Land Resources and Policy in Karnataka

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I. Introduction

A medium term land use policy becomes an important tool of handling not only the optimum use of land but also deals with the process of degradation. Policy interventions in this sector therefore require full assessment of the present status, likely impact of the historical, existing and intended policy interventions and above all the effectiveness of the institutions dealing with this. Such an analysis is confronted with multifarious uses of land in different economic activities. Here it becomes necessary, to borne in mind that land use categories work at cross-purposes and make the process of decision making difficult. In addition to this, given the present trend of liberalisation, it is difficult to theoretically justify the process of directing the land use policy from above with State intervention especially when most of the other factors of production are left to the free market forces. Probably the only justification for managing land use with a centralised organisation can be its optimum economic use (incorporating social costs and benefits) and sustaining land as a non-renewable resource from the food security and environmental point of view. Therefore, to have a long-term policy for land use is widely agreed among academicians and environmental activists.

Land as a basic production resource in the agricultural sector has various uses in the other sectors too. Management of land resource therefore, involves inter-sectoral economic linkages as well as intra-sectoral influences caused by different land uses. Broadly speaking we can classify land use into five main categories. First comes the land under agricultural crops especially the seasonal crops where the use pattern as a dynamic connotation becomes the most important category for any land use policy. Within this category we find land is allocated to food economy as also for the commercial crop economy. The allocation decision between these two sectors depend largely upon the

* This paper draws on the earlier work by the author (GoK, 2001).

relative prices and price elasticity of demand of different commodities. In addition to this the income elasticity of demand for various commodities also have greater influence in the land use pattern. However, in a broader sense, to obtain future projections of land use pattern it is necessary to arrive at land resources required for different purposes of the food economy and commercial crop economy based on the trends in consumption of these crops. The second use of land relates to forest, in which forestlands are defined as the land, which is legally allocated to the forest department. Quite often legal ownership and actual use of land in this context is confused. Recently the forest department with the help of National Remote Sensing Agency Maps, has done a complete exercise to arrive at different categories of forests. In addition to this, we have orchards and plantations which are ecologically similar to forest lands. The third important component of the land use policy relates to land for dwelling purposes, urban uses and industrial uses that depends upon the growth of population, rate of change in employment, sectoral composition of employment, and growth as well as changed structure of the industrial sector. Given the process of liberalisation it is more likely that the pressure of population as well as demand for industrial use of land is likely to increase substantially. Fourth, we have large land mass being under-utilised than its economic capability. This group includes fallows, cultivable wasteland and land used for miscellaneous tree crops. These land have good potential for alternative use but remained in the category for various reasons. Lastly, we have the vast patches of degraded land falling partially under each category and also existing separately.

In this paper we tried to analyse the existing land resources in Karnataka from the perspective of evolving a long term policy directing land use in the State. The paper broadly covers four important aspects. Initially, we have elaborated on the impact of national and international policies on land use in Karnataka. This is followed by an elaborate analysis of institutional impact of agrarian structure in the state. Tracing the changes in land use category becomes third important component of this paper. We have analysed this at district level for all the districts of Karnataka over last 4 decades. Finally, we arrived at the land use projections through different scenarios and policy contours for Karnataka State.

II. Impact of International and National Policies on Land Use in Karnataka

The global and domestic economic scenario is changing in fast succession responding to the policies favouring liberalisation and globalisation. Land being the major economic resource in a developing country like India, the policy changes in the international policy currents as also the interventions from the domestic economic parameters influence variations in land use. Therefore it becomes essential to address the issues of responses of the land use sector to the global and domestic policy changes. Since independence, land use in India, largely remained unaffected by international policies and will continue to be largely unaffected by international policies in future also. The provisions of WTO require removal of quantitative restrictions and imposition of Tariff barriers. Even tariff rates are to be kept at reasonable levels to promote efficiency. Even after these policies becoming operative, the contribution of foreign trade to gross domestic product in India has been stagnant around 9 per cent (9.6 per cent in 1996, 9.3 per cent in 1997, 8.8 per cent in 1998 and 10.8 per cent in 2000-01). The agricultural exports form around 2 percent of the GDP (1.95 per cent of GDP in 1996, 1.83 per cent in 1997, 1.62 per cent in 1998, and 1.52 per cent in 2000-01). The contribution of agriculture to India's foreign trade, the share is around 19 per cent (20.4 per cent in 1996, 19.5 per cent in 1997, 18.5 per cent in 1998 and 13.3 per cent in 2000-01) (GoI, Economic Surveys). Thus, considering the modest share of India's agriculture exports in GDP, there are no compelling reasons to believe that the international markets will greatly influence the land use in India. Heuristically, in Karnataka, even with the largely varying domestic prices, the land use has remained inelastic, dominated by the food crops. Thus, even if India's (or Karnataka's) land use is exposed to international prices, which are relatively stable compared with domestic prices, the land use will continue to be inelastic at macro level. This trend will continue as long as food grain production continues to dominate the priorities in Karnataka and in India. Our marginal propensity to consume is still on higher side and the proportion of people below poverty line still around 33 percent of the population. Thus, even though major conclusions regarding the influence of international policies on land use should only be drawn after examining time series, the available empirical evidences clearly demonstrates that Karnataka's land use will continue to be more responsive to domestic demand pressures rather than international policies.

