



Land Use Management in Andhra Pradesh (1960-61 - 2009-10): A Critical Analysis

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ABSTRACT: Land in Andhra Pradesh is scarce with an estimated area of 27.4 million hectares, accounting for 8.4 per cent of the share in India. Many economic, social and political pressures have a significant influence on land use pattern which lead not only to shrink in the per capita availability of land and food grains, it is the need of the hour to analyze the trends in land use pattern particularly in agro-dominant states like Andhra Pradesh. The present paper is an academic exercise in this direction. Classifying the 9-fold classification of land accounting system being adopted in Andhra Pradesh, into five broad categories, the present paper aims at an examination of land use efficiency in Andhra Pradesh. The paper observes that there is a dire necessity to improve and expand the scope of land use accounting system beyond the agricultural uses and suggests the need for future research to address the concerned human development issues built around the land use, particularly in Andhra Pradesh.

KEYWORDS: Land use system, Ecological land, Current fallows, Underutilization of land, Food and Non-food crops, Human development.

I. INTRODUCTION

In 1966, Kenneth Boulding in his classic paper “The Economics of Spaceship Earth” has underlined the necessity for revision in the perception of ‘cow boy Economy’ to a ‘spaceman economy’. He argued for a change in the people’s perception about the nature of economy-environment interactions and of measuring economic development. Though conventional economists believed that the economy is an open system, in recent years, the economists who are strongly supporting the objective of “sustainable economic development” have been arguing about “sustainable development index”. This index studies and analyses the relationship between humans and nature, which is called “harmony” (Shi Peijun et. al. 2005). They argue that only when the relationship between the people and nature is harmonious, the development would be sustained. Inevitably, the economic activities performed by the living beings cause ‘entropy’ and as long as there is production and consumption, entropy increases. This is done primarily by modifying the earth surface and land use is the most effective and most important tool to harmonize the development of ecological capital and social capital. Ecological capital refers to material resources (Natural Capital) and ecosystem services. Social capital refers to treasures from human laboring. However, these two kinds of capital are contradictive and as a result economic development and ecological conservation occupied a significant place in the strategy of sustainable development. We know well that the economic development of human society depends upon the materials offered by ecosystems and this economic development is at the cost of both material resources and ecosystem services. Hence present arguments about ‘sustainable development’ are being directed towards the judicious balance between development of ecological capital and social capital. As a result, today the economists have resorted to the concept of “harmony” which represents the ratio of ecological capital per unit area (ECP) and GDP per unit area (Shi Peijun et. al. 2005).

Consequent to these views, efforts are made to separate different land uses into ‘productive land’, ‘living land’ and ‘ecological land’ and to optimize and ecology-oriented land use pattern to achieve effective utilization of land resources and sustainable agricultural development. This classification reminds us about the fact that agriculture is a system consisting of a group of interrelated components that interact for a common

purpose and react as a whole to external or internal stimuli (Najafi, 2000). The human system (social system), natural resources system (ecological system) and economic system (market system) are sub-systems of agricultural system. Adoption of a systematic approach is therefore inevitable to design a land-use planning system for such a complicated system. Besides, globally it is a proved fact that land use changes contributes considerably to increases in atmospheric CO₂ concentration (IPCC, 2007). Recently, many of the Asian Productivity Organization member countries have observed that land and other natural resources are under increasingly intense pressure brought out by rapid population growth, widespread poverty, growing industrialization and urbanization. Since the cultivated area cannot be conveniently expanded, these countries have been adopting the measures to intensify the crop production and farm incomes through heavy investments on irrigation, crop diversification and looking for positive measures/policies for improving their land utilization systems to enhance productivity and conserve their land resources (APO,2000). Bangladesh has been examining the problems related to sustainable land use and in India the USDA Land Capability Classification is being widely adopted. The 'Land Acquisition Bill – 2011 also addresses the diverse needs of the land owners, project-affected families and industry. The bill also emphasizes that acquisition stipulations for multi-cropped land should not be applicable to mining and land bank corporations should acquire fallow, barren and unproductive lands for allocation to industry. In Indonesia, emphasis has been given to integrate farming systems to achieve proper land use. Thailand is striving hard to pass a law on land utilization and to ensure training/participation of all the stakeholders. The Republic of Korea established the 'farm land act' in 1996 to contribute to stabilizing farmers' agricultural management and efficient utilization of farm land. The experience of Vietnam reveals that land use systems with intercropping and crop rotation resulted into high yields and improvement in agricultural productivity. In Fiji, emphasis was laid on training and awareness on land use systems by the preparation of a National Land Use Plan.

