Land Use Planning for Agroforestry Systems Management

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Introduction

In India, the farmer in rainfed region has established land use planning merely in two thirds of the arable land (96 million ha) with multiple/mixed crops. The productivity and its stability on highly varying both spatially and temporally in rainfed agriculture. Current rainfed land use practices comprising monocropping, intercropping and to some extent mixed farming systems (with annuals, perennials and small/large ruminants) are no doubt supporting resource poor farmers by exploitation of natural resources but neither the productivity levels, viable incomes, year round employment or the sustenance of the ecosystem are usually not taken care adequately. In these complexities, a land use cannot provide a module, which is the need for a rainfed system. The final aim of rainfed land use planning is to build a model for individual farmer to sustain the farming system feeding his family, giving staggered and attractive income, improving the land quality and feed to the livestock apart returns from perennial trees like woody species.

" Land is a delineable area of the earth's terrestrial surface, encompassing all attributes of the *Biosphere* immediately above or below this surface, including those of the *Near Surface Climate*, the *SOIL and TERRAIN FORMS*, the *Surface Hydrology* (including shallow lakes, rivers, marshes and swamps), the near surface *Sedimentary* layer and associated *Ground Water* reserve, the *PLANT and ANIMAL* populations, the *Human Settlement* pattern and physical results of *PAST and PRESNT HUMAN ACTIVITY* (terracing, water storage or drainage structures, roads, buildings, etc.). " . Thus, a *Natural Unit of Land* has both: *Vertical* Aspect: from atmospheric climate down to ground water resources and *Horizontal* Aspect: an identifiable repetitive sequence of soil, terrain, hydrological, and vegetative or land use elements(FAO, 1993)

What is Land Use Planning?

LUP (FAO, 1993) is the systematic assessment of physical, social and economic factors in such a way as to encourage and assist land users in selecting land use options that :
1. Is an interactive and continuous process of development ; 2. Requires flexibility
3. Does not have a clear end-product; 4. Is problem oriented;5.Is area specific;6. Involves all stakeholders

LUP Principles: 1. Appropriateness to local context 2.Flexibility 3.Transparency, 4.Participative approach 5.Gender specific and 6.Inter-disciplinary

Why Land Use Planning for Agroforestry Systems Management

To achieve a sustainable, environmentally sound, socially desirable and economically appropriate form of land use.

Different Perceptions about LUP

Land use planning is not just crop/farm planning on a different scale, but it has a further dimension, namely, the interest of the whole community. LUP means different thing to different people:

- **For researchers -** it is the systematic assessment of land and water potential for alternative land use under existing economic and social conditions in order to select and adopt the best options.
- **For small farmers -** The effective utilization of land and water resources for crop production in order to minimize crop failures and risks and to sustain family needs. To market driven mismatching land suitabilities. The farmers expect family sufficiency and profit with or without sustained use of natural resources.
- **For Large Farmers -** An effective utilization of resources to maximize profit from the whole farm, based on principle of comparative advantage

Levels of Land Use Planning

- National(1;1Mormore); State(1:25000 or more);District(1;50000), Microlevel: Village / watershed (1:4000/8000/10000)

Experience from NATP Mission Mode Project vis-à-vis Microlevel Land Use Planning

The Mission Mode Project on Land Use Planning for Management of Agricultural Resourcese in Rainfed Agroecostem in its Network in 16 cooperating centers spread in arid, semiarid and subhumid Agroecosubregion in India has indicated the following (NATP-MM-LUP –Rainfed-Final Report, 2005):

- Soil Resource Inventory16 Rainfed AESRs in India indicate that there are 5 major soil orders viz., Entisols, Inceptislos, Vertisols, Alfisols and Aridisols and 132 soil subgroups were delineated in 5258 ha across 16 microwatersheds located.
- Socioeconomic Inventory in 16 Rainfed AESRs in India 1763 households was inventoried. In all, 14 biophysical, 9 socioeconomic,9 production, 14 infrastructure and 13 technical constraints were identified.
- In traditional rainfed crops (groundnut, pearlmillet, r*abi* sorghum, soybean, cotton, rice, fingermillet, maize, kharif sorghum) based production systems areas in the country, traditional land use practiced by the farmers in relation to scientific land suitability is done correctly by 53 per cent only. This mismatch is more noticed in cotton based and fingermillet areas.
- While the traditional land use in relation to Soil-site suitability in varying soils regions in rainfed agroecosystem, the land use practiced by the farmers is incorrect by 55 per cent in black soils region and 60 per cent in red soils region, the situation is far better in other soils regions and across soil types, it is 53 per cent.
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This warrants us to focus scientific land use planning at farming systems level with more emphasis on farming systems unit management, thus, may address efficient, optimized and sustainable use of natural resources including biotic, socio-economic and related infrastructural resources. All the above perceptions introduce the LUP dimension into Agroforestry Systems Mangement (AFSM)Approach