III. Institutions and Land Use Patterns in Karnataka

The interventions from institutions matter in the land use pattern both as incentive creator as well as land use modulator. A large number of institutions have direct as well as indirect influences on the land use pattern. The influence of institutions occurs either through a legal or modulated framework as well as from the creation of incentive structure or a regulatory body. These are the vehicles by which and regulations are made and implemented, business and commerce are organised, and individuals and communities participate in and influence events? They may be formal or informal, ephemeral or long term, public or private are constituted for a particular purpose and operate at local, community, national, regional or international level. Institutional shortcomings have been the most frequently recorded causes of development failure have been institutional shortcomings (Chadha *et. al.* 2002). This leads to institutional strengthening and capacity building. With the need to reduce public expenditure, and to improve national economic performance, many functions and institutions currently in the public sector are planned to move into private control. The key words of this process are: accountability; structural adjustment; institutional reform; re-inventing government; right sizing; market testing; decentralisation; and privatisation. We do not comment or explain any of these here.

Karnataka Land Revenue Manual, Land Acquisition Act of Karnataka and Land Reforms Acs and Karnataka State Land Use Board are the major legal institutional instruments governing land use pattern in the State. These institutions directly or indirectly influence the patterns of land use. We can group them among legal institutions, monitoring institutions, and incentive creating institutions. The main institutions influencing the land use patterns in Karnataka could be categorised into five groups, and each of them have a major bearing on the ultimate land use patterns of the state (Burns and Deshpande, 2001).

i. The institutions governing land ownership and monitoring land use
ii. The institutions for development of technology and transfer/disseminate the technologies developed.
iii. The institutions covering supply of credit and finance to farming community.
iv. The institutions, which help marketing of agricultural commodities.

These four components directly or indirectly monitor the use of land resources and tone the agrarian structure in the State.

Agrarian structure refers to the manner in which man-land relationships are governed and it covers the way in which land is held and cultivated. In addition to this it also covers the rights and privileges enjoyed by the different categories of people who have access to land. A tenure system which ensues to the cultivator fair rewards for his efforts will help promoting individual virtues of self-help, self-reliance, thrift and independence and at the same time the social virtues of tolerance, public spirit, co-operating and mutual working for common good. Land reforms is an integrated programme of measures designed to eliminate obstacles to economic and social development arising out of defects in the agrarian structure. Land reforms have been equated with a total programme of agrarian development including modification in rural credit, land division, land taxation, marketing facilities, co-operative organization, agricultural education and advisory service.

Land reforms involved the following components;

1 a) Land redistribution
  b) Tenancy reforms with aims of;
2 a) Providing greater equity in income and wealth
  b) Increasing agricultural productivity through;
3 a) Government sponsored reform legislations
  b) Legal public programmes of activity

and the scope of land reforms included;

i) Abolition of intermediaries
ii) Tenancy reforms which include: (a) regulation of rent (b) security of tenure for tenants and (c) conferment of ownership on them
iii) Ceiling on land holdings
iv) Agrarian reorganisation including consolidation of holdings and prevention of sub-division and fragmentation; and
v) Organisation of co-operative farms

with the main objectives of achieving greater quality and the efficient use of resources (Aziz and Krishna, 1997). The purpose of land reforms is to make more rational use of the scarce land resource by affecting condition on holdings, imposing ceilings and floors on holdings so that cultivation can be done in the most economical manner without any waste of labour and capital. It is a means of redistributing agricultural land in favour of

the less privileged classes and of improving the terms and conditions on which land is held for cultivation by the actual sellers, with a view to ending exploitation.

Land reforms in Karnataka are termed as better-implemented reforms as compared with many other states in the country (Sinha and Pushpendra, 2000). The reforms were certainly pragmatic in their content but the process of implementation left a large area unattended to. The major achievements include the acquisition of surplus land, abolition of intermediaries and abolition of tenancy at least the recorded old tenancy. The main failures listed by the analysts in the context of reforms are the distribution of surplus land, quality of the surplus land, economic viability of the distributed land and bringing check on the concealed tenancy. The reform measure including the consolidation of holding did not hold any ground. There are a few interesting observations, which emerge out of the broad trends shown in the table below. Marginalisation of land holdings is taking place at a faster rate and this may result in bringing down the viability of the small and marginal farmers (Aziz and Krishna, 1997).