All these efforts tell us that the future of land use sustainability depends on formulation of efficient land use systems and formulation of sound laws and policies and their effective implementation for enhancing the agricultural productivity and conserve the agricultural land and water resources simultaneously through land utilization. Particularly in the contemporary economic conditions, where in the humanity has been using 1.5 planet earths to support its activities (WWF, 2010); reducing world wide hunger and poverty and efficient land use system is highly inevitable.

II. MATERIALS AND METHODS

Keeping in view the increasingly urgent need to have rational land use for maximizing the sustainable production and satisfying the diverse needs of the society, an attempt is made in this paper to analyze the structural changes that have been taking place in the land use system of Andhra Pradesh, one of the agro-dominant states in India. Recognizing the fact that land use change impact the quality and availability of soils, water and lead to significant losses of biodiversity, an analysis of land use system in this food crop-dominant state assumes top priority to sustain the development of agriculture and its productivity.

In general, major objective of the present paper is to analyze the structural changes that are taking place in land use pattern in Andhra Pradesh state. Specifically the present paper aims at:

1. Analyzing the improvements that are occurring in ecological land use pattern.
2. Finding out whether land area underutilized has decreased or not?
3. Estimating the improvements in the proportion of operational land and to present the improvements in cropping intensity.
4. Identifying the changes that have taken place in the proportion of cropped land under food and non-food crops, and
5. Assessing the proportion of and shifts in land put to non-agricultural uses.

III. CONCEPTS USED FOR THE ANALYSIS

Agriculture, being an organic economic activity, has a close relation with the natural resources, particularly land. Relying exclusively on the secondary data published by the Directorate of Economics and Statistics, Government of Andhra Pradesh, the present paper examines the efficiency of land use in Andhra Pradesh state. Land use statistics for a period of 50 years i.e. from 1960-61 to 2009-10 were processed into 5 decade groups for analyzing the structural changes that are taking place in the land use pattern and to satisfy the objectives laid down for the paper. Decennial averages were worked out for the reference period of 50 years so as to bring about the changes and improvements in land use pattern. The functional use land summarized into a 9-fold classification adopted by the Government of Andhra Pradesh has been classified into five broad categories as detailed below:

1. **Ecological Land:** comprising forest area, permanent pastures and grazing lands and land under miscellaneous tree crops and groves not included in net sown area.

2. **Land Underutilised:** representing Barren land, cultivable waste and other fallows.
3. **Operational Land:** consisting current fallows and net area sown. (Area sown more than once and gross cropped area were also dealt with to assess the cropping intensity).
4. **Land put to Non-agricultural Uses:** considered as a proxy for built up area and also for land shifted to due to rapid economic development (for industry, infrastructure and residential uses etc.,).
5. **Total Cropped Area:** represents the use and allocation of cultivated between food and non-food crops as a measure of diversification of land area towards remunerative non-food crops, which also signifies the social demand for food and non-food production.

Based on these concepts five indicators have been employed for the analysis of efficient allocation of land resources based on economic and social demands in Andhra Pradesh.

1. An increase in the ecological land measured as percentage of total geographical area
2. A decrease in the land underutilized as the percentage of total geographical area
3. An improvement in agricultural intensity as measured in terms of cropping intensity and percentage of increase in the net cropped area to total geographical area.
4. An increase in the proportion of land put to non-agricultural uses to total geographical area, and
5. Trends in diversification of cropped area towards food-dominant to non-food- dominant use of cropped land, as a measure of assessing the impact of economic development on land use system.