Kinds of land degradation

1.Physical degradation : Soil erosion by water and wind: Water erosion is the most serious one. 16.35 t/ha/yr.Soil loss of 20 to 100 t/ha/yr due to sheet and rill erosion in rainfed regions.In red soils regions with 750 to 2000 mm annual rainfall,- rapid surface due to low water intake and surface crusting, results in rapid run off and erosion.Jhuming, cycle narrowed to 3 to 6 yrs.Forest cutting, burning, clearing and dibbling of seeds cause nearly 4.1 t/ha of soil to slide/roll down to foot hills.Wind erosion predominant in wetern dert region. Coastal areas where sandy soils predominate and cold desert regions of Leh.Wind erosion is moderate to severe in arid and semi arid northwest India covering 28600 sq.kms, of which 68 % is covered by sand dunes and sandy plains

2. Chemical degradation- nearly 3.7 M ha.Due to several processes like los of nutrients and/or OM,, accumulation of salts, pollution by toxic substancesof industrial/urban/mines/huge quantities of fertilizer application, pollution of ground water etc. First ameliorate the soils, then take up Agroforestry activities at field/ micro level (micro site improvement)

Integration of LUP with Agroforestry Systems Management (AFSM):

Traditionally, developmental programmes were imposed in a top – down approach. This approach has been attempted at state, district and village level. Data requirements would vary from broad physical resources at state level to more detailed agro climatic, social and economic resources at village level. Hence, the needs and constraints of the farming community are expected meet.

Building bridges for LUP for AFSM

Between disciplines in the study of integral land use systems, where much is expected of the new tools of systems of engineering and Information Technology, Remote Sensing and Geographical Information System(GIS).Between the different stakeholders influencing Land Use Planning decisions for Farming Systems Management. Building bridges between the Indigenous Knowledge and Scientific Knowledge as practical land use planning models for Farming Systems Management in Rainfed Agroecosystems

Tools for LUP for AFSM :

Resource Survey: Resource identification; **Remote Sensing:** Land use, Land cover

Land Evaluation: Resource based interpretation;**GIS** : Documentation -Integration -Retrieval

Modelling : Forecasting.

Steps in LSP for AFSM

Land evaluation is done based on certain principles (FAO,1983):

- During land evaluation, land suitability is assessed and classified with respect to specified kind of use.
- Evaluation requires a comparison of the benefits obtained and the inputs needed on different types of land.

- Land evaluation is a multi-disciplinary approach.
- Evaluation is made in terms of relevance to the physical, economic and social context of the area concerned.
- Land suitability refers to use of the land on a sustained basis keeping in view the ecosystem.
- Evaluation involves comparison for more than a single kind of use.

The relevant qualitative land evaluation procedures for establishing farming systems modules in the rainfed regions are:

- Land Capability Classification
- Land Suitability Classification

Land Capability Classification

It is an interpretative groupings of soils based on inherent soil characteristics, land features and environmental factors that limit land use or impose risk of erosion. Soils are grouped in 8 capability classes on the basis of their ability to produce commonly cultivated crops. The risk of soil damage progressively increases from Class I to Class VIII. Arable lands are put in Class I to IV and the non arable in Class V to VIII. There is a provision to assign subclass on the basis of kind of predominant hazard, limitation or conservation problem. A sub-class may be further divided into capability units according to similarity in potential and response to management. While land capability classification system is useful for relatively broad level planning it needs to be supplemented by more precise evaluation for micro level planning. Further, the land capability classification is conservation oriented which considers the negative aspects. Yet this system is still widely used because Of its simplicity and ease of comprehension. The capability classification gives general idea about the Capability of the soils but does not explain specific crop performance unless supplemented by additional information. This method could be followed effectively for highlighting the conservation oriented limitations which need immediate attention and for broad grouping of soils into agricultural and non-agricultural lands.