Table 1: Trends in Land Holdings in Karnataka 1970-1990

(Area under holdings)
(in 000 ha)

Sl No	Size Class	1970-71	1976-77	1980-81	1985-86	1990-91	1995-96
1	**Marginal**	549	638 (16.2)	733 (14.9)	866 (18.2)	1072 (23.7)	1248 (16.4)
2	**Small**	1221	1319 (8.0)	1543 (17.0)	1888 (22.4)	2308 (22.2)	2480 (22.3)
3	**Semi-Medium**	2205	2288 (3.7)	2572 (12.5)	2880 (11.9)	3200 (11.2)	3298 (11.1)
4	**Medium**	3792	3858 (1.7)	4018 (4.1)	3881 (-3.4)	3770 (-2.9)	3489 (-7.45)
5	**Large**	3601	3254 (-9.6)	2880 (-11.5)	2364 (-17.9)	1971 (-16.6)	1593 (-16.6)
6	**Total**	11368	11357 (-0.01)	11746 (3.4)	11879 (1.1)	12321 (3.7)	12109 (-1.7)

Note: Figures in brackets are percentages increase/decrease over previous censuses.

Source: Agricultural Censuses of Karnataka for the respective years.

It is feared that a large number of them are likely to going out of cultivation swelling the ranks of urban poor. The area under large and medium farms is going down at a faster rate and though this has not shown any telling effect on the production it is likely to be a problematic in future in the context of the fast changes that are taking place in the agricultural sector. In Karnataka, the number of operational holdings by different size groups are; 2,26,2000 marginal, 15,86,000 small, 11,63,000 semi medium, 6,36,000 medium and 1,29,000 large holdings. The ceiling limit on land holdings in Karnataka is 4.05-8.10 hectares for irrigated land with two crops, 10.12-12.14 hectares for irrigated land with one crop and 21.85 hectares for dry land. The land concentration is 0.685 as against all India level of 0.713

The Karnataka Land Reforms Amendment Bill 1995. This has brought a major change in agrarian relationship in the following areas;

1. Made provision to lease in the agriculture land for aquaculture for a period of 20 years in the districts of Dakshina Kannada & Uttara Kannada up to 40 units (around 220 Acres)
2. Agricultural land can be bought or inherited by any one whose income from non agricultural source is below Rs. 2 lakh
3. Up to 108-acre of agricultural land can be brought for industrial development purpose.
4. Up to 28 acres for educational institutions
5. Up to 54 acres for places of worship
6. Up to 54 acres for a housing project
7. For horticulture including floriculture and agro based industries up to 108 acres

(Burns and Deshpande, 2001)

Karnataka's Land Reform policy was developed with the twin objectives of (i) conferring ownership on erstwhile tenants and (ii) redistribution of surplus lands available after land ceiling to the deserving. This policy has relatively achieved its objective by fixing ceiling on land holdings and conferring ownership to tenants. Up to the latest Amendment in 1995, the Land Reforms did not promote land leases. However, after this Amendment the Government has permitted leasing out land up to 40 standard acres for aquaculture, 20 standard acres for industrial development, 4 standard acres for educational institutions recognised by the State, 20 standard acres for housing project; and 20 standard acres for horticulture including floriculture and agro based industries. This policy has brought changes in land use especially in the urban fringes and in semi-urban areas, where in absentee landlords are promoting floriculture/horticulture. In fact,

instead of leasing out land, farmers have resorted to total sale of their land, and this has resulted in many cases farmers becoming tenants on their own land, due to poor portfolio management.

The main purpose of the Amendment is to supplement the objective of new-agricultural policies of Government of Karnataka and augmenting the process of liberalisation and globalisation initiated by Government of India.

Table 2. Land Reforms Implications and Likely Changes

Sl.No	Land Reform Measure	Implications and Likely Changes
1	Abolition of intermediaries	Successful but this is Likely to re-emerge in other forms
2	Tenancy reforms which include: (a) regulation of rent (b) security of tenure for tenants and (c) conferment of ownership on them	Partially Successful. Gave rise to un-recorded Tenancy and reverse Tenancy. Land Tenancy market will have to be opened up
3	Ceiling on land holdings	Partially Successful but unlikely to Sustain in near Future
4	Agrarian reorganisation including consolidation of holdings and prevention of sub-division and fragmentation; and	Consolidation of Holding either through state Efforts or by Co-operation likely to Emerge strongly.
Proposed Changes		
1	Organisation of co-operative farms	Small and Marginal farmers are likely to form consortiums not on the co-operatives way
2	Increased Ceiling Limit for Specific Purposes (Educational Inst, Industries, Housing, Horticulture)	Land Concentration in the hands of Resourceful individuals is likely to increase.
3	Widening the Definition of Agriculture	Mis-use of the Provision is more likely
4	Allowing Non Agriculturists Holding of land	This was happening earlier. Land Concentration is likely to Change.