IV. ABOUT ANDHRA PRADESH

Andhra Pradesh, one of the few states in India blessed with reverie geography, is historically called as “the Rice Bowl of India” with a coast line of 974 Kms. Agriculture is the main occupation for about 62 per cent of the people and rice is the major food crop of the state, which contributes 77 per cent of the food grain production in the state. Andhra Pradesh has 274.4 lakh hectares of geographical area in which forests occupy 22.7 per cent of the area and net sown area accounts for 40.6 per cent (111.6 lakh hectares in 2011-12). The State has been witnessing a gradual transformation of demographics being driven by a continuous increase in per capita income, industrialization and urbanization. According to 2011 Census 33.5 per cent and 66.5 per cent of the people are living in urban and rural areas respectively.

An overview of the transformation in agricultural sector that has been taking place in Andhra Pradesh during the past five decades reveals that the state has been moving towards cereal-dominant system to high value crops and oil seeds. As a result, significant changes are taking place in the land use pattern, which automatically exert a dominant influence on food security, agricultural production and other agricultural macro-economic aggregates. An analysis of land holdings in the state indicates that the average size of land holdings has been drastically declining. It was 1.36 hectares in 1995-96, declined to 1.20 hectares during 2005-06 and further to 1.08 hectares during 2010-11. Though the no. of holdings for the size classes of less than 2.0 hectares has increased in 2010-11, significant increase in the size of the holdings (in hectares) did not take place in this class, instead declined marginally compared with the data for 1995-96. Most importantly, the growth rates of Gross Domestic Product from agricultural sector has declined from 22.95 per cent in 2007-08 to – 2.69 per cent in 2012-13 and this decline was most deranging at -- 6.22 per cent in 2011-12 as per the first revised estimates (GOAP, 2013).

Under these conditions, it is felt necessary to inquire into the land use pattern to analyze its dynamics so as to find out the structural changes that are being experienced by the agricultural sector in Andhra Pradesh. An analysis of these dynamics facilitates to through light on the measures to be taken to improve the land use pattern and to achieve a sustainable agricultural development which results into hunger-free and food secure Andhra Pradesh.

V. RESULTS AND DISCUSSION

Evaluation of a socially-efficient land use system is necessary for an agro-dominant economies like Andhra Pradesh and for proper management of the “Common Pool Resource” – land, so that the ‘tragedy of commons’ may not occur. Hence, different land use planning approaches and methodologies like SYSNET, MFCAL, NELUP, MCDM, IMGLP etc., are being widely used in the analysis that aim at an analysis of agricultural land use sustainability in a particular region and for enhancing the agricultural productivity.

In the present paper, as said under methodology adopted , the following five important indicators are used for the analysis.

1. Use As Ecological Land

Recently in China, research has been carried out to assess the impact of land system change on ecosystem services as one of the main objectives and they have considered this type of research as ‘ecological capital research’, which is identified as ‘progress in land use research’ towards sustainable agriculture. Forests,

permanent pastures and miscellaneous trees not included in the net sown area is considered as ‘ecological use of land’ and ‘green sinks’ providing immense ecological services to mankind in any region. Hence, land allocated to these uses has been analyzed in this paper so as to assess how ecological demand for land is satisfied with the allocation of geographical area in Andhra Pradesh, the study area. The data in Table.1 summarizes the details of land allocated to this ecological use.

Table. 1: Ecological Land Use in Andhra Pradesh (in Lakh Hectares)

Reference Decade	Average Area during the Decade Used as				Percentage to Total Geographical Area	
	Forests	Permanent Pastures	Miscellaneous Trees	Total Ecological Land (2+3+4)	Forests	Total Ecological Land
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1960-61 to 1969-70	61.13 (80.7)	11.65 (15.4)	2.98 (3.9)	75.76 (100.0)	22.3	27.6
1970-71 to 1979-80	62.87 (83.3)	9.85 (13.0)	2.77 (3.7)	75.49 (100.0)	22.9	27.5
1980-81 to 1989-90	60.17 (23.8)	8.92 (12.4)	2.69 (3.9)	71.78 (100.0)	21.9	26.2
1990-91 to 1999-2000	62.41 (86.0)	7.62 (10.5)	2.51 (3.5)	72.54 (100.0)	22.7	26.4
2000-01 to 2009-10	62.04 (87.0)	6.36 (8.9)	2.88 (4.1)	71.28 (100.0)	22.6	26.0
1960-61 to 2009-10	61.71 (84.1)	8.88 (12.1)	2.77 (3.8)	73.36 (100.0)	22.5	26.7

Source: Compiled by the authors from the data extracted from the “Compendium of Area and Land Use Statistics of Andhra Pradesh (1955-56 to 2004-05) and Statistical Abstracts of Andhra Pradesh, Directorate of Economics and Statistics, Hyderabad.