Classes

- Groups of land units that have the same degree of limitation.
- The risk of soil damage or limitation becomes progressively greater from Class I to Class VIII.
- The classes show the general suitability of a land unit for agricultural use.

I to IV - Arable ;V to VIII - Non-arable

Sub-classes: These are based on major conservation problems such as a:

e - erosion and run off; w - excess water; s - root zone limitation - climatic limitations

Capability unit: Grouping of one or more individual soil mapping units having similar potentials and limitations or hazards

(a) Produce similar crops - under similar management.
(b) Require soil conservation or management.
(c) Have comparable potential productivity.

Land Suitability Classification

Land suitability classification refers to the fitness of a given type of land for a defined use. Suitability classification is arrived at on the basis of soil survey information, economic and social analysis, kinds of land use and the need for change. Separate c1assification are made with respect to each kind of land use that appears to be relevant for the area (FAO, 1976). The categories recognized *in* land suitability classification are order, classes, sub-classes and unit. There are two orders suitable(s) and non-suitable (N). The classes distinguished are 5-1 highly suitable, 5.2-moderately suitable and 53-marginally suitable. The sub-classes reflect kinds of limitation as in land capability sub-classes. The suitability units in a sub-class differ in management requirements. Depending upon the purpose, scale and intensity of study either all or limited number of categories may be adopted.Soil suitability models FAO(1976) for specific crop are dependent upon the suitability criteria of sail site characters under the existing management conditions. Since the suitability of a soil to the crop is determined on the limiting characteristics(s), the suitability of q soil with respect to a crop might be underestimated.

An ideal method to decide adoption of a cropping pattern (land use) on a particular soil unit is to have prior knowledge of the yield performance or yields are the integrated end products of interactive processes of all factors and inputs and' are, therefore, :the best indices of productivity potentials. It is hardly possible to obtain such information for all soil units in all the area in view of neither the cost nor it necessary. Soil survey and classification aid in transfer of technology and are therefore the basis for evolving rational land use and management methods. Analysis of crop yields obtained by farmer over the years in relation to management levels "on known soils (soil series) in surveyed area or field experimental data should help in deciding cropping pattern and transfer of technology to similar areas.

Land Suitability	Codes Used	Remarks
Orders	S = Suitable	Types of Suitability
	N = Not Suitable	
Classes	S1 = Highly Suitable	Degree of Suitability
	S2 = Moderately Suitable	
	S3 = Marginally Suitable	
	N1 = Currently not Suitable	
	N2 = Permanently not Suitable	
Sub Classes	Ex: S2m (moisture)	Reflecting Types of Limitations
	S2k(workability)	
	S2e (erosion risk)	
	S2me (moisture, erosion risk) etc.,	
Units	Ex: S2m-1	Reflecting small differences in required Management
	S2m-1	
	S2m-1	

Land Use Requirements of Some Land Use Types (FAO,1984)

Requirements Based on Forest Volume, Growth Rate And Yield Estimates: Present forest stand (F), estimated growth rates/yield,estimated survival rates (F).

Management Requirements: Conditions for site clearance and land preparation,conditions for mechanized operations soil workability, conditions affecting timing of production conditions for harvesting,conditions affecting transport, storage and processing,conditions for nursery sites, accessibility, size of potential management units conditions for road construction and maintenance

Conservation Requirements: Erosion hazard,land degradation hazard,tolerance to vegetation degradation Preservation of plant and animal species

