do, it is true. Over half of those households surveyed reported that they grew some rice. But it was not considered by the farmers who did so to be an optimum use of their land.

The individual landholdings are small in size and widely dispersed. The cultivation of rice is not an efficient use of the land. The land resources available to the urban farmer are not sufficient to generate a rice harvest that would meet the needs of the household.^{*} This marks a point at which the theory of Von Thunen and the plight of the urban farmer meet. By taking advantage of their location to the urban market and growing a vegetable crop, the farmer can not only produce a food item for household consumption but also a cash crop valuable in the marketplace. (Amatya, S.L.; 1975) The income derived from the sale of a part of his crops^{**} can then be used to purchase rice from the market

^{*}It is generally suggested that at least 1.5 ha. of land would need to be cultivated in a rice crop in order for an averagesize household to attain self-sufficiency in foodstuffs. Discussions with individual farmers during the interviewing process indicate that this situation is also acknowledged to be true by the urban farmer as well, and is one reason why rice production is not a significant feature in the urban agricultural system.

^{**} The portion sold does not necessarily represent a surplus of foodstuffs. But rather may be a part of production which is deemed necessary to market in order to generate sufficient cash to purchase rice and other goods as well as meet other financial responsibilities such as festival expenditures, loan repayments and taxes.

(a relatively less expensive item), as well as other household necessities like kerosine, candles, clothing and other staple needs. (<u>Small Farmers and the Landless in South Asia</u> (World Bank Staff Working Paper No. 320, February 1979)).

In considering the sale of household agricultural production, we must recognize one final feature. Oftentimes produce must be marketed because there exists no means of storing it. A household may find it necessary to market the vegetable foodstuffs it produces shortly after harvest, even if it would be more desirable to retain the larger portion of it. Interviews with several farming households indicate storage facilities to be inadequate. There is oftentimes little room in household compounds that could be devoted to storing foods in a manner which would safeguard them from pests or spoilage. Cash, on the other hand, does represent an item that may be retained by the household to be used as and when needed.

CASE STUDIES

To aid in attaining a better understanding of the role of the urban agricultural household, I would like to relate several illustrative examples. These are based on field interviews with individual farmers and exemplify some of the problems and prospects of such individuals and households.

Example #1: A Self-Sufficient Farming Household

The first example involves a farming household residing

in an eastern location of Kathmandu, near the Naxal-Garidhara area just north of the Royal Palace compound. It is an example of a successful urban agricultural enterprise, one that is providing the household with all of its food needs - gained from the cultivation of less than one ropani (75' x 75') of land. In addition, this household generates, through the sale of part of its vegetable crop, sufficient income to meet other household expenditures.

The crops reported to be most important for this enterprise include rice, potatoes, cauliflower, onion and garlic. Only a part of the vegetable crop is sold, the rice is kept for domestic household consumption. In addition to these crops, the household owns a number of animals. Chickens (15 in all) are kept for egg production and for meat needs which occur most often during festival times. Two goats provide milk for the household. The chickens are fed on scraps from the family meals and other wastes which arise from day-to-day activities. The goats consume various forage foods gathered by the children from areas around the neighborhood.

The farmer interviewed appeared well-pleased with the results of their farming efforts. He had come from an agricultural background and was glad that he was able to continue successfully in this tradition while residing in the city. He did express fears that with the coming of more intense urban development, his landholdings and livelihood may be threatened.

The fact that this household reported complete self-sufficiency in terms of food needs, based on its own production efforts, marks it as an anomaly. In most cases, household diets are only partially supplemented by household production. The degree to which food and other needs are met from domestic production varies from one household to another. More often than not, a household cannot depend entirely on its own agricultural production and must turn to other types of income-generating activities. These households often tread a very thin path, as illustrated in the next example.

Example #2: Temple Residents

The Pachayli Ghat temple houses a total of 600 persons, off and on. Most live on temple grounds and eke out livings performing a variety of odd jobs as they become available around the area. Some have family rights to small parcels of land within the temple compounds which they cultivate as small vegetable gardens, to varying degrees of success.

The farmer interviewed in this case is a member of a household which has been residing on these lands for many years. His family consists of three persons, all of whom depend upon him for their subsistence. He is over fifty years old and has no regular job. He does till a very small plot of land, though, on which he grows a vegetable crop. He also owns one cow, given to him as a gift by a relative a few years ago.

The vegetables grown are consumed by him and his family, but are not enough to satisfy all of their needs. The milk

from the cow (he gets 3.5 liters a day) is sold on the streets to purchase additional food. Pure milk sells for rps. 4.00/600 ml.^{*} This man, however, dilutes his milk with water and sells it for rps. 2.00/600ml., the standard price for 'unpure' milk. By selling it this way he can make a bit more money. And, as he says, sometimes he is able to sell his diluted milk as 'pure milk' and thus double his income.

The earned results of his agricultural efforts are not enough for him and his family to live on. He must also turn to begging for additional food and money, especially during the winter months when he must pay to have his cow lodged inside another's shed. He is too old to be considered for manual labor and the options for other types of work are very scarce or do not exist. The day-to-day life of this man and his family illustrate the marginal living of many of those farmers with very scanty resources.

A third example illustrates a situation which is common among the urban agriculturalists in Kathmandu. That is, it illustrates the case in which a household is only partially dependent on its agricultural production as a food source. The head of household (and at times other members of the household) is also engaged in another occupation which supplies a cash income for the household.

^{*}As of September, 1980, one Nepales rupee equals approximately .09 U.S. dollars.

Example #3: Shopkeeper/Farmer

The household, in this example, is residing in a highly-congested part of the Jaise Debal area on the city's southside. The head of household is also a small shopkeeper, owning his own business. His is a very small shop, one of the ubiquitous small enterprises selling a wide variety of day-to-day items which range from bolts of cloth to soap to kerosine. He and his wife spend most of their day seeing to the operations of this small business. In the early mornings and later evenings they tend to the chores associated with their farming enterprise. This household does not own the land which it farms, but rather the head of household works it on a tenancy basis. Since it is situated directly across the street from his shop, he can keep an eye on it during the day while he is engaged in shop-related activities.

This particular household owns no animals for meat or dairy purposes. Their land is devoted to the cultivation of just three vegetable crops - maize, beans and pumpkin. They provide a substantial supplement to the household diet, in some years up to fifty percent of their daily food intake. While they act primarily as an activity in addition to the shopkeeping duties, this household's agricultural efforts serve to satisfy a large part of the household's food needs. In discussions with the farmer, the importance of these activities to him and his household needs is frequently mentioned. None of this household's production is directed to the market,

but rather is consumed entirely by household members.

SUMMARY:

The situation facing the urban tiller in Kathmandu are ones not so much different than that facing many small farmers throughout Nepal. In this chapter I have discussed specific characteristics of production and the use of production. A major constraint placed on productivity is the small size of the land holdings. The fragmented and often dispersed parcels of land and urban farming household may still preclude enjoying most economies of scale and prohibit the efficient production of certain crop types, most notably rice.

The urban tiller is, however, in a unique position of living and working fields that are very close to the urban market. The demand for vegetables is great. His location near the market, the relatively high prices paid for vegetables, and his reliance on traditional, labor-intensive transportation puts him in an advantageous position in many respects. He can market his goods throughout the city, reaching those areas neglected by larger enterprises originating from outside of the city. He is also able to offer his produce at a price lower than what is generally found in the established market area at Ganderbahl.

The production of vegetables reflects an intensive utilization of land resources and conform to a Von Thunen-type analysis which recognizes the spatial interaction between

varying types of agricultural land use as being determined by proximity to a commercial market. The Jyapu farmer of Kathmandu is in the unique position of being located directly within the market area. The cultivation and sale of a portion of the household's vegetable crop provides the household with a cash income which can then be used to purchase rice supplies and other household necessities.

In discussion with individual farmers about problems which they perceive as threats to their production system, several points are emphasized. The most obvious were land shortages and a lack of adequate fertilizer and seed. Also reported to be important were problems of theft, weather and the threat from developers. Few steps are taken to combat theft other than watching over the fields whenever possible. Fences are almost non-existent except in those cases where an agricultural field occupies an interior courtyard. The issue of development will be considered in the next chapter.