IV. Changing Trends in Land Use

Growth pattern for different land use categories is analysed at State and District level using time series data covering a span of forty years (1955-56 to 1995-96). The secondary data available with Directorate of Economics and Statistics ,Govt of Karnataka, provided distribution of total area (geographical/reporting) into nine-fold land classification. No doubt, it is appropriate to study the growth pattern in different land

use category at Agro-climatic zonal level to draw more meaningful micro plans. But as data on land use are not readily available at the level of agro climatic zones (Zones cut the district boundaries and time series at taluka level are not available). Keeping this limitation in view, in the present study district has been chosen as unit to analyse the growth in different land use categories at desegregated level.

Analysis of land use at state level indicates that land classified under Net Sown Area, area under forest and area under non-agriculture uses have registered positive and significant growth rates of the magnitude of 0.12,0.42 and 1.28 per cent per annum respectively. (Results of the trend analysis are presented in the Annexure tables) Surprisingly, the land classified as Current Fallow has also registered a positive and significant growth of the order of 1.04 per cent per annum. This is a disturbing trend. The area gained by first three categories of land use mentioned above have been contributed by, permanent pastures, other grazing lands, Cultivable Waste, Other Fallow, land under miscellaneous tree crops and groves not included under Net Sown Area and barren and unCultivable Waste. These land use categories have registered a negative and significant growth during the reference period (GoK, 2001).

District wise analysis of growth in land use under nine –fold category has been under taken to capture growth at desegregated level. In respect of area under forest, six districts, namely, Shimoga, Hassan,Bidar, Gulbarga ,Raichur & Mandya have registered positive growth rate of more than one per cent per annum. On the other hand, in four districts (Chitradurga, Chikmagalur, Mysore, and Dharwar) area under forests have registered positive growth rates. In these districts the area under forests is growing at the rate of less than one percent per annum .In seven districts, namely, Bangalore, Kolar, Tumkur, D.Kannada, Kodagu, Belgaum and Bijapur there is no significant growth in area under forest. Interestingly, Uttara Kannada Which has nearly 80 per cent of its land under forest and Bellary which has only 13 per cent total land under forest both the districts have registered negative rates of growth (See Annexure tables).

Land classified under barren and uncultivated waste (B&U lands) is growing at more than one percent per annum in Bangalore, Kolar & Hassan districts. In the districts

of Mandya, Bijapur, Uttara Kannada, Bellary & Gulbarga, B&U lands are growing at the rate of less than one percent per annum. Area under this category of land is declining in Shimoga, Chikmagalur, Mysore, Belgaum, Daharwar, and Raichur districts. In districts of Chitradurga, Tumkur, D.Kannada, Kodagu & Bidar this category of land did not show significant growth rates (See Annexure tables).

As many as nine districts have recorded positive and significant growth rates of more than one per cent per annum in respect Land Put to Not Agricultural Uses and for the other five districts land under this category is increasing at rate of less than one per cent per annum. Only in three districts, namely, Shimoga, Uttara Kannada and Bidar growth rates are not significant. Thus, it reflects the fact that area put to non-agricultural purposes in some districts is increasing at faster rate in most of the districts in the state. With respect to area under Cultivable Waste, except for Bidar district has registered a growth of more than one per cent per annum under this category of land, rest of eighteen districts either have registered non significant or negative growth rate. Similar trend is being observed in respect of land put under permanent pasture & other grazing, where Uttara Kannada district alone has registered positive growth of more than one per cent per annum and all the other district except Kodagu district which has non significant growth rate has registered negative growth. Land under Misc. tree crops which is not included in Net Sown Area has shown positive and significant growth in Bangalore, Chikmagalur, Mandya, Mysore, Belgaum, U. Kannada, Bidar, Raichur, Chitradurga, Kolar and Bellary districts. Area under this category of land has negative growth in Shimoga, Tumkur, Dakshina Kannada, Kodagu, Bijapur, Dharwar and Gulbarga districts. Only Hassan district did not register significant rate of growth (See Annexure tables).

Area brought under cultivation has positive growth rate in twelve districts viz., Bangalore, Chikmagalur, Kodagu (growth is more than one per cent per annum), Chitradurga, Kolar, Shimoga, Tumkur, Dakshina Kannada, Hassan, Mandya, Mysore and Bidar . This is evident from the fact that net area sown has shown an increasing trend in these districts. Interestingly, Net Sown Area has registered negative growth rates in Belgaum, Bijapur, Dharwar, Uttara Kannada, Gulbarga and Raichur districts, whereas Bellary district has non-significant trend in respect of area brought under cultivation.