Agro-forestry

Perennial species also play an important role in areas where cropping of annual plants has reduced total water use and allowed water tables to rise, with resultant salinization. In such areas, an appropriate density of trees in 'agroforestry' systems can help reestablish a hydrological balance that keeps the water table and its salt content below the root zone of crops. Agroforestry has extended rapidly in southeast Australia, where in 100 years since evergreen sclerophyll forests of eucalyptus were cleared for annual crops and pasture, substantial areas have been lost to agricultural production through rainfed salinization. The socio-economic dimension of the solution is complex. The technical solution identified restoration of an appropriate hydrological balance as the basis of the solution; implementation is problematic. The complexity lies in the physical separation of recharge areas where treatment is required from discharge areas where response to treatment is sought. These occur infrequently on individual farms, are not restricted within individual watersheds, and may even be separated by hundreds of kilometers. Ley farming, for example, involves the sequential accumulation and loss of soil structure and fertility in pasture and crop phases. The emphasis here in agroecological analysis is on the processes and balance of resource supply and capture, and on the competitive and complementary relationships between the planned and unplanned (associated) biodiversity (Connor,2002) (Table 1).

Table 1. Some factors affecting decisions on incorporation of Agroforestry in crop diversification in rainfed regions of India

Short-term profit factors:Crop production and quality;Forage production level, quality and timing;Yields of trees, economic shrubs and forages Input costs;Output prices for annuals, perennials and livestock products
Dynamic factors – short term to medium term:Soil health;Tree and forage density Abiotic stresses;Water harvesting;Optimum tillage
Sustainable factors: Soil degradation;Nutrient loss; Tree/forage establishment
Risk factors:Yield variability;Price variability;Yield/price covariance Flexibility of the enterprise in response to changed conditions;The farmer's attitude to risk
Whole-farm factors;Total arable area;Machinery ;Total feed requirements Financial support;Labour availability, quality and cost;The farmer's objectives (profit, risk reduction, sustainability);Traditional wisdom

How many different crops to grow? How to mix or sequence them? How do the physical characteristics of their farm, eg. size and soil types, and their financial position and attitude to risk, determine a different optimal solution to those of their neighbors? How farmers devise and manage cropping systems that meet their objectives. Crops are less bio-diverse than most natural plant communities, including those from which they have been developed. At least staple commodities, is dominated by systems constructed of monocultures of individual crops. Man is a dominant part of them. A common misunderstanding is that the crops grown in each region are, or should be, the ones that are most closely adapted to the particular combination of soil and climate. That is, however, not the driving force in agriculture Adaptation to the physical and biological environment serves only to establish the range of options from which farmers make economic choices. A proactive R&D system should facilitate raising desirable crops. World's broad-scale cropping is rainfed and therefore subject to the risk of drought and/or flood as well as extremes of temperature (and wind). Subject to substantial inter-seasonal variation because yield responds to weather at the site of production while price also responds to yield of the same or competing crops grown elsewhere. Risk is an important feature of cropping activities, especially of extensive, rainfed cropping operations in low-rainfall regions. Farmers with limited financial reserves are understandably the most risk averse.

Resource protection

In extreme cases, the most vulnerable sections of land are taken out of crop production completely, eg. on steep lands and along water courses, which were inadvisably cleared for agriculture in the first instance. In all cases, land use design and management are directed to reducing erosion to acceptable if not zero levels. The major distinction, applied here, between the roles of diversity in 'productivity' and 'resource protection' serves to highlight the range of environmental challenges that confronts agriculture.

Society's views

These views can be grouped in two classes: The first concerns the appearance of the farming land scale. The second, highly topical at this time, concerns the sustainability of mechanized broad-scale (pejoratively industrial) agriculture, including the maintenance of the genetic resource base. Some people, as discussed previously, propose a return to multi species cropping systems, modeled on natural systems, as a solution to both these issues. Price support has the effect of reducing risk and so without other controls is most likely to reduce diversity. Direct subsidy, to clearly defined goals, would appear to be the better strategy. There exists a belief and developing paradigm that the sustainable cropping systems of the future will be found only in multi-species crops designed to mimic the structure and processes seen in the natural systems that they have replaced. Any agroforestry systems to be relevant shall address following issues:

- Sustain efficient cropping systems
- Risk and cost minimization
- High income and employment generation
- Up gradation of natural resources viz., land and water, through integrated restorative high biomass producing farming systems
- Food, nutritional, economical and ecological security
- Poverty alleviation vis-à-*vis* small and marginal holdings
- Competing with comparative advantage in new Trade regime

To remain competitive and survive in the current economy, farmers must be insightful, innovative, and ready to make changes. In recent years, conventional wisdom has encouraged diversification with alternative enterprises and increased on-farm processing, packaging, and other means for adding value to raw products before they leave the producer's hands. While this makes good sense, making diversification and value-added strategies work can be challenging (Table 2).