The data on ecological land presented in Table.1 indicate that the average area under forests as percentage of total geographical area was 22.9 per cent during the decade 1970-71 to 1979-80 and decreased to 22.6 per cent during the decade 2000-01 to 2009-10. It seems the average area under forests did not reach the prescribed proportion of 30 per cent during the reference period of 50 years. In spite of implementation of forest policies and forest development programmes, the land under forest did not improve significantly and remained at 62 lakh hectares during the present decade as compared to 61.13 lakh hectares during 1960’s. Similarly there was a drastic decline in the area under permanent pastures from 15.4 per cent (11.65 lakh hectares) of the total geographical area in 1960-61 to 1969-70 to 8.9 per cent (6.36 lakh hectares) during the decade 2000-01 to 2009-10. However, there was a marginal increase in the proportion of land under miscellaneous trees in spite of an absolute decrease in the area from 2.98 lakh hectares in 1960-61 to 1969-70 to 2.88 lakh hectares in 2000-01 to 2009-10.

The absence of improvement in the forest cover and the decline in the area under permanent pastures and miscellaneous trees has significantly influencing the area under ecological land and as a result the extent of ecological land has declined from 75.76 lakh hectares to 71.28 lakh hectares in Andhra Pradesh. In fact, a loss of 5.29 lakh hectares of permanent pastures and grazing lands automatically becomes a hurdle for the development of cattle wealth and also exerts a negative impact on per capita availability of milk and bullock power that is to be employed in agricultural operations. Again, a decrease in the area under miscellaneous tree crops and groves etc., represents the decrease in the land put to some agricultural uses like growing casuarinas trees, thatching grass, bamboo bushes and the groves for fuel etc., which deters the energy-consumption and housing facilities of the weaker sections particularly in rural areas. In this context it is to remembered that more than 7 crore (2007 Census) livestock is dependent on pastures and grazing lands in rural areas and even today about 59 per cent of the total households (124 lakh households) in Andhra Pradesh are still dependent on fuel used for cooking like firewood, crop residue and cow dung according to 2011 Census. A decline in the area under ecological land not only negatively impacts the ecological services that are essential for the people but also health and energy consumption of the weaker section particularly.

2. Land Underutilized

Barren and uncultivable land, cultivable waste and other fallows are included in this category. Barren and uncultivable land included lands like hills, mountains, deserts etc., In Andhra Pradesh, 8 per cent of the

total geographical area comes under this category and there are some human settlements in these areas. On an average about 3.4 per cent and 4.6 per cent of the total geographical area are estimated as cultivable waste and other fallows as shown in Table. 2.

Table.2 Land Underutilized in Andhra Pradesh (in Lakh Hectares)

Reference Decade	Average area reported during the decade used as			
	Barren and Uncultivable Land	Cultivable Waste	Other Fallows	Total Land underutilized (2+3+4)
(1)	(2)	(3)	(4)	(5)
1960-61 to 1969-70	21.60 (7.8)	14.13 (5.1)	8.70 (3.3)	44.73 (16.2)
1970-71 to 1979-80	22.94 (8.4)	9.95 (3.6)	10.64 (3.9)	43.53 (15.9)
1980-81 to 1989-90	22.74 (8.3)	8.66 (3.2)	14.11 (5.1)	45.51 (16.6)
1990-91 to 1999-2000	20.88 (7.6)	7.67 (2.8)	15.33 (5.6)	43.88 (16.0)
2000-01 to 2009-10	20.77 (7.6)	6.87 (2.5)	15.65 (5.7)	43.29 (15.8)
1960-61 to 2009-10	21.79 (7.9)	9.45 (3.4)	12.89 (4.7)	44.13 (16.0)

Note: figures in the brackets denote percentages to total geographical area.

Source: As in Table.1.