The Current Fallow lands indicate that the land has not been brought under cultivation during the reference year. Growth in area under Current Fallow is more than one per cent per annum in Bangalore, Kodagu, Mysore, Belgaum, Bijapur, Dharwar, Uttara Kannada and Bellary districts and less than one per cent per annum in case of Mandya district. On the other hand, Chikmagalur, Dakshina Kannada, Hassan and Bidar districts have registered negative significant growth in area under Current Fallow. But the resource constrained districts of Chitradurga, Kolar and Tumkur did not show any trend .The land under Other Fallow indicate that these lands were not brought under plough for more than one year but they are not out of cultivation for more than three years. Nearly 13 district, either registered negative or non-significant growth in area under Other Fallow, six districts namely, Bangalore, Kolar, D.Kannada, Mandya, Gulbarga and Raichur has registered growth of more than one percent per annum

V. Arriving at land use policy

Unlike capital land is neither an abundant nor an easily regenerating resource. Limits to the use of land and setting-in process of degradation could be easily visualised. More than that land is a resource, which has a tendency to get subjected to economic degeneration and environmental degradation at a faster rate. At the same time, the process of reclamation of land is not only un-economic but also requires longer span of time. Therefore, its distribution among the use-categories and optimum economic efficiency in its use through policy intervention assumes prime importance.

Any land use policy should broadly address to the following objectives:

i) To prevent further deterioration of land resource by appropriate preventive measures,
ii) To restore the productivity of the degraded land by appropriate package of practices,
iii) To meet the consumption needs of the growing population.
iv) To allocate the land for different uses based on land capability, economic and environmental efficiency.
v) To install efficient and effective administrative structure for prescribing and regulating land use by all concerned

One of the major limitations of the implementation of land use policy in India is the lack of resource based systems approach and non-recognition of the integrated inter-linkages between different uses of land. Operational plans for any individual land-use category are quite often pursued independently by the concerned departments without any

horizontal co-ordination. These target oriented operational programmes are bound to use the infrastructure and other services inefficiently and over years wear out the quality of land. In such case a medium/long term perspective on land use become a pre-requisite.

Perspective planning for land use requires full assessment of the present status, likely impact of the historical, existing and intended policy interventions, and the State level constraints, which are likely to emerge in envisaging such perspectives. Therefore, while formulating the medium term perspective it is essential to assemble the long-term trends in land use, the earlier processes of policy framework, identified constraints in land use and major structural determinants of land use.

A perspective plan of land use in the state can therefore include the following:

i. It should be attempted at two levels namely at broad state level as well as at the district level.

ii. It should aim to integrate agriculture with the allied sectors of the economy. Integrate forest management with agro-industries by restructuring forest policy and redefining its social relevance, economic objectives, and environmental goals.

iii. Redefine social objectives of land policy. These should reduce the incentives for agricultural land ownership as a tax shelter for rich and as a way of subsistence living for rural poor. Taxation of agricultural income, land tax to promote productive use of land, free freights on forestland can be used to promote economic as well as environmental gains to the nation. Monitoring the land use and taxation of land should be the responsibility of the local level institutions. State level land use Boards can have promotional and facilitating role in providing institutional infrastructure and the personnel for technology development, extension, and effective post harvest administration.

The very process of the above exercise is not only to evolve a medium-term plan but also to direct policy tools towards the problems that are likely to come in the way of preparing any such plan. Therefore, as a first step it is essential to begin on two fronts viz., (i). the assemblage of policy changes in the land use sector and (ii). analysing the long-term trends in the policy. This will involve collecting and collating the changes in the policy that directly or indirectly affect the land use.

VI. Land Use Projections for Karnataka

(a) Based on Growth Trends

Attempt is made here to project the land use pattern in Karnataka using the data for more than four decades. For the purpose of projections, growth rates derived from the time series data have been utilized. The projections have been worked out with an interval of five years period. Accordingly, projected land use is obtained for the years 2000, 2005, 2010, 2015 & 2020. When each Category of land use is projected using the growth rates obtained and aggregated, it was felt that necessary correction should be incorporated keeping in view the region specific characteristics. We have resorted to some tenable assumptions to overcome this problem. It is assumed that area under Forest, Current Fallow and Land put to non–agricultural uses would grow at lesser pace than the reflected growth. It is expected that concerted efforts would be made to restrict the land being shifted to non-agricultural uses and prevent more area attaining the status of Current Fallow. In addition to this the limits of land available for these purposes are being reached very fast. On the other hand, it may not be possible to increase area under forest as depicted by historical growth due to socio, economic and budgetary constraints operating on the economy. It is also assumed that area under Current Fallow, Other Fallow, permanent pasture, Cultivable Waste, Barren & other uncultivated land and land under misc. Tree crops will decelerate at lesser pace than the one reflected by historical data. The projected figures are presented in the table in the appendices. By the year 2020 net area sown would stabilize around 57 percent of geographical area and area under forest would be around 18 percent of geographical area. The area under other land use category range from eight to one per cent.