Table 2. Issues and functions provided by Agroforestry in rainfed regions

Issue/Functions provided by diversification
Productivity and stability: Increased yield, reduce intra seasonal variation and improved stability through diverse components viz. crop, tree, plant and animal
High risk and high cost: Risk and cost minimization through yield and income from annual and perennial mixtures
Unabated land degradation;Minimization of kinds, effect and extent of land degradation by appropriate land care through alternate land use systems
Inadequate employment: Staggered employment round the year
Low profitability;High income generation from various components
Poor energy management: Energy efficient implements

It must be remembered that the objective of diversification is to spread risk, not to increase it through poorly conceived undertakings. Success or failure can depend on a number of factors; one of these is good information. Before plunging into new, costly ventures, the following advice is worth heeding. Anticipated benefits of crop diversification are -

- *Alternative crops may enhance profitability*
- *Diversified rotations can reduce pests*
- *Labor may be spread out more evenly*
- *Different planting and harvesting times can reduce risks from weather*
- *New crops can be renewable resources of high value products*

Suggested Microlevel Land Use Planning vis-a- vis agroforestry systems in rainfed regions of India

Land degradation and climatic change are the twin problems challenging rainfed agriculture in India. Kinds, degree and extent of land degradation are of immediate concern in sustaining production system, reducing cost of production, and natural resource management and conservation (Vittal *et al.,* 2006).The spatial distribution of diversification index is given in Fig. 5.The crops were grouped into Rice, Oilseeds, Pulses, Cotton and Coarse Cereals. In each production system, based upon diversification index and severity of soil degradation horizontal and vertical diversifications were suggested. Horizontal diversification focuses on the multiple cropping, ie. Intensification of cropping in time and space dimensions under a given land degradation status in a particular district in a crop(s) based production system. This has special significance in small farm diversification, which is predominant in rainfed regions. Horizontal diversification aims at is advantageous in effective utilization for natural resources, viz. soil, light water and conservation, employment generation, and risk minimization. Vertical diversification aims at reducing the soil loss, high biomass production, high income and employment generation through year round activity and addition of organic matter to soil, organic linkage between agriculture and industry wherein the scope is widened for post harvest value addition by practicing the enterprises like agro forestry (alley cropping, silviculture, silvipasture, agri- horticulture and agri-silvi-pastoral system), sericulture, rainfed horticulture, olericulture, medicinal aromatic plants, other economic shrubs like dye yielding plants and most importantly animal component for diary, poultry, apiary, rabbit rearing etc.

These complementary enterprises with multiple objectives and advantages in rainfed regions may help for comparative advantage in the present trade regime. Few examples are given below.

I. Soil Degradation Status: Water erosion**,** High severity with moderate loss of top soil

State: Andhra Pradesh **District:** Nalgonda

Soils: Deep loamy, clayey mixed red and black soils; Rainfall: 763 mm

Length of growing period: 120 – 150 days

Suggested Diversification

1. Horizontal Diversification

Castor + Pigeonpea ;Castor + Sorghum;Castor + Greengram/Blackgram;Castor + Pigeonpea (2:1);Intercropping one row of clusterbean between 90 cm castor rows.;Blackgram + Castor (6:1), Castor + Setaria and; Castor + Cowpea

2. Vertical Diversification

Parkland systems: *Azadirachta indica, Acacia nilotica, Tamarindus indica*

Trees on bunds: *Tectona grandis*, *Leucaena leucocephala, Borassus flabellifera, Cocos nucifera, Acacia nilotica var. cupressiformis*

Silvipastoral system: *Leucaena leucocephala + Stylosanthes hamata, Leucaena leucocephala + Cenchrus + ciliaris*

Alley cropping: *Leucaena leucocephala + sorghum/ Pearlmillet, Gliricidia sepium + sorghum/pearlmillet*

Agri-Horti system: Mango + short duration pulses

Fruit: Mango, Ber, Custard apple, Guava, Pomegranate, Amla

Fodder/green biomass: *Luecaena leucocephala. Azadirachta indica, Albizzia lebbeck, Bauhinia purpurea, A. procera, B.monosperma, A.amara, D. sissoo*