The details of the land area underutilized as presented in Table.2 reveal that around 8 per cent of the land is categorized as Barren and uncultivable land, which accounts for around 22 lakh hectares. The land under cultivable waste includes land available for cultivation which are either fallow or covered with shrubs or jungles and not put to any use. Land once cultivated but not cultivated for five years in succession are included in this category. This category of land has declined from 14.13 lakh hectares (5.1 per cent of the total geographical area) to 6.87 lakh hectares (2.5 per cent of the total geographical area), the information about the use these lands is not available. On the contrary, the land under 'other fallows' are the lands which were taken up for cultivation, but are temporarily out of cultivation for a period of not less than one year and not more than five years. The land use under this category accounted for 8.7 lakh hectares in 1960-61 to 1969-70 (3.3 per cent of total geographical area) and increased to 15.65 lakh hectares during 2000-01-2009-10, accounting for about 5.7 per cent of the total geographical area. The reasons for the increase in other fallow lands are to be paid attention to have more land under cultivation. It is true that in spite of the heavy demand for food production and for residences due to population growth 'other fallows' were not put to proper use and left uncultivated though they were available for proper use.

In total, the land underutilized accounted for about more than 22.3 lakh hectares (9.45 lakh hectares of cultivable waste and 12.89 lakh hectares of other fallows) on an average during the past 50 years, even if the barren and uncultivated land is left unaccounted by its nature.

3. Operational Land

Operational land for the present paper is defined as the land under current fallows and area sown once (net sown area). Current fallows represent cropped area kept fallow during a particular agricultural year. Net sown area represents the total area sown with crops and orchards. Current fallows arise due to many socio-economic, geographical and institutional conditions and the net sown area is the land used for growing crops on permanent basis during agricultural seasons. In the present paper besides these categories of land use, area sown more than once and the gross cropped area were also included to estimate the agricultural intensity (cropping intensity) as a measure to assess the land use efficiency of cropped area. Table. 3 present these details.

Table. 3. Operational Land Use in Andhra Pradesh (in lakh hectares)

Reference Decade	Average Area Reported during the Decade Used as					Cropping Intensity (6/3)
	Current Fallows	Net Area Sown	Total Operational Land (2+3)	Area Sown More than Once	Gross Cropped Area (3+5)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1960-61 to 1969-70	21.95 (8.0)	112.74 (41.1)	134.69 (49.1)	13.30	126.04	1.12
1970-71 to 1979-80	22.61 (8.2)	111.78 (40.7)	134.39 (49.0)	15.81	127.59	1.14
1980-81 to 1989-90	26.69 (9.7)	108.07 (39.4)	134.76 (49.1)	17.99	126.06	1.17
1990-91 to 1999-2000	26.90 (9.8)	106.16 (38.7)	133.06 (48.5)	23.69	129.85	1.22
2000-01 to 2009-10	29.00 (10.6)	104.55 (38.1)	133.55 (48.6)	24.78	129.33	1.24
1960-61 to 2009-10	25.43 (9.3)	108.66 (39.6)	134.09 (48.9)	19.11	127.77	1.18

Note: Figures in the brackets denote percentages to total geographical area.

Source: as in Table. 1

It is quite evident from the data presented in Table. 3 that current fallows, net sown area and total operational land in Andhra Pradesh accounted for, on an average, 9.3 per cent, 39.6 per cent and 48.9 per cent respectively. A look at the data presented makes us to infer that the current fallows have significantly increased from about 22 lakh hectares to 29.0 lakh hectares registering a net increase of 7 lakh hectares. Consequently, no significant improvement is seen in net area sown and on the contrary it has declined by more than 8 lakh hectares during the last 50 years. As a result, the net sown area which was 41.1 per cent of the total geographical area during 1960's, has declined to 38.1 per cent during the decade 2000-01 to 2009-10. This decline in net sown area and increase in current fallows resulted into a decline of total operational land, which automatically influences the crop production and per capita availability of cereals and pulses as the cropping structure in Andhra Pradesh is the food-dominant system.