(b). Based on Carrying Capacity

Land under different use category is projected with 1991 year as base For the purpose of deriving carrying capacity of land of different use categories, adult population, which is eighty six percent of total population, is considered as uses of the land. Extent of land required to retain same level of carrying capacity as that of base year is estimated by multiplying the coefficient of carrying capacity of different land use by the projected population. Requirements for different land use category are projected for the years 2000, 2005, 2010, and 2015. The results are presented in the table given in appendices. When

the estimates are compared with the projections made using historical data, the estimate in respect of forestland appear to be on higher side. But, in respect of land put to non-agriculture uses, requirement is considerably low. Net Sown Area projected through this method has provided higher estimates when compared to the projections made based on the historical growth. It is found that by the year 2020 only 109 lakh hect, can be brought under cultivation according to the projection made using historical growth. Projections of Net Sown Area derived by adopting carrying capacity approach indicate that by the end of the year 2020 nearly 147 lakh hect has to be under Net Sown Area. Since this can not be achieved due to the limits on land, it is necessary to double crop nearly 40 lakh hect to meet the food requirements.

VII. Towards a Policy and Monitoring Framework

(a) Policy for Arable Areas

i. The watershed development programme should be implemented in three phase namely resource conservation, resource development and resource utilisation with human interface. The programme should ensure farmers participation in the development activities including in its financial components.

ii. Instead of Govt. incurring the expenditure on development of waste lands, the responsibilities should be left to the farmers under the technical prescription of the Department of Agriculture. If the farmers do not undertake the presented advises, it has got to be undertaken by the Department and the cost should be treated as a loan at nominal interest rate.

iii. Environmental protection laws which relate to acts as cutting trees should be made more stringent and the growth of the appropriate species on land should be supported by incentives in favour of growing the recommended crop or trees and disincentives for departures from recommended land use. Such a package of incentives and disincentives should be carefully worked out.

VIII. Institutional Requirements for Policy and Monitoring

i. The State Land use Boards are recognised but do not function as a coordinating and supervising agency of the State Government for ensuring land resources management, development, and conservation. It is necessary to correct this shortcoming. It should have technical and managerial staff of proven ability to prepare annual action plans for training of extension personnel and coordinate the different departmental activities in the implementation of the action plans for agricultural development. It should also function as a regional resource centre for management of the Production Management Information System (PMIS) at the State level.

ii. The Panchayat Raj Government should be the grass-root agency for developing the operational (investment) plans for promoting the desired land use in the micro-watersheds.

iii. The classification and maintenance of land records of rights should be given high priority and land records should be constructed before any field level investment planning is taken up in the micro-watersheds. The land use planning recognises the capability of land resources for alternative uses, but their social benefit-cost calculations vary depending on the ownership. For this reason, a clear demarcation of biosphere reserves, production forests, community lands, urban green belt and private level on a priority basis.

iv. For effective land use, capability classification of the FAO system of land evaluation has to be preferred to USDA system. The land use survey organisation should be decentralised to district or even taluk level to suggest most appropriate land use and a data card maintained for each holding.

v. The one solution to this problem is to decentralise land revenue administration and the social development programmes like drinking water, primary education, and health care to a constitutional self-government closer to the people. For this purpose, the proposed constitutional amendment on Panchayat Raj should

ensure adequate financial autonomy and an adequate law and order machinery that should go with it if it is to function effectively as a constitutional third tier of government for micro-ecology development through land use planning.

vi. The concept of land reforms may have to be reviewed in line with the concepts of New Economic Policy. Although abolition of tenancy has been ideal of many land reform movements, it is debatable whether the tenancy can ever be entirely abolished even if the man-land ratio in agriculture is favourable for its abolition. Variety of circumstances may necessitate its continuance to some extent in all situations. Even if the redistribution of land is carried out, every rural family cannot possibly be given a piece of land sufficient to provide subsistence. In the short run, only a realistic course of policy is to recognise the inevitability of some tenancy and to legalise and promote the most productivity oriented form of tenancy and not to attempt to outlaw it. Empirical research is required to determine the precise manners in which alternative tenancy arrangements effect input use and productivity.