CHAPTER VI

URBAN DEVELOPMENT TRENDS

The presence of agricultural lands within the city of Kathmandu reflects, in part, their relationship to the development of land resources for urban-related uses, represented by residential, commercial, industrial and infrastructural needs. In Chapter 3 I discussed aspects of this relationship in terms of the compatibility and conflict of land use. In Chapter 5, this subject was again approached and was considered in light of the size of agricultural landholdings, their relative location, and the associated use of the land within the structure of the urban system.

In this chapter I shall look more closely at the trend of development emerging within Kathmandu. Patterns of land use, changing land values, and dynamic processes associated with the growth of the city will be investigated. Specific attention shall be paid to the question of whether agricultural lands currently available in the city will continue to survive amidst an intensified process of urban development and growth.

THE GROWTH OF KATHMANDU

To better understand the present morphology of the city, as well as potential future patterns of development, it is useful to acquire an awareness of the unique processes and patterns of change which have affected the spatial and functional structure of Kathmandu. In doing so, I shall rely heavily on the work of Professors C.B. Shrestra and W.M. Malla. (Shrestra, C.B. and U.M. Malla; "Urban Centers of the Kathmandu Valley" <u>The Himalayan Review</u> 1969-70)

Kathmandu embodies a complex and often confusing urban system which reflects the impact of successive phases of cultural, economic and political leadership. The ancient Newari civilization, the Buddhists, the Hindus, and the Rana Family regime have all left their mark on the city's physical and cultural landscape. (Shrestra, C.B. and U.M. Malla; "Urban Centers of the Kathmandu Valley" <u>The Himalayan Review</u> 1969-70) The impacts of these distinct historical phases overlap and mix with current attempts at modernization and lend a unique flavor to the spatial character of the city's residential, commercial and industrial zones.

Most of the growth of Kathmandu took place in the 15th through the 18th centuries, when it emerged as the political and economic center of the kingdom. During the latter part of the 18th century, Kathmandu developed rapidly as a cultural center, as well, and the art manifested in the architecture and artisanry of the city testify to its role

as a center of Himalayan art forms. During this period, the city grew in a fashion dictated by its fortress-status. A network of walls and gates sectioned off the city into a number of small but distinct areas associated with a particular courtyard or square (Tols). (Shrestra, C.B. and U.M. Malla; "Urban Centers of the Kathmandu Valley" <u>The Himalayan</u> <u>Review</u> 1969-70) Each tol, or sector, developed a very intensive use of the land for residential and commercial purposes.

During rule by the Rana family in the 19th and early 20th centuries. Kathmandu was virtually closed off to western influence. The period of modernization and industrialization which swept through much of India did not penetrate into the capital city of primarily agrarian Nepal. Instead, under the Rana regime, the growth of the city as the administrative center of the kingdom came to be associated with the emergence of architecturally-complex palaces and elaborate gardens and parks which were built outside of the traditional residential and commercial quarters. These structures which reflected the royalty of the Rana family, acquired roles as cultural barriers. (Shrestra, C.B. and U.M. Malla; "Urban Centers of the Kathmandu Valley" The Himalayan Review 1969-70) They also proved to be influences upon the spatial organization of the city as well. With increases in the urban population and accompanying increased pressure placed upon available space, the compactness of the tols gave way to a sprawling development which expanded the city's

residential and commercial areas outward onto surrounding lands. There has occurred a concomitant gradual flow of persons from the highly-congested, traditional quarters to the newly-developed sites. Open land was readily available for a price much lower than current market prices and the building and construction which followed employed a much less intensive use of the land resources. Open spaces remained as residential and commercial quarters clustered along main transportation arteries.

CURRENT TRENDS

The areas which were developed in the 1940s through the 1960s for residential and commercial purposes continue to be important in the 1980s.

In particular, the areas of Naxal, Tangal, and Lainchaur in the northern part of the city are being heavily developed. The southern areas of Tripureswar and Lagan Tole are also experiencing much building and construction associated with residential housing needs and the rise of touristoriented hotels and restaurants. In the east, development has been curtailed by the presence of the Vishmumati River acting as a natural barrier to the spatial expansion of the city in this direction.

A very visible component of this newer development is the appearance of modern office complexes and diplomatic quarters which are growing in accompaniment to the emergence of Kathmandu as an internationally recognized administrative

and economic center. The complexes associated with these institutions generally make use of relatively large tracts of land for buildings and adjacent lawns and gardens and add to the expansive nature of development in these areas.

PATTERNS OF GROWTH

Contemporary Kathmandu is experiencing rapid growth, both in population and land area. The spatial expression of this takes what is essentially two forms. One is an outward expansion of the urban system onto surrounding rural lands. The second is an intensification of land use within already-designated urban boundaries. Both of these forms will be discussed with an emphasis on their impact on the urban agricultural system.

The Process of 'Implosion' in Kathmandu: Intersticial Growth

The flow of more and more people into a restricted amount of space is a phenomenon demographers have designated "implosion". (Borgstrom, Georg; 1973, p. 78) What this does is greatly increase the pressures exerted upon the available land resources and necessitates the utilization of such land in a much more intensive fashion. Such a growth process leads to an increased use of any open spaces which might exist, that is, intersticial growth. This phenomenon has been associated with the urbanization process throughout the world. * It is no less a factor affecting the urban system of Kathmandu.

The intensification of land use within the presentlydefined urban boundaries of Kathmandu takes on a number of forms. What is not observed here is the extreme verticle growth often associated with expanding urban centers; that is the use of air space rather than land surface area, by constructing high-rise development. (Rugg, Dean S.; 1972) Granted. Kathmandu does exhibit the use of two and even three story buildings within its urban structure. Shops usually occupy the first story with residential quarters taking up the top floors. (Karan, PP.; 1973) But this reflects the traditional architectural style and not recent modernization trends. This situation is undergoing change, however. In the areas of Naxal and Tangal where much of the tourist-related development and diplomatic quarters occur. there is a shift toward multi-storied hotels and residential apartments. The southern areas of Lagan Tole and Tripureswar are also experiencing an increase in four and five-storied apartment complexes and hotels. But the pattern of development in Kathmandu associated with the implosion process is mainly along horizontal lines and is directed primarily toward the more intensive use of currently available open spaces.

^{*}The reader is referred to Brunn, Stanley; <u>Urbanization in</u> <u>Developing Countries: An International Bibliography</u> (East Lansing: Latin American Studies Center Research Report No. 8, Michigan State University; 1971), 693pp.

Impact of 'Implosion' on Agricultural Lands

The land resources integral to the urban agricultural system are represented in the form of open spaces within the city. It becomes a key issue to determine how the increasing intensity of land use for urban purposes, other than agriculture, affects the continued operation of this system. Perhaps the most intuitively obvious result of this process would be a continued 'squeeze' being places upon such open spaces, until they no longer exist in present form. There is no doubt that a significant amount of open space, and thus land resources available for agriculture, will be lost to this phenomenon. Whether or not the final result will be the ultimate disappearance of all such lands must be investigated more closely.

I have discussed in previous chapters the relative size of landholdings which are incorporated into the urban agricultural system. They are, for the most part, extremely small. Moreover, they are widely dispersed, fragmented, and often of questionable ownership. These factors play an

^{*}I have not discussed this aspect of land ownership before. It seems appropriate to do so at this time. Registration of land ownership and tenancy rights within Kathmandu are fraught with error. The adjucation of cases involving land ownership and tenancy claims is a primary function of the district land administration office and the time spent in dealing with such situations is enormous. In 1966, in the Kathmandu District Office, there were over 18,000 cases pending which involved land ownership records. Most errors are rooted in clerical mistakes, boundary drawings, and questionable ownership claims. This situation makes the transference of land titles a very lengthy and delicate process. (The Food Problem in Nepal: Its Magnitude and Requirements for Solution, report of a committee, May 26, 1967, Kathmandu)

important role in the relationship between land for agriculture and land for other urban use; and may prove to be to the advantage of the former.