However, an optimistic trend is seen with regard to land sown more than once in an agricultural year during the past 50 years. On an average during these 50 years, a net increase of about 11.5 lakh hectares is seen under area sown more than once, which had probably influenced the increase in gross cropped area. Area sown more than once was 13.3 lakh hectares during 1960's and increased to around 24.8 lakh hectares in 2000's. Consequent to the increase in area sown more than once, the gross cropped area which was 126.04 lakh hectares during 1960's has increased to 129.85 lakh hectares during 1990's and with a marginal decline, to 129.33 lakh hectares (when compared to 1990's) during the first decade of the present century, indicating a net increase of 3.29 lakh hectares during the past 50 years. The cropping intensity which was 1.12 has increased marginally to 1.24 during this period and it is the cumulative effect of increasing current fallows and decreasing net sown area.

4. Land Put to Non-agricultural Uses

Beyond doubt, it can be said that rapid economic growth is always accompanied with a shift of land from agriculture to industry, infrastructure and residential uses. The rate of this conversion gets more speed when the urban areas are expanding at a faster rate with simultaneous backward linkages with rural areas. The demand for land put to non-agricultural uses increases with an increase in per capita income, necessity for infrastructural facilities and allocations to industrial uses particularly for the establishment of Special Economic Zones and for residential purposes both in rural and urban areas as population growth takes place. For example, the UPA Government has set a target of 20 kms.per day road laying. The data on actual road laying reveal that during the fiscal 2009-10, 2010-11, 2011-12 and 2012-13, on an average, 14.5kms, 11.87 kms, 13.73 kms. And 15.7 kms. of road per day was laid. The 2011 Census revealed that people living in urban areas accounted for 31.2 per cent with a decadal (2001-2011) growth of 31.8 per cent in our country. In Andhra Pradesh, the share of urban population accounted for 33.5 per cent with a decadal growth of 36.3 per cent, which is higher than the national growth rates. No doubt, the growth of population spirals the demand for higher amount of land for different purposes, which exerts a tremendous pressure on land use pattern and higher amounts of cultivable land even are converted and put to non-agricultural uses. Table. 4 summarize the trends in the proportion of land used for non-agricultural purposes in Andhra Pradesh.

Table. 4. Trends in Land put to Non-agricultural Uses in Andhra Pradesh (in Lakh Hectares)

Reference Decade	Average Area put to Non-agricultural uses during the decade	Percentage of Land put to Non-agricultural uses to the total geographical area
(1)	(2)	(3)
1960-61 to 1969-70	19.65	7.2
1970-71 to 1979-80	21.00	7.7
1980-81 to 1989-90	22.36	8.1
1990-91 to 1999-2000	24.49	8.9
2000-01 to 2009-10	26.03	9.5
1960-61 to 2009-10	22.70	8.4

Source: As in Table .1.

The data on land put to non-agricultural uses as presented in Table. 4 indicate that on an average, 8.4 per cent of the total geographical area was put to non-agricultural uses during the last 50 years (22.7 lakh hectares). The data show that this proportion of land use has been continuously increasing. 19.65 lakh hectares were put to non-agricultural uses (7.2 per cent of the total geographical area) during 1960's and this proportion has increased to 26.03 lakh hectares (9.5 per cent of total geographical area) during the decade 2000-01—2009-10. The data also reveal that there was a net increase of about 6.4 lakh hectares during this reference period of 50 years, which is less even compared to the increase in land under cultivable waste (Refer Col.2 of the Table. 2).

Of course, it may also be due to underestimation of land put to non-agricultural uses in the land accounting and recording system in Andhra Pradesh. The statistics on land utilization for houses, buildings, transport and communication infrastructure, land degraded and land-fill sites are not adequately available to estimate the actual quantity of land put to non-agricultural uses in Andhra Pradesh.

5. Total Cropped Area

Land use pattern, besides many factors, also depends upon the perceptions and preferences of the farmers on the one side and most importantly upon the consumption pattern of the people and the demand for exports of agricultural commodities. In Andhra Pradesh, increase in per capita income of the people, which again influences the consumption pattern has primarily led to structural changes allowing diversification of land area from cereal-dominant cropping system to high-value crops as well as towards crops which have export potential. This type of diversification represents the movement of land use towards achieving higher productivity and irrigation-use efficiency. An attempt is made by the presentation of data in Table. 5 to identify the structural changes that have been taking place in land allocated to different types of crops.