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Annexure Table 1: Land Utilisation -Compound Growth Rate-1955-56 TO 1995-96 - Bangalore Division

	BANGALORE		CHITRADURGA		KOLAR		SHIMOGA		TUMKUR	
LAND USE	Compound G.Rate	R-Square	Compound G.Rate	R-Square	Compound G.Rate	R-Square	Compound G.Rate	R-Square	Compound G.Rate	R-Square
FOREST	0.63 NS	0.04	0.15*	0.22	0.001 NS	NEG	2.82*	0.89	-0.03 NS	0.02
BARREN AND	1.32*	0.40	-0.23 NS	0.03	1.34*	0.73	-2.87*	0.59	0.25 NS	0.06
UNCULTIVABLE WASTE LAND PUT TO NON-AGRICULTURAL USES	2.04*	0.80	0.29*	0.36	0.77*	0.82	0.01 NS	0.01	0.50*	0.26
CULTIVABLE WASTE	-2.03*	0.83	-1.48*	0.31	-0.61*	0.20	-3.44*	0.76	0.16 NS	0.01
PERMANENT PASTURE AND OTHER GRAZING LAND	-2.29*	0.56	-1.39*	0.85	-1.92*	0.94	-1.01*	0.60	-1.75*	0.80
LAND UNDER MISC.TREE	4.02*	0.70	0.81*	0.75	0.94*	0.46	-3.28*	0.50	-7.22 *	0.79
CROPS AND GROVES NOT INCLUDED IN NET AREA SOWN:										
CURRENT FALLOW	2.46*	0.65	-0.24NS	0.004	0.01 NS	NEG	-1.52 NS	0.04	0.12 NS	NEG
OTHER FALLOW	2.64*	0.23	-3.62*	0.75	1.06*	0.14	-0.58 NS	0.04	-0.91*	0.25
NET AREA SOWN	1.21*	0.14	0.53*	0.21	1.06*	0.71	0.71*	0.87	0.53*	0.60

Annexure Table 2: Land Utilisation -Compound Growth Rate-1955-56 TO 1995-96 - Belgaum Division

	BELGAUM		BIJAPUR		DHARWAR		U.KANNADA	
LAND USE	compound G.Rate	R-SQ-UARE	compound G.Rate	R-SQ-UARE	compound G.Rate	R-SQ-UARE	compound G.Rate	R-SQ-UARE
FOREST	0.26 NS	0.01	-0.01 NS	0.03	0.13*	0.31	-0.02*	0.55
BARREN AND	-1.09*	0.59	0.63*	0.25	-2.85*	0.82	0.91*	0.45
UNCULTIVABLE WASTE								
LAND PUT TO NON	9.25*	0.72	1.31*	0.68	6.23*	0.88	-0.17NS	0.02
AGRICULTURAL USES								
CULTIVABLE WASTE	-1.73*	0.66	-1.18*	0.61	-1.68*	0.58	-2.77*	0.98
PERMANENT PASTURE	-1.72*	0.84	-2.12*	0.55	-1.68*	0.46	10.50*	0.68
AND OTHER GRAZING LAND								
LAND UNDER MISC.TREE CROPS AND GROVES NOT INCLUDED IN NET AREA SOWN.	3.01*	0.26	-1.17*	0.21	-3.32*	0.65	1.50*	0.56
CURRENT FALLOW	4.28*	0.67	3.81*	0.540	4.83*	0.65	3.90*	0.70
OTHER FALLOW	-5.58*	0.92	-0.62NS	0.06	-1.79*	0.43	-1.18*	0.64
NET AREA SOWN	-0.12*	0.37	-0.25*	0.34	-0.13*	0.20	-0.15*	0.13

Annexure Table 3: Land Utilisation -Compound Growth Rate-1955-56 TO 1995-96 - Mysore Division

	CHIKMAGALUR		D.KANNADA		HASSAN		KODAGU		MANDYA		MYSORE	
LAND USE	**Compound**	**R-**	**Compound**	**R-**	**Compound**	**R-**	**Compound**	**R-**	**Compound**	**R-**	**Compound**	**R-**
	G.Rate	**Square**	**G.Rate**	**Square**	**G.Rate**	**Square**	**G.Rate**	**Square**	**G.Rate**	**Square**	**G.Rate**	**Square**
FOREST	0.89*	0.82	0.09 NS	0.07	2.71*	0.76	-0.04 NS	0.04	1.98*	0.33	0.28*	0.90
BARREN AND UNCULTIVABLE WASTE	-1.38*	0.75	-0.14 NS	0.05	1.25*	0.88	-0.05 NS	0.07	0.79*	0.38	-0.77*	0.44
LAND PUT TO NON AGRICULTURAL USES	1.50*	0.79	1.25*	0.91	1.29*	0.79	0.68*	0.65	1.91*	0.81	1.86*	0.74
CULTIVABLE WASTE	-1.35*	0.72	0.04 NS	NEG	-1.26*	0.60	-4.89*	0.95	-0.50 NS	0.07	-1.01*	0.66
PERMANENT PASTURE AND OTHER GRAZING LAND	-1.90*	0.96	-0.25*	0.46	-3.20*	0.95	-0.76 NS	0.03	-2.13*	0.88	-1.78*	0.56
LAND UNDER MISC.TREE	2.76*	0.61	-0.91*	0.83	-0.03 NS	0.01	-0.19*	0.15	1.98*	0.16	1.03*	0.15
CROPS AND GROVES NOT INCLUDED IN NET AREA SOWN.												
CURRENT FALLOW	-3.78*	0.71	-2.73*	0.830	-3.40*	0.62	5.24*	0.55	0.22 NS	NEG	2.74*	0.37
OTHER FALLOW	-2.30*	0.57	1.17*	0.18	0.80 NS	0.03	-2.83*	0.3	3.98*	0.52	0.35 NS	0.03
NET AREA SOWN	1.16*	0.95	0.43*	0.43	0.94*	0.89	1.56*	0.84	0.28*	0.27	0.66*	0.85