In discussing the comparative advantages of urban land resources and how the bidding process affects the utilization of these resources, Ratcliff notes that the pattern of land use in a city is developed through ". . . a strong tendancy . . . for each site to be developed in its highest and best use through the competition of entrepreneurs. . ." (Ratcliff, R.V.; 1949; pp. 356-57. As cited in Soloman, 1969; p.4) How this concept can best be applied to the agricultural lands within Kathmandu reflects both the nature of landholdings in terms of size, ownership and dispersal, as well as the <u>relative</u> location of such lands. Soloman suggests that ". . . it is not possible to place a value on a vacant plot of land without first assuming a use for it in some process or system of development. . ." (Soloman, R.J., 1969; p. 4)

THE EFFECTIVENESS OF AGRICULTURAL USE OF OPEN SPACES

The question arises whether the agricultural lands in Kathmandu can be effectively used in other types of development; most notably building and construction. For some, the answer is yes. Many lie in areas already incurring a considerable amount of new development. It will be only a matter of time before the adjacent open areas become

incorporated into a system of buildings, parking areas, transportation arteries or other associated development needs. When the questions of land ownership are settled, when small parcels of land can be effectively organized for purchase, and when the owner(s) are presented with the high market prices for their land, then there is little doubt that the rights to a significant proportion of such lands will be transferred to real estate developers and enter the development scheme.

However, there does exist those lands which, by virtue of their individual characteristics. may not be especially amenable or attractive for non-agricultural development purposes. When a land use change is brought about such as one from agriculture to non-agricultural use, a situation arises which is not unlike a loose interpretation of the physical laws of inertia. Bourne raises such a notion when he states. ". . . Once an area is occupied by a given class of use the environment created is such that land is often removed from subsequent occupation by different uses, unless succession is of a significant scale to alter this environment. . ." (Bourne, Larry S.; 1971; pp. 3-4) The pattern of use of such lands for agricultural purposes in Kathmandu is a long-standing one, and implies a cultural as well as an economic and physical association. It can, of course, be argued that a new use of these lands for building and construction purposes would constitute 'a succession of

significant scale' and thus could alter this traditional use. In cases, this will no doubt happen. But the nature of landholdings as described above (i.e. small in size, widely dispersed, questionable ownership) may preclude this transition. Again, as Bourne points out, ". . . Land fragmentation, heterogeneity of ownership, and property obligations make this scale of change immensely difficult. . ." (Bourne, Larry S.; 1971,p.4)

It simply may not be feasible for developers to set their sights on the small, fragmented parcels of land contained within the city and which are presently being used for agricultural purposes. Would it not be a more effective use of time and capital to concentrate on the outlying areas which exhibit lower land values and more readily accessible landholdings?

A second feature of agricultural land characteristics which must be addressed here is the <u>relative location</u> of such parcels of land. This may be approached in two ways. One concerns the spatial distribution of open spaces which are being used for agriculture. Where are they located in relation to other forms of urban land use? The other also considers location, but concern here is placed on location relative to adjacent, primary use. That is, if a parcel of land that is being cultivated is located within the grounds of another type of land use that is actually the primary use of those lands (such as schoolyards or temple lands), then what future alternatives are in store for those open spaces?
If we look first at this issue of distribution, we can make use of the concept set forth by W.T. Martin, in which he states that, ". . . a population. . . tends to distribute itself around a point of intersecting transportation and communication lines. . . all persons and groups compete for the limited number of sites at this favorable location where accessibility, vehicular and pedestrian traffic, and the potential number of social contacts are maximized. . ." (Martin, Walter T.; 1953; pp. 15-16)

Applying this concept to an urban system, one can discern definite patterns of land occupancy, for both commercial and residential purposes. In Kathmandu commercial enterprises, apart from those in the central marketing area, are restricted primarily to land directly adjacent to the transportation routes into the city and well-travelled routes within the city, including both pedestrian and vehicular routes. Residential development patterns are closely aligned to this distribution of commercial enterprises, but not exclusively so. The areas exhibiting highest population densities reflect the most favorable locations in respect to such factors as transportation and accessibility. Areas which are furthest removed from such locations and which are situated in what are essentially interior sections of a transportation grid, exhibit the lowest land values and are the least densely populated.

These interior areas also often reflect unfavorable sites for development such as hilly areas or depressions which are not amenable to the establishment of roads or avenues, or the construction of buildings. The placement of intra-city agricultural lands is most often within the interior sections of such a grid, composed of the major transportation routes. While they are not totally secure in this position, these agricultural lands do occupy areas that will be developed only after other, more attractive locations are used. If the pattern of development assumes a horizontal expansion outward, these lands may remain relatively isolated for some time.

A second approach which can be taken when considering this issue of relative location deals with relationships between the use of land for agricultural purposes and the associated (and most often primary) use of the land. It has been assumed in the foregoing discussion that open lands currently being used for agricultural purposes are potentially available for other uses, that they are a part of the "bidding process" integral to Von Thunen's analysis of land use. In fact, factors associated with the nature of landholdings (i.e. size, heterogenity of ownership, etc.) and their relative locations may preclude their inclusion into other development schemes having a more commercial or industrial urban use.

As has been mentioned in Chapter Four, there does exist a significant amount of agricultural land that is

directly linked with another land use that is its primary Temple complexes (Guthi lands) have associated open use. spaces used by residents of the temple grounds or tenant farmers from the outside for agriculture. School grounds include agricultural lands cultivated by tenant farmers. Administrative complexes, parade grounds, government estates, diplomatic quarters, interior courtyards, and 'backyard' kitchen gardens are additional features within the urban system which incorporate significant amounts of land which is devoted to agricultural production. These are all forms of land use which will retain their individuality in the face of ongoing urban development. Thus they will remain longest as sites for continued agricultural activities even if building and construction puts 'the squeeze' on all other available open space. Unless radical changes are imparted onto the land use system, these lands will remain integral features of an active urban agricultural system.

THE DEPLOSION PROCESS

I would like to extend this line of thought to discuss how the outward (horizontal) expansion of the urban area might affect the agricultural system operating within the city. This phenomenon, often referred to as 'deplosion' is marked by a movement of urban residents and associated land uses away from the city center and onto surrounding,

mainly rural lands. (Borgstrom, Georg; 1973, p. 78) It is a process which has received considerable attention in the literature because of the direct conflict it creates with rural agricultural land use. I will not address this discussion to the effects of such a process on the dynamic interaction of urban and rural areas. I will, however, address the issue of how it affects the agricultural lands within the city.

As the population of Kathmandu increases, overcrowding and congestion within the central city also increases. The opportunities for residential and commercial development decline. Moreover, the cost of those opportunities become greater, and in many cases prohibitively so. A discussion of land values for areas within Kathmandu must be approached with several points in mind. The first is recognizing that there does not exist any standards for land value appraisals. There is no centrally-administered method or institution for dealings in land sales. There is no fixed price; but rather, each transaction is handled separately and the settlements may fluctuate widely.

In an attempt to gain a grasp of the current (1980) land values for different areas of the city, I interviewed three separate land developers/land trading persons. The land values shown in Table 6.1 are based on information obtained in discussions with these individuals. It was emphasized to me that these were not 'hard and fast' values,

Area	Sale Price
Durbarg Marg	Twenty
Rani Pokari	ten to twelve
Thamel	eight to ten
Lazimpat	four to five
Naxal	four to five
Dilli Bazaar	four to five
Tripureswar	five
Chetrapati	three
Naya Bazaar	two
Garidhara	two
Thapathali	three to four
Teku	three to four

TABLE 6.1. Land Values for Selected Areas in Kathmandu(in lakh rupees per ropani)**

*Based on roadside land ** One lakh equals 100,000

but do show general trends. They indicate a decrease in the prices a parcel of land commands as the distance from the city center increases. This process is well-accepted phenomenon among urban planners and students of development.*

The lone factor of distance, however, cannot account for all aspects of these price differentials. We must also

^{*} R.J. Johnson argues this point when he states rather simply that ". . . land values decline with distance from the city center. . . " (Johnson, R.J.; 1977, p. 371)

consider the introduction of transportation arteries into this scheme. It has been noted earlier that people tend to congregate at sites most favorable in respect to accessibility, transportation and social contacts. (Martin, Walter T., 1953) The most intense development of land in Kathmandu for urban-related use tend to align itself with the major transportation arteries into town and the major transportation linkages within the city. This is the most logical pattern if we assume that such development is directly interacting with the social, political and economic milieu of the city. Simply put, by being nearest to access points leading into the city center, the commercial and residential development is most economically (and conveniently) located.

Returning to the land values listed in Table 6.1 and to discussions with individual land developers, it must be noted that these values are based on land directly adjacent to major roadways. They represent the highest land values and are predominantly used for commercial purposes, primarily shops and retail businesses. As one moves away from these major roadways, but remaining within the same area, the price drops - as much as fifty percent in some instances, and the land use becomes mainly residential. It is in these areas furthest away from the major transportation links, that agriculture becomes a significant use of the land, occupying the available open spaces.

