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Land Resources



Urban solid waste for construction of Railway Platform - A story of sustainable waste management

M. Jacob Abraham

The Indian railways has joined hands with Suchitwa Mission of Kerala Government in finding out an effective solution to the crisis of solid waste management in Thiruvananthapuram city. Urban waste disposal in the state Against this backdrop, the attempt by Suchitwa Mission & Southern Railways is laudable one.

The 40 metre long and six metre wide platform of the Murukkumpuzha railway station is a testimony to that attempt. The Southern Railway constructed the platform on land filled using solid waste collected from the state capital city. The newly built railway platform is the first of its kind on the rail network in the country where the urban solid waste was used as landfill. The filling of the land using the city garbage was under an agreement between State and Railways. Under the agreement the Thiruvananthapuram Municipal Corporation provided the garbage and red earth required. Around 600 tonnes of non biodegradable waste was used to construct platform II of the Murukkumpuzha railway station. The platform with coloured interlocking tiles will not give any clue to what lies under it. The plan was to construct the platform up to a length of 540 metre but only 40 metre was completed due to protest by local people against the landfill by waste materials collected from the city.



Landfills are said to be one of the most safe and engineered method to protect the environment and prevent pollutants from entering the soil and possibly polluting ground water. In Municipal solid waste landfills synthetic lines like plastic are used to separate the landfill's trash from land below it. About 55 percent of waste generated in the United States goes to landfills while around 90% of waste created in United Kingdom is disposed in this manner.

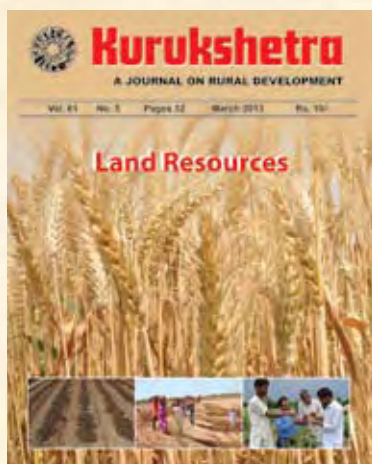


The construction process involves spreading of thick plastic sheet at the identified site and layer of trash and earth is evenly spread over it as 30 cm layer. Each time the spread is thoroughly compressed by rollers. When the spread attains required height, a layer of red earth is sprinkled over it. On the top cobble stones or interlocking tiles are laid as part of beautification. Railways was able to save Rs. 10 lakh in construction by using the garbage for landfill. The Southern Railway is ready to develop the remaining 500 metres of platform if the local people extend the support for this new experiment.

After the successful completion of Murukkumpuzha platform, Thiruvananthapuram Railway division of Southern Railways is now going ahead with platform construction at Kochuveli, a nearby railway station by making use of the same technology. The platform construction at Kochuveli is measuring 540 m x 5.5 m in dimension. If the local people extend support, Southern Railway is planning to extend the platform at Parassala on the Kerala - Tamil Nadu border.

According to Suchitwa Mission, using urban waste for landfill is fully safe method of waste disposal, thereby protecting ecology and environment since hills need not be razed for red earth to do the land filling.

(The author is Deputy Director, Press information Bureau, Thiruvananthapuram)



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INSIDE

It is essential to combine natural resources, human and capital, to boost economic development, especially in the rural areas which will ultimately raise the quality of life of the majority of the population who live in the villages. Natural resources include land, water resources, fisheries, mineral resources, forests, marine resources, climate, rainfall and topography. Effective management of these resources is needed to achieve the best results for any society. For that to happen we must know the quantity and quality of land resources which are endowed by nature.


India constitutes 18 per cent of the world's population, 15 per cent of the live stock population and only 2 per cent of the geographic area, one per cent of the forest area and 0.5 per cent of pasture lands. The per capita availability of forests in India is only 0.08 per hectares as against the world average of 0.8 per cent, thus leading to pressure on land and forests. This poses a major and urgent concern. In accordance with the National Remote Sensing Agency's (NRSA) findings there are 75.5 million hectares of wastelands in the country. It is estimated that out of these around 58 million hectares are treatable and can be brought back to original productive levels through appropriate measures.

Of the total 328 million hectares, statistics is available for approximately 305 million hectares which is around 93 per cent of the total geographical area. Out of this nearly 69 per cent falls within dryland that encompasses arid, semi-arid, dry and sub-humid land.