Medicinal & Aromatic Plants: *Catharanthus roseus, Cassia angustifolia, Aloe barbadensis, Withia somnifera, Cymbopogan martini, Cymbopogan flexuosus, Vetiveria zyzanoides, Al Psoralea,* Palma rosa

II. Soil Degradation Status: Water erosion**,** High severity with moderate loss of top soil

State: Karnataka, **District:** Chitradurga

Soils:Medium to deep red loamy soils;Rainfall: 654 mm;Length of growing period:120-150 days

Suggested Diversification

1.Horizontal Diversification

Pigeonpea paired rows – groundnut (10:2);Groundnut – castor (8:1)

2. Vertical Diversification

Fodder/ green biomass: *Cassuarina, Silver oak, Glyricidia, Calliandra, Faidherbia albida* on bunds Gravelly shallow soils – *Stylosanthes scabra*

High gradient non-arable lands with shallow soils – Amla In catche pits with deep soils – neem, pongamia, and *Albizzia lebbek* Forage crops – *pennisetum, pedicallatum / cenchrus ciliaris, microtaliem axillaries*

Wastelands – jackfruit, custard apple, tamarind

Fruit: Mango, Pomegranate, Sapota, Guava, Custard apple, Jamun

Medicinaland aromatic plants: *Catharanthus roseus, Cassia angustifolia, Salanum viarum, Dioscrorea, Geranium, Pogostemon patchouli, Jasmine*
Vegetables: Tomato, chillies, okra watermelon, bitter gourd, drum stick, brinjal, bitter gourd.
Animal Component: Male / female cattle, Female buffaloes, poultry, sheep, goat,
Other enterprises: Muhsroom cultivation, sericulture, piggery, apiary, rabbit rearing

LUP for Agroforestry Systems Management in Rainfed Regions of India :Productive Farming Systems- 3X3 Matrix Approach – AICRPDA experience

In Productive Farming Systems- 3X3 Matrix Approach model (Fig.1.) livestock will be an integrated component. The form of livestock may vary from region to region. In this cycle, the number of animals will be kept as low as possible meeting essentially home needs of the farmer and very little towards commercial activities. The browsable species will be fed to the cattle by mostly stall feeding, except in pasture plots. Silaging will be the method for off-season needs. The non-browsable species will be converted into compost. The farmyard manure and silt accumulated in the farm ponds will be recycled. Instead of spreading too thinly, a method will be designed in consultation with farmers as per the requirements to enrich different areas and covering the entire land in due course of time. Proper land use plans, keeping in view the aspirations of farmers, constraints of the resources, would need to be developed in association with the farmers. Micro level highly diversified farming systems are practicable only in rainfed lands due to resilience in adoption of diversification from crop through tree to animal. This promises microenvironment change for coping the adverse effects of drought and coping over a long time. Various plant species, soil water conservation methods required for the above models for various Agro Eco sub- regions. The research efforts made so far includes the development and testing of these different practices in an isolated manner at research stations and on on-farm experiments. In the proposed project, these individual components would be amalgamated and implemented in individual farmer fields. Land used based Farmstead plan State of Art based agroforestry models linked to livestock and watershed management for soil and water conservation including water harvesting. Some of the subjects are - hedge fencing, multipurpose tree species, bush farming, cereals/millets. Pulse/ oilseeds/ cotton, parkland horticulture, olericulture, floriculture cum IPM, home remedies, water harvesting, livestock, poultry, fisheries, apiary etc. Part of the farmstead could also be used for generating seed spices. Types of agricultural drought in India and drought ameliorating measures for arid, semiarid and subhumid regions are given below(Vittal *et al.,* 2003). Biodiverse farming systems models specific to a particular agroecological setting were developed