A third factor which must be considered here is the role of environment - both physical and social. In

investigating this issue, within a western context, Papageorgiou suggests that location in part. is determined by environmental quality. The less-congested, outlying areas represent a much more attractive environment to persons seeking a relief from the overcrowded conditions which occur within many areas of the city center. In Kathmandu, the use of newly-developed outlying areas for residential purposes employing an extensive use of land resources is associated primarily with a wealthier class of people enjoying the financial resources needed for initial land purchases and additional transportation costs. In addition to higher class residential development is the rise of new hotels, government complexes and diplomatic quarters - all of which are directed to the outlying areas, and all of which exhibit a more extensive use of land resources than what is observed in the traditional quarters.

THE IMPACT OF DEPLOSION ON AGRICULTURAL LANDS

I have so far addressed the <u>process</u> of expansion occurring Kathmandu. Most important to this study is the <u>effects</u> of such a phenomenon on the agricultural lands located within the city. Just as urban growth directed toward a more intensive utilization of open or vacant lands within the city has left its impact on agricultural landholdings, so too does the 'deplosion' process. But in quite a different fashion. Whereas implosion, or intersticial growth,

poses a direct threat to available open areas, deplosion, or horizontally expanding growth, may prove, in an indirect way, to be to the advantage of a continued use of open spaces within the city for agricultural purposes.

What happens to open land within the city when the population begins to disperse outward? One result is a reduced stress being placed on the open lands within the city. As Bourne points out, ". . . Vacant land is absorbed into use, but at a decreasing rate, as areas of residential use expand. . ." (Bourne, L.S.; 1971, p. 6) Open spaces will still be increasingly incorporated into non-agricultural use, but at a slower rate. Moreover, those agricultural lands occupying sites least amenable to other uses will retain their status quo (i.e. agricultural use) for a longer period of time than what otherwise might be the case.

There is, of course, a trade-off taking place. While <u>intra-city</u> agriculture may benefit through the deplosion process, agricultural lands located in the rural urban fringe will feel most heavily the burden of such growth. The loss of cropland to urban land use is a topic which has received a good deal of attention in the literature. It is not only the physical transformation from one use to another, but there is also a psychological impact stemming from not knowing what the future will hold. Gowda and Mahdev include this idea in a study of the rural-urban fringe transformation in Bangalore, India. They state that,

"Speculation of the land for urban use results in the withdrawal of farmer's labor as well as the capital resources from agriculture. Since the farmer waits for offer (sic) by urban developers, there is no incentive for him to make long term investments on farm improvements . . ." (Bourne, L.S.; 1971; p. 6) Moreover, they add; ". . . In this uncertain environment, farm land is left idle by both the farmer and the developer. . ." (Gowda, P.B. and P.D. Mahdev, 1977; p. 2)

Agricultural lands are being displaced further and further away from the city center as a result of a bidding process which places a higher value on fringe lands for urban-related uses than for agricultural purposes. Does this process also affect the agricultural system operating within Kathmandu? Again the answer is yes. If agricultural production in the outlying rural areas is pushed out beyond a certain point, a number of things can happen. It may no longer be feasible for a small farmer residing in the outlying fringe area to transport his produce into the city markets by foot power. He may choose, instead, to market the goods nearer to his land through 'farm-gate sales' along the main road or at a nearby intersection. (Gowda, P.B. and P.D. Mahdev, 1977; p.2) If Kathmandu remains the major market center (as for example with larger concerns), then costs associated with the increased transportation distance would rise. This would be felt in the

marketplace through an increase in prices for such agricultural products. Those farmers operating within the city would be placed in a more advantageous position because they would not be incurring these additional transportation costs. They would be in a position of being able to market their goods at a price lower than what outside farming enterprises would need to charge, and thus experience a strengthening of their competitive edge.

SUMMARY

What we see emerging here is a process of land development which has varying effects on the urban agricultural system of Kathmandu. An intensified use of open spaces within the city for non-agricultural urban use places a direct threat on the continued use of such land resources for food production. This situation is ameliorated, however, by the size of landholdings, ownership patterns and relative location. By virtue of their small size, fragmented and questioned ownership, and unfavorable site characteristics, a significant amount of these lands may survive the 'squeeze' being placed upon available open spaces within the city by the process of 'implosion'. In addition, the added opportunities for development in outlying areas can serve to lessen the stress placed upon intra-city agricultural lands, by directing development outward, rather than occupying vacant or open land in the city.

CHAPTER VII

ANIMAL HUSBANDRY AND THE PRODUCTION OF ANIMAL PRODUCTS

The emphasis of this study so far has centered on the cultivation of plant products. The urban agricultural system described and analyzed in the preceeding chapters incorporates a land use scheme and farming activities and inputs directed toward achieving the production of various crop types, most important being vegetables. But this system also includes a significant amount of attention directed toward the yield of animal products. In the city of Kathmandu, as in cities and towns throughout South Asia, the presence of livestock, poultry and other food-producing animals is a ubiquitous sight. Cows, especially, are common in the South Asian city, its languid presence a seeming anomaly to the hurried activity of the contemporary city. As the anthropologist Marvin Harris notes, they ". . . wander through the streets, browse of the stalls in the marketplace, break into private gardens, defecate all over the sidewalks, and snarl traffic by pausing to chew their cuds in the middle of busy intersections. . ." (Harris, M., 1974; p. 12)

Among the population of Kathmandu, unlike many Indian cities, there is not a strong adherence to what

has come to be referred to as 'cow love'. This term is often used to explain the presence of untold numbers of seemingly useless cows in Indian cities by giving it a metaphysical connotation and linking it to various religious taboos. (Harris, M., 1974, p. 12) Many, and Harris is among them, emphasize the economic role such animals play in the way of food production (primarily dairy products), manure for fertilizer and for use as traction animals. It is argued that the animals are allowed to exist and roam the cities' streets because they fulfill an important economic function.

In Kathmandu, which is predominantly Hindu, there are certain religious prescriptions which discourage the use of certain meats in the diet. But adherence to such taboos varies widely between individuals and between families. (Bista, 1972) Food-producing animals observed within the city are there to serve a purpose. That purpose is linked directly to household food production and thus becomes an essential component of the urban agricultural system.

In this chapter, I shall consider the role animals play as a source of meat, eggs and dairy products for household consumption and for sale in the market. Those animals encountered most frequently within Kathmandu include poultry, goats, cows, and bullocks. Table 7.1 provides an enumeration of those animals being kept by the sample

	A. # of house- holds owning at least one of the follow- ing.	B. Avg. #/ household A	C. Total # of each animal
Chickens	15	4.13	62
Ducks	2	2.50	5
Goats	6	1.66	10
Cows	7	2.43	17
Wild Boars	1	1.00	1
Peacock*	1	1.00	1

TABLE	7.1.	Animal	Population	of	Sample	Households
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* The feathers are sold during religious festivals for decorative wear and for handicraft work.

households. In Table 7.2 a comparison is made between characteristics of animal ownership within the sample group and those of Kathmandu District in total.

	Sample Households	Kathmandu District*
Milk cow	.49	.23
Poultry	1.77	2.15
Goats	.29	.85
Milk Buffalo	-	.06
Sheep	-	.23

TABLE 7.2. Number of Animals per Household

***SOURCE:** Agricultural Statistics of Nepal, 1977.

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ANIMAL REARING CHARACTERISTICS

A total of 54.3 percent of all households surveyed own at least one animal for food production. The distribution of animals within this group varies widely, however, and presents a situation in which a household may own as little as one or two chickens (as in the case of two households) or as much as four cows, fifteen chickens and fourteen ducks (as one wealthy urban farming household does). Clearly, this reflects the resources that a particular household has as well as their individual inclinations toward animal raising. It also points to the inadequacies of 'average' figures. In addition, there are a significant number of households (45.7%) that do not own any animals at all and must rely entirely on the marketplace to meet their animal food needs.

When interviewing individual households, it was found that the majority of animal products produced by the household were consumed by that household. This point is illustrated in Table 7.3 and points to the subsistence orientation of animal rearing among the urban agriculturalists.