Table. 5. Structural Changes in the Total Cropped Area in Andhra Pradesh (in Lakh Hectares)

Reference Decade	Average Area Reported during the Decade under				
	Total Cereals and Millets	Total Food grain crops@	Total Food Crops#	Total Non-food Crops	Gross Cropped Area (4+5)
(1)	(2)	(3)	(4)	(5)	(6)
1960-61 to 1969-70	79.90 (63.4)	93.69 (74.3)	100.15 (79.5)	25.89 (20.5)	126.04 (100.0)
1970-71 to 1979-80	78.41 (61.5)	92.23 (72.3)	99.58 (78.0)	28.01 (22.0)	127.59 (100.0)
1980-81 to 1989-90	68.68 (54.5)	83.20 (66.0)	92.47 (73.4)	33.59 (26.6)	126.06 (100.0)
1990-91 to 1999-2000	48.97 (42.0)	63.42 (54.4)	76.00 (65.2)	40.65 (34.8)	116.65 (100.0)
2000-01 to 2009-10	46.39 (35.5)	71.39 (54.6)	87.31 (66.7)	43.52 (33.3)	130.83 (100.0)
1960-61 to 2009-10	64.47 (51.4)	80.79 (64.4)	91.10 (72.6)	34.33 (27.4)	125.43 (100.0)

Note: @ represents total cereals and millets and total pulses.

represents total food grains, chilies, sugarcane and other food crops

Source: As in Table. 1

There is clear evidence as seen from the data presented in Table. 5 that structural changes are taking place in the cropping system of Andhra Pradesh. It is evident from the data that the area under cereals and millets, total food grains and total food crops has been declining over the past 50 years. On an average, the area under total cereals and millets has declined 33.51 lakh hectares, total food grains by 22.3 lakh hectares and consequently the area under total food crops witnessed a net decline of 12.84 lakh hectares in 2000-01 to 2009-2009-10 when compared to the 1960's. When we look the area under total food and non-food crops, it is evident that the decline in the area under total food crops accounted for 12.84 lakh hectares and on the other side the area under non-food crops increased by 17.63 lakh hectares. As a result of this net increase in area under non-food crops, the gross cropped area has increased from 126.04 lakh hectares during 1960's to 130.83 lakh hectares during the first decade of the present century. All these variations can be considered as the trends in diversification of cropping system from food-dominant to income-dominant and irrigation-efficient crops in Andhra Pradesh.

VI. CONCLUSION

The foregoing discussion amply reveals that there is a dire need for evolving a scientific land accounting system to put in place a monitoring and regulatory system for the use of land in Andhra Pradesh. Land use programmes must be regularly prepared to direct and examine how best the finite source – land can be put into use, which ensures sustainable agricultural development. It is to be remembered that high ecological capital lies where the forest are and efforts are to be made in each and every district to improve forest cover, permanent pastures and miscellaneous trees particularly in rural areas. District-specific causative factors that are determining the continuous increase in current fallows and the resultant decline in net area sown for getting more and more area of land under operation, which again plays a significant role in increasing the area sown more than once and ultimately the size of the gross cropped area. Suitable steps are to be taken to revitalize the data collection system particularly for scientific recording of 'land put to non-agricultural uses'. No doubt, we are having a qualitative and most efficient accounting system summarized as "9-fold Classification", even compared with 'System of National Accounts' (SNA) of United Kingdom and 'System of Integrated Environmental and Economic Accounting (SEEA), an alternative accounting system developed by United Nations Statistical Commission.

However, our accounting system must pay attention to account the degradation of agricultural soil due to different environmental factors, which determine the size of the productive land that can be used efficiently. More importantly, the further research on collection of land use statistics must focus on looking beyond the scope of agriculture alone. The present accounting system in Andhra Pradesh must be suitably be improved and expanded with proper and adequate attention to use of land for other than agricultural purposes, which have a symbiotic relationship with the issues of human development. Efforts are to be made to strengthen the land use statistics to embrace the human development concerns built around the use of land as an asset (Suresh Kumar). To sum up, the land use statistics must guide the decision making process related to improving the per capita availability of productive and cropped land on the one side and on the other the issue of 'food security' by improving the per capita availability of cereal and food production in Andhra Pradesh.

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