Annexure Table 4: Land Utilisation -Compound Growth Rate-1955-56 TO 1995-96 - Gulbarga Division

LAND USE	BELLARY		BIDAR		GULBARGA		RAICHUR		STATE	
	Compound G.Rate	R-Square	Compound G.Rate	R-Square	Compound G.Rate	R-Square	Compound G.Rate	R-Square	Compound G.Rate	R-Square
FOREST	-0.83*	0.64	5.15*	0.92	2.17*	0.56	4.88*	0.81	0.42*	0.91
BARREN AND	0.22*	0.35	0.97 NS	0.08	0.38*	0.12	-2.55*	0.86	-0.35*	0.75
UNCULTIVABLE WASTE LAND PUT TO NON	0.16*	0.32	0.01 NS	NEG	1.34*	0.81	1.34*	0.72	1.28*	0.97
AGRICULTURAL USES										
CULTIVABLE WASTE	-0.45NS	0.04	1.08*	0.25	-3.26*	0.90	-0.50*	0.15	-1.24*	0.93
PERMANENT PASTURE AND OTHER GRAZING LAND	-0.94*	0.12	-1.79*	0.63	-0.81*	0.51	-0.82*	0.72	-1.64*	0.93
LAND UNDER MISC.TREE	0.31*	0.11	2.41*	0.20	-3.32*	0.5	1.98*	0.34	-0.40*	0.45
CROPS AND GROVES NOT INCLUDED IN NET AREA SOWN.										
CURRENT FALLOW	1.71*	0.20	-1.37*	0.240	1.37*	0.13	2.05*	0.36	1.04*	0.35
OTHER FALLOW	-2.85*	0.50	-0.85*	0.14	2.89*	0.16	3.21*	0.27	-0.84*	0.3
NET AREA SOWN	-0.11 NS	0.05	0.11*	0.15	-0.20*	0.16	-0.33*	0.65	0.12*	0.24

Annexure Table 5 : Land Use Projections for Karnataka

	Year				
					Area in Hectares
	2000	**2005**	**2010**	**2015**	**2020**
Total Geographical Area					
By professional Survey	19187919	19187919	19187919	19187919	19187919
Forests	3282592	3330082	3365144	3432520	3482059
Barren and Uncultivable Land	718310	705827	693561	631509	619665
	3.7	3.7	3.6	3.3	3.2
Land put to Non Agri. Use	1531808	1632386	1739567	1803787	1925505
	8.0	8.5	9.1	9.4	10.0
Cultivable Waste	368745	301320	230071	260108	241352
	1.9	1.6	1.2	1.4	1.3
Permanent pastures and	812555	698076	588713	584060	533745
Other grazing land	4.2	3.6	3.1	3.0	2.8
Land under miscellaneous	310425	304266	298230	242312	236513
free non-crops included N.S.A	1.6	1.6	1.6	1.3	1.2
Current Fallows	1076775	1108944	1144148	1057549	924316
	5.6	5.8	6.0	5.5	4.8
Other Fallows Land	451662	408009	365125	347980	331544
	2.4	2.1	1.9	1.8	1.7
Net Sown Area	10635047	10699010	10763359	10828094	10893219
	55.4	55.8	56.1	56.4	56.8

Note: Figures are in Hectares and those in the Second row are per centages to the Total Geogr. Area

Annexure Table 6: Projected Land use Based On Carying Capacity Of Land During 1991

Area in Hect.

Category of land use	Year			
	2000	**2005**	**2010**	**2015**
Forest	3559201	3786984	4029306	4244219
Land put to non-agriculture use	1379330	1467605	1561514	1644801
Net Sown Area	12395607	13188905	14032840	14781314
Area under foodgrains	8470853	9012975	9589699	10101187
Area under non-foodgrains	3924754	4175930	4443141	4680127
Area to be double cropped	1760560	2489895	3269481	3953220