Table 7.3 also shows a small proportion of the animal products going toward worship purposes. This is not to be confused with the extensive animal slaughtering associated with certain major religious festivals, such as the Dasai Festival held in October, in which large numbers

	Percent
Consumed directly by household	86.0
Sold in markets	10.0
Used for religious purposes	4.0

TABLE 7.3. Use of Household Animal Food Production

of animals, primarily goats and chickens, are slaughtered in the streets of the city. Rather, this figure reflects the use of small quantities of milk or eggs during day-to-day puja offerings. For the larger, annual ceremonies, animals destined for sacrificial slaughter are purchased separately - specifically for that purpose.

In questioning farmers about the effectiveness of household animal-rearing, it was found that an average of 11.4 percent of the perceived animal food needs of a particular household was met by household production. While this may not seem a particularly large amount, such an 'average' figure obscures the importance of such activities at an individual level. For 23 percent of the sample, household production accounts for over half of the animal products consumed by that household.

The role of household animal-rearing is an important feature of the meat and dairy foods exchange occurring within the city as well. Most is consumed directly by the household, but there is also that portion which is sold within the urban marketing system. Characteristics of both domestic consumption and marketed animal products are included in the discussion which follows.

PRODUCTION CHARACTERISTICS

The production of animal goods in the urban system is an intensive activity, and as such, underlies its compatibility with the other agricultural pursuits of the urban household. The animals are raised within household residential quarters and are fed a variety of household and plant wastes. Dr. Martin includes animal rearing as a component of his intensive, subsistenceoriented small farm land use design, and emphasizes the role of small meat animals such as poultry and the use of goats for effective milk production. (Martin, 1980)

W.P. Blount has also investigated the effectiveness of various kinds of animals for food production on a small farm and argues in favor of intensive types of livestock such as pigs and poultry. (Blount, 1968) Pork is considered unclean and the sale of pork and trading of pigs is prohibited within Kathmandu. (Lee, 1971) Poultry raising, however, is an important activity among the urban agriculturalists (See Table 7.1) and provides the household with meat as well as eggs. Blount does not consider dairy cows as an intensive type of livestock because they are not housed during the whole of their productive lives and use large land areas for food. (Blount, 1968) In Kathmandu, however, the raising of this animal <u>does</u> represent an intensive activity. The cows are housed within inner courtyards or in sheds built adjacent to the house and rely on food gathered by household members or on small plots of vacant land for grazing.

It is argued here that animal production does not present a conflict of food use or land use between animal and man or animal and cultivated crops. The feed for animals is derived from sources not used by persons living within the city. These include scraps and waste products discarded by the household as well as a wide variety of grasses and plant roughage growing in scattered areas around the city and which are not used directly by humans as a food source. Much of the plant food directed to animal feed is comprised of cellulose material not digestible by man but which can be broken down by ruminant animals' digestive systems. The conversion of waste products into food for the household or into a marketable commodity used to generate a cash income is an essential feature of intra-urban animal production.

In a small number of instances, animals can be observed grazing on rather large plots of land which could be used for cultivation purposes. This is not a common sight, however, and is restricted primarily to those parcels of land which are soon destined to be incorporated into non-agricultural development and thus not amenable to a sustained cultivation system.



Figure 7.1: Animal Husbandry - Courtyard Livestock



Figure 7.2: Animal Husbandry - Grazing Cattle

DAIRY PRODUCTION

As Martin notes, ". . . Milk and milk products are often neglected on small farms because they are the most difficult class of food to obtain. . ." (Martin, 1980) There are, however, alternatives which may be pursued by the urban agriculturalist which would allow for the effective production of milk products.

One such alternative is to raise those animals which can produce such an item while still remaining within the economic and physical constraints of the urban system. This can only be accomplished by using those resources that are available in the most intensive fashion possible.

Goats are a reliable source of milk and milk products and, as seen in Table 7.1, play a significant role among the animal-rearing households of the urban area. Again, as Martin points out, ". . . Goats can consume remnants of food and farm byproducts, and when carefully staked and moved from site to site, can control weeds along roadsides, and ditches, under fruit trees and around buildings. . ." (Martin, 1980; p. 52) In Kathmandu, goatrearing is carried out precisely along these lines. They compete with the chickens for household scraps and are tethered along walls, buildings and roadsides to graze on unused grasses and weeds. While initially a substantial investment, goats can contribute greatly to the continuing household food budget.

The other major supplier of milk and milk products in Kathmandu is the cow and she-buffalo. Again, feed for these animals comes from sources not directly used by persons residing in the city. It is interesting to note that a considerable amount of pasturage is made available by way of government lands. On the Bagh Bazaar Road and in other areas near the Royal Palace compounds are situated a number of government administration buildings. These very often include expansive, walled-in open spaces left in native grasses. Before and after working hours, local people are allowed to bring their cows into these areas to graze. In some instances grazing prohibited and the grasses are left to grow. After it has reached a certain length (.5 to 1.0 meters), young girls are allowed to enter and cut it to take home to feed the family cow. For each large bundle they carry away, a fee of 50 paisa (approx. U.S. \$.04) is charged. In addition to the government office compounds are the expansive tracts of open lands at Ratna Park and the

[&]quot;Interviews with several farmers raising milk cows indicate that they receive from 3.0 to 4.0 liters of milk per day from one cow. This compares favorably with average milk yields of 4.5 litres obtained from cows raised in the humid tropics on good pasture (Williamson, Payne; 1965) It is nowhere near, however, the expectations of a western-style commercial dairy production system which exhibits yields of 2-2.5 gallons of milk per day (Lockwood, 1977). In making such a comparison, though, we must note the fact that the animals within this urban system are making use of what are essentially waste products and thus represent very effective food producers.

military parade grounds. In these areas, cows, buffaloes and goats are allowed to graze so long as they do not interfere with official ceremony or other primary use of these lands.

MARKETING OF DAIRY PRODUCTS

Returning for a moment to the discussion presented in Chapter Five concerning the Von Thunen analysis of agricultural land use, we note that, in addition to vegetable production, the most important use of the innermost zone of agricultural activity is for dairy production. (Hall, 1977) The perishability of this product prohibits its inexpensive transport over long distances. In addition, cold storage facilities are not readily available in Kathmandu and milk is kept on hand by individual households on a day-by-day basis only. Thus milk and milk products must be made available on a regular basis at a reasonable price if they are to be an effective component of the urban marketing system. For all practical purposes they must originate from an area within close proximity to the urban market. The dairy production which occurs within the city represents a very favorable situation in this regard.

Milk products entering the Kathmandu market take essentially two forms - government controlled sales and unregulated sales. Officially, all milk sold in the city must be from a healthy cow or buffalo. Cow milk must contain 3.5 percent solid fat and buffalo milk, 8.5 percent. Milk mixed with water is prohibited. Moreover, all milk must be stored in unscratched, enamel-painted containers which should be covered at all times.^{*} In practice, such regulations are often overlooked. Milk which is sold on the streets by local farmers is often stored and transported in unpainted ceramic or glass containers and may be diluted with proportionally large amounts of water.

The Dairy Development Corporation, through the Central Dairy outlet, distributes two types of milk bottled and open. Bottled milk is distributed to individuals holding coupons registered with the Central Dairy. The container size is one-half liter, and the average sale is one bottle per household. Open milk is sold for cash and is ladled out into containers brought to the Dairy by individuals. The average sale of this type is one-fourth liter. (Interview with Central Dairy, Kathmandu (1980))

According to an estimate by the Central Dairy, approximately 30 percent of the daily milk collection is brought to the Central Dairy by local farmers. (Interview with Central Dairy, Kathmandu (1980)). Table 7.4

[&]quot;Laws and Regulations on Marketing of Agricultural Commodities, (Economic Analysis and Planning Division, Ministry of Food and Agriculture; His Majesty's Government of Nepal, September 1972).

illustrates the role of local milk production in the total milk products distributed by the Dairy.

Local Milk Component <u>(liters)</u>	Total Pasteur- ized Milk Produced (liters)
968,627	1,632,748
1,315,507	1,802,257
1,824,545	2,482,825
1,615,065	2,744,925
1,927,378	4,369,117
2,984,575	6,522,678
	Local Milk Component (liters) 968,627 1,315,507 1,824,545 1,615,065 1,927,378 2,984,575

TABLE 7.4. Milk Products Distributed by Central Dairy

SOURCE: Dairy Development Corporation, Kathmandu.