Land degradation is a major problem especially the decline caused by human activity. Land degradation is increasing in severity and extent in many parts of the world with more than 20 per cent of all cultivated areas, 30 per cent of forests and 10 per cent of grasslands undergoing degradation. Millions of hectares of land per year are being degraded in all climatic regions. It is estimated that 2.6 billion people are affected by land degradation and desertification in more than a hundred countries, influencing over 33 per cent of the earth's land surface.

Watershed degradation in the third world countries threatens the livelihood of millions of people and constraints the ability of countries to develop a healthy agricultural and natural resource base. Increasing population and livestock are rapidly depleting the existing natural resource base because the soil and vegetation system cannot support present level of use. As population continues to rise, the pressure on forests, community lands and marginal agricultural lands lead to inappropriate cultivation practices, forests removal and grazing intensities that leave a barren environment yielding unwanted sediment and damaging stream flow to down stream communities.

In this issue we discuss the initiative taken by the government to check land degradation.

The Ministry of Rural Development has a separate Department of Land Resources which acts as a nodal department in the field of watershed management and development. 

LAND USE AND AGRARIAN RELATIONS

Francis Kuriakose and Deepa Kylasam Iyer

'The test of our progress is not whether we add more to the abundance of those who have much; it is whether we provide enough for those who have too little.'

Franklin Delano Roosevelt

Land is a finite resource and there is conflicting and competing demands on it. For 80% of the world, agriculture land is the primary source of life and livelihood. India holds 2.4% of the world's geographical area (328.73 mha) but supports 17.5% of the world's population. India is home to 18% of the cattle population of the world while owning a mere 0.5% of the total grazing area. Of the total 328 mha (total geographical area), land-use statistics is available for approximately 305 mha (93%) of the total land. 228 million ha (69%) of its geographical area falls within dryland that encompasses arid, semi-arid, dry and sub-humid land as per Thornthwaite classification.

India is blessed with a wide range of soil pattern, each particular to the locale. The alluvial soil (78 mha) that covers the great Indo-Gangetic Plains, the valleys of the rivers Narmada and Tapti (Madhya Pradesh), the Cauvery Basin (Tamil Nadu) supports cereals, oil, pulses, potato and sugar cane. The Black Cotton soil (51.8 mha) found in Maharashtra, Gujarat, Madhya Pradesh, Uttar Pradesh, Karnataka, Rajasthan and Andhra Pradesh supports cereals, cotton, citrus fruits, pulses, oil seeds and vegetables. The red soil of South India and Madhya Pradesh, West-Bengal and Bihar supports rice, millets, tobacco and vegetables. The laterite soil (12.6 mha) and desert soil (37 mha) are not found suitable for agriculture.



Water is a resource precious and scarce in India. The variability of precipitation spatially and in quantity can be inferred by the fact that rainfall has been recorded as low as 100 mm in West Rajasthan and 9000mm in Meghalaya in North Eastern India. India receives 4000 cubic kilometre of precipitation in the country in its 35 meteorological sub-divisions. Of this amount, only 50% is put to benefit due to topographical and other constraints. The fact that water is crucial to agriculture in a country that has 68% of its net cultivated area as rain-fed, can hardly be exaggerated. Of the total cultivated area of 142 mha, 97 mha is rainfed. The full irrigation potential of the country has been revised to 139.5 mha out of which 58.5 mha is watered by major and minor irrigation schemes, 15 mha by minor irrigation schemes and 40 mha by groundwater exploitation. India's irrigation potential increased from 22.6 mha (1951) to 90 mha (1995-96) but water usage efficiency is a meagre 30-40%. That is why more than 50% of the total cultivated area is still rainfed. The state of soil and water that mainly determine land and its utility in agriculture is of prime importance to maintain sustainable development. We need to define and examine land use pattern with an emphasis on a viable land use policy taking the above factors into consideration.

Land Use Pattern

Land Use Pattern is determined by physical, economical and institutional framework, ie the action and interaction of the physical characteristics of land, the economic factors like capital and labour, location of land with respect to factors of infrastructure like transport and institutional framework that determines the inter-relation between all the factors involved. In other words, land use pattern is a complex phenomenon determined by the dynamic equilibrium of factors of agrarian relations, economic development, infrastructure and policy making. It is the synthesis of physical, chemical and biological process on one hand and human process on the other.