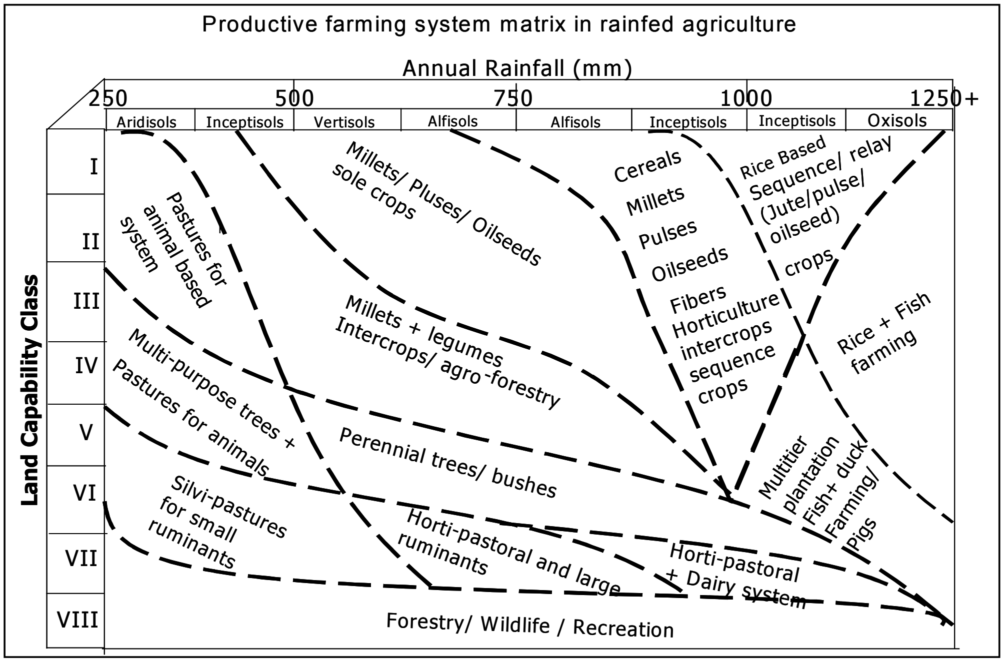

Fig.1.Productive farming system matrix in rainfed agriculture

Epilogue

Land Use Planning for Agroforestry Systems Management appears to be a rational for sustaining the rainfed agriculture in the country. However, it is clear that attempts to meet the challenge are not keeping pace with the escalating severity of the problems. To remain competitive and survive in the current economy, farmers must be insightful, innovative, and ready to make changes. In recent years, conventional wisdom has encouraged diversification with alternative enterprises and increased on-farm processing, packaging, and other means for adding value to raw products before they leave the producer's hands. While this makes good sense, making diversification and value-added strategies work can be challenging. The emphasis here in agro-ecological analysis is on the processes and balance of resource supply and capture, and on the competitive and complementary relationships between the planned and unplanned (associated) biodiversity. A framework of participatory rainfed land use planning for rainfed agroecosystem relevance to various scales of operation with relevant stakeholders is conceptualized for sustainable land management (Ravindra Chary et al., 2004). The database for the agriculture sector will be strengthened to ensure greater reliability of estimates and forecasting which will help in the process of planning and policy making with the subjects like Improvement of Rural Livelihoods, Policy, Social and Institutional Issues, Agroforestry and Food Security, Carbon Sequestration and Environmental Benefits, Public/Private Partnerships, Water Issues, Agroforestry for Health and Nutrition, Biodiversity, Carbon Sequestration and Environmental Benefits, Eco-agriculture, Local Agroforestry Knowledge in Global Context, Management Genetic Diversity, Medicinal and Aromatic Plants, Scaling up of Agroforestry Benefits, Short-ration Woody Crops, Phytoremediation, Small Farm Soil Fertility Management Strategies, Tree Domestication, Trees in Fragmented Landscapes, Tropical Home gardens, Valuation of Environmental Benefits etc. with the the ultimate goal or the ends of LUP for FSM that include:

- Developing farming systems that are productive and profitable
- Conserving the natural resource base
- Protecting the environment, and
- Enhancing health end safety.

From Centralized Technical Programme development to Participatory Local Planning(Looking at larger issues).Utilize enoromous knowledge/experience available in addressing Wastelands Management thru Agroforestry where in Microlevel Land Use Planning could act as a TEMPLATE in a Consortium Approach.Make an inventory of key constraints /opportunities in each region and Divide them in to: Policy related;Technology related;Development/extension related;Market related *"The essence or truth of the tree is the soil. It is the same for all material things like trees which constitute the world." -The Hindu Vedas*

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