The trend illustrated in Figure 7.1 points to a marked decline between the years 1972 to 1980 in the local milk component as a percentage of the total pasteurized milk production. This decline should not be attributed entirely to a decline in local production. It may instead reflect differences in the market strategies employed by local producers. Note the word <u>pasteurized</u>. Both Table 7.4 and Figure 7.1 both illustrate the position of <u>pasteurized</u> milk production. In order to be marketed through the Central Dairy, all milk must undergo a pasteurization process. The small farmer in Kathmandu who is producing milk products will often choose not to go through



Figure 7.3: Dairy Production

the Central Dairy. Instead, he will sell his milk on the street in unsterilized, raw form. Moreover, it is often diluted with water. In speaking with different farmers, it was discovered that water sometimes constitutes 60-70 percent of the volume of milk sold. While officially prohibited, such activities do occur on a very widespread basis. "Pure" milk sells for rps. 4.00/600 ml. and "unpure" or diluted milk sells for 2.00/600 ml.

The situation illustrated in Figure 7.1 may reflect a trend in which local production is being directed away from the regulated market and toward street sales, rather than strictly a decline in local milk production. Unpure milk is sold in the early morning hours by street vendors whose buffalos and cows are situated in the city or easy walking distance away. The primary markets are the small hotels and restaurants, and the many tea and sweet shops which line the city's streets and where the unpure milk is easily disguised as an additive to tea and sweets. Such a situation benefits both the producer who can increase his volume of sales by diluting his milk with water, and the purchaser who pays a lower price.

MEAT PRODUCTION

The raising of animals specific ally for slaughter is much less common than for dairy or other purposes. Many times, however, animals are raised which do represent potential meat sources, should the household choose to use

them so. This type of use is often additional to their primary use. For example, chickens raised for egg production are slaughtered periodically to provide meat for the household. The same holds true for goats and to a lesser extent, buffalos and cows which provide milk products.

It must be remembered that by slaughtering such animals for meat, their primary economic function is eliminated. Goats are reared for milk production. Chickens supply the household with eggs. Cows and buffalos give milk, provide manure for fertilizer, and may be used for traction. In all cases, they have a breeding purpose as well. These functions rely on their continued prosperity and their slaughter means not only the short-term end of these important economic functions, but also a threat to the future if breeding stock are removed from the system. In speaking with individual farmers, it was found that the nature of this situation was acknowledged and the slaughtering of animals was not a thing taken lightly. Nevertheless, meat is a part of the diet and is obtained, in part, by slaughtering household animals. How this is handled is an especially interesting feature of the meat production activities within the urban system.

Interviews with individual households indicate that forty percent of the families are raising at least one animal for meat purposes. Poultry are the most important animal type of this group, but goats were also mentioned to

be used frequently for meat. The slaughter of these animals, however, does not represent a significant drain on initial investments nor the elimination of other economic functions because it is restricted to the offspring of already productive animals. Moreover, their slaughter coincides with religious festivals in which the sacrifice of an animal is deemed to contribute to the continued prosperity of the household, and thus serves a dual role. It is estimated that 150 goats are slaughtered in Kathmandu each day.^{*} This number increases sixfold during the festival season which extends from September through November.^{**}

Regulations concerning slaughter of animals and the marketing of meat products do exist on the legislative books of the Town Panchayat. However, active trade in these products does occur illegally within the city . Slaughter of female animals is officially prohibited, as is the sale of pork. The meat of both may be obtained in a number of shops and restaurants operating in this respect, outside of the official regulations.

** Report to His Majesty's Government of Nepal on Agricultural Marketing Development Programs (United Nations Development Program, FAO Rome, 1973).

[&]quot;This figure represents that number slaughtered in registered shops. The animals may originate outside the city as well as within - thus this figure does not represent a daily total of animals slaughtered which originate <u>exclusively</u> from the urban agricultural system.

MARKETING OF ANIMAL PRODUCTS

The sale of meat is to be restricted to licensed shops. In Table 7.5 an enumeration is presented of those shops which are licensed to deal in a particular meat trade. Only the meat from that animal for which a license has been

	Number of Shops
Buffalo	268
Goat	170
Wild Boar	8
Chicken	9

TABLE 7.5. Animal Slaughter Facilities in Kathmandu

SOURCE: License Department, Kathmandu: Nagar Panchayat

issued is allowed to be sold by a particular shop. In addition, Kathmandu Town Panchayat Rules stipulate that a) no roadside slaughter take place; b) all slaughter-houses must be approved by the Panchayat; c) all meat shops must have cemented floors and d) rotten or 'unhygienic' meat must not be sold.^{*} A casual observation of early morning slaughtering activities within the city quickly points out

^{*}Report to His Majesty's Government of Nepal on Agricultural Marketing Development Programs (United Nations Development Program, FAO Rome, 1973)

the inadequacy in the enforcement of these rules. Especially during the festival season, streets are full of 'impromptu' slaughter activities which are not regulated by any central slaughter system. There has been a recommendation set forth that calls for the introduction of public slaughterhouses in Kathmandu but the cost of such a program has prohibited its enactment.

ANIMAL TRADE

A household which chooses to sell an animal has several options. They may approach the central marketing system and sell to established, licensed shops offering the 'going rate'. Animals are traded by <u>dharni</u>^{**}, but in practice scales are rarely used. Table 7.6 gives the prices for various animals as of 1971. Though these represent established rates, it must be noted that the actual prices paid for animals fluctuate widely. As has been mentioned, scales are seldom used. Instead, the animals are hoisted up in the arms of prospective buyers and a person's individual discretion is the final judge of weight. In addition, the price is arrived at only after some time has been spent haggling

^{*}Report to His Majesty's Government of Nepal on Agricultural Marketing Development Programs (United Nations Development Program, FAO Rome, 1973).

¹ Dharni = approx. five pounds.

Live	stock	Average Weight (dharni)	Rps/Dharni	Average Total Cost
Buffa	alo	50 - 100	9.00	500 - 1000
Goat	(castra	ated) 4 - 10	24.00	110 - 240
Goat	(non-			
	castra	ited) 4 - 10	14.00	60 - 140
Wild	Boar	20 - 40	30.00	600 - 1000
Pig		30 - 60	24.00	700 - 1200
Yak		50 - 100	-	300 - 700
Cow		50 - 100	-	200 - 500
Bull		70 - 200	-	500 - 1000

TABLE 7.6. Animal Prices (1971)

SOURCE: C.Y. Lee, <u>Marketing of Livestock and Livestock</u> <u>Products in Nepal</u>; (Ministry of Food and Agriculture, 1971)

over the various offers presented, and the person best adept at bargaining will be the one who fares the best. Of the 60,000 buffalo traded each year in Kathmandu, it is estimated that 15 percent originate in Kathmandu. (Lee, 1971) Similarly, 10 percent of the approximate 50,000 goats traded in the city originate in the city (Lee, 1971)

Besides licensed slaughter shops, a household may turn to the weekly animal market which is held on Saturday mornings at the military parade grounds. Here, live animals are traded in a brisk business lasting throughout the day. The area takes on a carnival atmosphere as procession of goats, cows, sheep and buffalo file past prospective buyers, and the air is filled with the sounds hawkers and buyers alike yelling their best offer and hoping to be heard above the noise and excitement.

Finally, as has been mentioned earlier in this chapter, animals or meat products are often sold illegally, on the street or to individual households, restaurants and shops, on a day-to-day basis. There is little preventing an individual from taking part in such unregulated unlicensed activity and many find it convenient and profitable to do so.

SUMMARY

The production and marketing of animals and animal products is an essential feature of the urban agricultural system operating within Kathmandu. A significant proportion of households involved in the cultivation of plant foods also raise animals for dairy, egg and meat purposes. The majority of production achieved is consumed directly by the household, but a part also enters the marketing system. In addition to centralized, regulated operations, many 'impromptu'. unlicensed dairy and meat enterprises exist within the city. For sake of convenience and to bypass regulatory restrictions, many urban farming enterprises who choose to sell a part of their dairy or meat production do so on the street level, selling to shops, restaurants or other individuals within an unlicensed environment.

CHAPTER VIII

CONCLUSION

The preceeding description and analysis will probably raise as many questions concerning urban agricultural activities as it does provide answers. One issue that no doubt arises for many concerns the applicability of such a phenomenon. Does one encounter such a land use and associated inputs in other cities of the world? In fact. will such a system continue to exist even in Kathmandu? Or rather, is this a mere anomoly which happens to have developed within a singularly unique urban environment given certain cultural and physical characteristics and traditions, and which will quickly disappear as one progresses through time and over space? Before approaching such questions, it would be wise to review the discussions presented in the preceeding chapters. This is not so much in the way of summary as it is an attempt to isolate those features and elements which are unique to Kathmandu as well as to address those that may have a broader application.

SUMMARY AND REVIEW

I began this study with a brief description of attempts which have been made in the past and which were directed toward achieving a 'balance' of city and country. That is,

certain models of urban systems were developed which sought to incorporate an agricultural element within the urban environment. Such attempts found little favor among the western urban planner, however, and failed to generate a great deal of sincere attention.

In examining current popular literature, it appears that the notion of urban agriculture is coming into its own. 'Backyard gardening' is a growing phenomenon among North American suburbia; cooperative efforts directed toward the utilization of vacant city land for small, intensive gardens is gaining support and momentum. Even 'rooftop gardens' of high-rise tenements in the inner city have come into vogue. (Anderson, Mavis; "Happiness is Sharing a Garden" in <u>Parade</u> (Supplement to the <u>Knoxville News-Sentinel</u>, May 25, 1980; pp. 4-5)) Thus it seems that, in many cities of North America, the idea of intra-city food production is becoming more acceptable and does not represent entirely fanciful thinking.

Within our own western society, it is difficult to discern exactly why such a phenomenon is taking place. For some, it may represent one approach toward achieving a greater sense of independence; adopting a 'back-to-the-land' philosophy while still remaining urban residents. Partly, it is a factor of escalating food prices. People are finding out that it is inexpensive and relatively easy to grow a good amount of food on a very limited amount of land, such as may be encountered in the city. I suspect that it goes much further than this. The increasing urban populations, the

accompanying density of urban structures, of concrete space and of pollutant-filled air may be triggering a response among the urban dweller to create a more livable environment. The use of open spaces for agriculture represent one approach. In most instances, food-production activities within the western city may reflect little more than a leisure activity; a hobby to be pursued by family members during the course of the day. The production achieved certainly adds to the household food larder, but its contribution to the subsistence of the household might not be all that great. This is not to say that the potential is not there. But with current urban social and economic trends and land use characteristics, it has certainly not been realized, or until relatively recently, even recognized. Herein lies the difference between the situation as it exists in the western city and that which may be found in other urban environments of the world.

In this study of urban agriculture in Kathmandu, Nepal, the viability of such a system and its relative importance as a food-producing phenomenon has been addressed. The persons most directly involved in this system are the Jyapu farmers, occupying the cultivator caste of the Newar peoples of Kathmandu Valley. The Jyapu residing within the city are farmers by tradition, and, as evidenced by the presence of agriculture in the urban area, may have retained their traditional occupation while still remaining urban residents. While there are those who have migrated in Kathmandu from

other areas of Nepal, many are traditionally inhabitants of this area and have witnessed the growth and expansion of the city to the extent that the city has literally 'enveloped' their agricultural lands. Having become incorporated into a dynamic urban system has not necessarily meant putting a halt to farming activities. Rather, they have become a part of the informal sector of the urban economy and an integral element of what is referred to here as the urban agricultural system. Because of certain characteristics inherent in this system, as well as associated trends in the growth and development of Kathmandu's urban area. the elimination of cultivated lands and food-producing activities within the city is not seen as being inevitable. The interaction between agricultural activities and other urban functions and land uses is very often of a complementary nature rather than one that presents a conflict.

The activities and inputs directed toward agricultural production operate for the most part outside of the formal urban economy. That is, the fertilization of lands, the development of seed supplies, the marketing of produce, and the procurement of labor are all approached from a traditional base which does not necessarily rely on the goods and services of the established economy. This reflects in part the relatively unstable economic position of urban farmers in Kathmandu. The means and wherewithal needed to employ government-distributed supplies or market commodities, or to sell products in the established markets are not generally available to the small-scale generally poor urban tiller. It also reflects a traditional and culturallydefined method of coping with limited resources and external regulations. Land resources is the other major input into the urban agricultural system. The spatial characteristics of agricultural land use in the city are such that it, too, represents a compatibility with other urban functions. The distribution of agricultural lands, the nature of landownership and the relative location of parcels of land devoted to food-production provide a great deal less conflict with current urban growth trends than what might be initially expected.

This system is a <u>labor-intensive</u> system. Farm labor is supplied primarily by household members who perform activities associated with household food production ranging from field maintenance and planting and harvesting, to the transportation and sale of market-oriented produce. Seeds are dried and stored from previous harvests. The fields are fertilized with animal manure, applied by hand in small, regulated quantities. Water, if distributed to the field, is carried by hand in earthern containers. All members of the household contribute time and energy to this non-mechanized system of agriculture and it is only during rather rare occasions marked by peak labor needs within the farm calendar, that outside labor will be relied upon.
The <u>role</u> of agriculture and urban food production in Kathmandu becomes an important point of inquiry. There are a good many people living in the city who are highly dependent upon household food production for subsistence. It was found that among the sample group, over forty percent of the reported daily food intake was supplied by household production. Clearly, then, this presents a situation in which urban farming <u>does</u> make a difference. It is argued here that the urban agricultural system is an essential feature of the urban environment of Kathmandu, and that its role in household food intake can take on very significant proportions.

A WIDER APPLICATION?

Does such a situation arise in other cities around the world? This is a question that can only be answered after direct field investigations have been made. I have seen very little reference to such a phenomenon among the many studies concerning urbanization and urban land use and employment. Most of what appears in the literature is only in passing and while agriculture within an urban context is occasionally remarked upon, little in the way of substantive information is available. Rhoades Murphy, a prominent geographer who has examined in detail the urban setting in Asia, notes the existence of such a phenomenon and remarks that, "... No census system except the Japanese takes account of another factor which also helps distinguish Asian cities the inclusion within the urban area. . . of significant amounts of agricultural land and of agricultural workers . . ." (Murphy, Rhoades; "Urbanization in Asia" in Gerald Breese, ed.; <u>The City in Newly-Developing Countries</u> (Englewood Cliffs: Prentice-Hall, Inc.; 1969)).

Dr. Martin has worked extensively with the small subsistence farmer in Latin America and suggests that there is the potential for intensive farming opportunities on even the smallest parcels of urban land. (Martin, 1980) Albert Ravenholt, an expert on tropical agriculture and a scholar who has done considerable field work in East and Southeast Asia, has also noted the presence of agricultural activities within the barrios and cities of the Philippines. (Ravenholt, Albert; "So Many Makes for Malnutrition" American Universities Field Staff Report, Vol. XXII, No. 5, 1974.) But here too. the mention of such activities results more from casual observation than any direct investigation. Those involved in urban studies within the Third World tend to use Western categories of urban employment and so miss the potential importance of agriculture as an urban land use and employment activity.

Individuals and households engaged in urban agriculture operate for the most part, outside of the formal sector of the economy and are involved in activities which do not necessarily result in a substantive cash earning. Their actions are not regulated to the extent that they would appear

in any documented statistics, and their labor yields (in the way of food products and cash earnings) are not often incorporated into any centralized system of accountancy. They are, in effect, 'lost' to the investigator using a westernbiased approach.

Additionally, the fact that urban-based food production opportunities lack much thoughtful inquiry leads this author to question our own points of reference. Is it because we too quickly assume that urban living and ecologicallysound lifestyles are incompatible? Or is it an economically oriented vantage point which only naturally assumes that agriculture is not an effective use of available urban land. Or, rather, is it merely that such a land use and the related farm activities are of a small-scale, grassroots nature and thus overlooked in the many investigations of urban problems and prospects?

While all three and probably more may be involved, I suspect the latter is often the case. Relatively speaking, urban agriculture, as a system, involves small plots of land, small inputs of fertilizer and seed, small amounts of time, and a labor force effectively disguised as the household unit. As such, it is little wonder that it is often an overlooked, ignored, or misunderstood phenomenon. It is argued here that the cumulative effect of such activities can take on very significant proportions. And while perhaps minor in the face of some other aspects of a dynamic urban system, agriculture and food production within the city can contribute very real opportunities in the way of employment, land use, and food supply.

The cultivation of crops within the city depends on the availability of open spaces. Within Kathmandu, such open spaces take on a variety of forms. Temple lands located in the city are often used for agricultural purposes by the residing priest or the many persons living in the compounds. They represent agricultural lands which will remain an essential feature of the city indefinitely. Private lands are also used for agriculture and may take the form of interior courtyards and backyard gardens which are clearly linked to a residential compound. But they also include large amounts of land which are located in the city not necessarily adjacent to living quarters and which are not being currently used for building and construction purposes. These are often small in size and exhibit fragmented and questionable ownership. To incorporate such scattered plots of land into a concentrated development plan would require endless amounts of court litigation. Until such cases are settled, if they are indeed pursued, the use of such lands remains one for food-producing activities. In addition to these lands are schoolyards, government offices, diplomatic quarters, and other primary land uses which include an associate

^{*}For a further discussion of this please refer back to Chapter 6.

land use for agriculture.

These sorts of land uses are not exclusive to Kathmandu. They and many others, occur in urban centers around the world. In Kathmandu the value of their use for agriculture is recognized and is pursued. Whether such a thing is found in other cities is open for investigation. The fact that it does exist in this capital city reflects an acceptance, on many levels, of the notion of viable opportunities available for food production which exist within the urban environment.

In addition to the cultivation of crops, the agricultural system in Kathmandu incorporates as a very visible component, animal husbandry and the production of animal goods. Most important among these are the dairy products attained from the numerous cows and goats which are raised in the city. The resulting yield of milk and milk products is directed primarily toward domestic household consumption. A significant part, however, does enter the marketing system and becomes an income-generating commodity for the household. The marketing of milk products is carried out for the most part outside of the central dairy distributive system. Dairy products are sold at the street level in raw, unsterilized form and in many instances the milk sold is diluted with water.

In addition to dairy products, animals raised in the city represent important sources of eggs and meat products. The raising of poultry provides meat as well as eggs, and is the most common animal rearing activity found in the city.

In addition livestock such as goats, wild boar and cows are periodically slaughtered for meat. This activity is generally restricted to the festival season when it can serve the dual purpose of sacrifice for the deities and meat for the household.

The continued presence of agriculture within the city of Kathmandu depends to a great extent, on the direction of urban growth and development. The intensive utilization of existing open spaces for building and construction purposes poses a direct threat to the continuation of agricultural activities on those parcels of land which can be incorporated into a cohesive development strategy. As has been mentioned before, however, the nature of landholdings and the relative location of open spaces in Kathmandu inhibits their inclusion into other forms of urban use. In addition, agriculture as a form of land use, is often associated with other primary uses of land which will retain their individuality in the face of increasing development. Temple lands, school yards, office compounds and diplomatic quarters are examples of this type of situation. These areas will remain essential components of the urban setting and the use of adjacent land parcels for cultivation and food-production will continue indefinitely.

POSTSCRIPT:

It is argued here that agriculture is and will remain, a viable component of the urban system of Kathmandu. The activities associated with food production and the marketing of locally-grown foodstuffs will continue to be a very visible

element of the urban milieu. Whether such activities and land use are recognized to be effective functions of the city depends in part on making available data concerning the nature of urban agriculture. This study represents one investigation into the characteristics and dynamics of an urban agricultural system that exists in Kathmandu, Nepal. The questions that it raises are perhaps as useful and as meaningful as any answers that it might provide.

Agriculture is not the major function of an urban area. In the case of Kathmandu, however, it is a significant element. In suggesting a need for future study of this phenomenon, I would like to present only one recommendation that it be considered in its proper perspective. It is (or could be) an important form of land use and an opportunity for employment as well as a potential source of food supply. How effective such a system could be is dependent upon its relationship with the development of other aspects of urban growth. A valid approach which needs to be examined concerns the degree of potential compatibility between land for agriculture and land for other urban uses. Similarly, it is important to recognize the role of farm activities and other inputs into the urban agricultural system and to determine the relationship between these and other urban economic functions.

It is necessary to recognize here that agricultural activities which take place within the urban environment are often of a very marginal nature. But for those directly

involved in such activities they become quite significant. What is needed in any future investigations of this type of phenomenon is that the proper scale of inquiry be clearly defined. One reason why agriculture as an urban option, is overlooked is because it becomes obscured by the more visible problems, prospects or processes of the urban environment. With Third World cities experiencing rapid population growth rates, with relatively declining opportunities presented in the way of services, employment and food sources available to the urban poor, those 'marginal' opportunities become all the more important.

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HOUSEHOLD QUESTIONNAIRE

KATHMANDU, NEPAL 1980

- 1. How long have you lived in Kathmandu? 1) greater than ten years 2) 5-10 yrs. 3) 3-5 yrs. 4) 1-3 yrs. 5) less than 1 yr. 2. Where had your family originally come from? 1) high mountains 2) terai 3) Middle Hills area 4) Kathmandu Valley 5) Another country. 3. What was your occupation before coming to the city of Kathmandu? 1) trader/merchant 2) agriculture 3) government 4) laborer 5) unemployed 6) other Did you own land before coming to the city? 4. 1) yes 2) no If no, what were your ties to the land? 1) landless laborer 2) tenant farmer 3) no ties (non-5. agric. employment) 4) worked family-owned land 5) rented land from another. What is your occupation here in Kathmandu? 6. 1) trader/merchant 2) agric. 3) government service 4) laborer 5) unemployed 6) other 7. How many persons live in your family - male? (Household) 1) one 2) two 3) three 4) four 5) over four How many persons live in your family - female? (Household) 8. 1) one 2) two 3) three 4) four 5) over four How many children live in your household? 9. 1) one 2) two 3) three 4) four 5) over four 10. What crops do you grow in your garden? This is an open ended question, note crop types on back of data card. 11. Do you own animals? 1) yes 2) no 12. If yes, which animals? This is an open ended question, note types on back of data card.
- 13. Do you engage in fishing?
 1) yes 2) no

- 14. How many times a year do you harvest your crops?
 1) once 2) twice 3) three times 4) continuous harvesting 5) other
- 15. What do you do with your crops? 1) household consumption 2) sell to market 3) give away 4) festivals 5) other worship
- 16. What do you do with animals/animal products?
 1) household consumption 2) sell to mkt. 3) handicrafts
 4) give away 5) worship 6) other
- 17. What portion of animal products do you/family consume? 1) all 2) none 3) 1/2 4) less than 1/2 5) greater than 1/2
- 18. What portion of crops harvested do you/family consume? 1) all 2) none 3) 1/2 4) less than 1/2 5) greater than 1/2
- 19. What portion of daily food intake is derived from the food your household produces?
 1) none 2) less than 25% 3) 25-50% 4) 50-75% 5) over 75% 6) all
- 20. How well are your plant food needs satisfied by your own crop production (Household)?
 1) completely satisfied 2) not at all satisfied 3) 50% satisfied 4) less than 50% satisfied 5) greater than 50% satisfied
- 21. How well are your animal/dairy food needs satisfied by your own animal production?
 1) completely satisfied 2) not at all satisfied 3) 50% satisfied 4) less than 50% satisfied 5) greater than 50% satisfied
- 22. How many animals do you own which produce dairy foods?
 1) one 2) two 3) three 4) four 5) more than four
 6) none
- 23. How many animals do you own which produce meat foods?
 1) one 2) two 3) three 4) four 5) more than four
 6) none
- 24. How many plots of land do you <u>own</u> (for agric. purposes)? 1) none 2) one 3) two 4) three 5) more than three
- 25. How many plots of land do you farm but do not own? 1) none 2) one 3) two 4) three 5) more than three

- 26. Who does the work in the agricultural fields?
 1) all in household share in work 2) male adults
 3) female adults 4) children 5) hired labor 6) other
- 27. How much time each day is spent in food producing activities by your household members?
 1) less than 1 hr. 2) 1 hr. 3) 1-3 hrs. 4) 4-6 hrs.
 5) more than 6 hrs.
- 28. What times of day are most often spent in foodproducing activities? (not to include marketing activities) 1) morning 2) midday 3) afternoon 4) evening 5) no fixed time
- 29. How far is your garden(s) from your living establishment? 1) less than 100 ft. 2) 100 ft.-300 ft. 3) 300 ft. -1/4 mile 4) 1/4-1/2 mile 5) greater than 1/2 mile 6) greater than 1 mile.
- 30. What are the major problems which beset your food production capabilities?
 1) thieves 2) weather 3) government intervention
 4) money shortages 5) land shortages 6) other
- 31. How many ropani of land do you own in total for agric. purposes? 1) .25 2) .50 3) one 4) two 5) three 6) more than three

This questionnaire is one research tool being employed in a study of the marginal opportunities available for food production within the urban environment of Kathmandu, Nepal, June 15, 1980.