The pattern of land use in India can be determined by looking at the post independence scenario. Till 1949-50, land area was divided into a five-fold classification. This was inadequate to meet the agricultural demands as there was lack of

uniformity in definition and scope of classification. Hence it was difficult to compare and utilise the classification to improve the existing land pattern. To break up the existing tracts of land into smaller constituencies for better utility and monitoring, The Technical Committee on Co-ordination of Agricultural Statistics (Ministry of Food and Agriculture) recommended a nine-fold use of land in the country. There was the area under agriculture that was the mainstay of farmland. Three-fourth of this area was shared by the states of Bihar, Gujarat, Madhya Pradesh, Karnataka and Maharashtra with Maharashtra topping the chart with the highest percent of the net sown area. The area under non-agricultural use comprised the land under water, land used for the construction of buildings, roads, railways and barren agricultural land. The area under forest was 76.52 mha (State Forest Department, 1999). It was classified as Reserve, Protected and Unclassed. Using Remote Sensing Technology, it was ascertained that the actual forest cover was only 63.73 mha. The ownership of forest land was left to the Government of India and community clans wherever applicable. The per capita availability of forest land was 0.08 hectares whereas the optimum area of land required for meeting the basic needs was 0.47 hectares. This immense pressure on forest cover led to the search of potential areas for expansion of forest cover in culturable land tracts. 13.94 mha of the total land form wetland, fallow land and land put to other uses. Forests form an important part of land use. Land allocation for forestry include forest land and land allotted for agro forestry, farm woodlots, wind belts, shelter belts, avenue trees, urban forests, homestead forests and sacred groves. The state of Natural forest in India can be deciphered from table 1.

Table 1
State of Natural Forests in India

Area of Natural Forest	51.73 mha
Total growing stock in Natural Forest	2431.30 million cu.m
Total biomass in Natural Forests	4805.7 million tonnes

Source: NFAP, MOEF, Government of India, 1999

Forests in India show the greatest variation and range depending rainfall topography and

climactic factors. Forests are both a resource and a habitat and of the 16 detailed forest types given, 38.2% is tropical deciduous forests and 30.2% is moist deciduous. The benefits of natural forests include soil protection, fertility, water flora and fauna conservation, microclimate, genetic resource conservation, use of genetic breeding and biotechnology, integrated watershed management and regeneration of eco-systems.

11 mha of the total land comes under permanent pastures and grazing lands. Rajasthan, Uttar Pradesh, Madhya Pradesh, Andhra Pradesh and Orissa cover 75% of the grazing land in India. The forests of India support 40% energy needs of the country out of which 80% needs are in the rural region and 30% fodder needs of cattle remain significant. The live stock statistics of India given in the table is relevant in this context. It is evident that as land remains constant, the increasing livestock population and their needs could be met only with judicious planning and sustainable use of land.

Table 2
Livestock population in India

Year	Total livestock population in (000)	Cattle (in 000)
1977	369,645	180,140
1982	419,742	192,453
1987	445,286	199,645
1992	470,860	204,584

Source: Agricultural Statistics at a glance, 2001, Directorate of Economics and Statistics, Ministry of Agriculture, Government of India. Note that livestock includes cattle, buffalo, sheep, goat, horse, pig, donkey, mule, camel, yak and 'mithun'.

Area under Common Property Resource (CPR) includes the land that caters to the basic needs and services of the vulnerable sections of the rural poor. This includes village forestry, grazing and watershed drainage to help the farmers in crisis. CPRs should not be confused with wasteland. Whereas CPRs have property rights in the land allocated, wasteland is the ecological characteristics coined to initiate developmental programmes for the recovery of degraded lands irrespective of property rights. Velayutham (2000)

has shown that the area under CPR has diminished during the period 1950-1997. Grazing pressure, land degradation resulting from a burgeoning cattle population that increased from a livestock population of 292 million to 462 million during the period resulted in the gross erosion of CPR changing them into wastelands.

Case for Land Use Policy

The way land is used as a means for life and livelihood is not just dependent on the direct users, it is exposed to a wider realm and is decided by all the factors directly and indirectly involved. One of the main problems that is faced today is the depletion of the quality of land and land degradation. Approximately 5-7 million hectares of usable land is lost every year through land degradation. The relative influence of land degradation is 39% in Asia. This translates to half a billion people in the developing world with no irrigation facilities, 400 million living on soil unsuitable for agriculture, 200 million on slope dominated regions and 130 million in fragile forest eco-system. 73 % of the earth faces severe and significant problems in agricultural investment while trying to sustain a rising population. A recent pioneering study by three UN agencies including FAO, UNDP and UNEP estimate the severity and cost of land degradation in South Asia to be 2% of the Gross Domestic Product of the region and 7% of the agricultural output. The statistics given below reaffirm the finding.

Table 3
Extent of Land degradation in India (area)

Source of Erosion	Area in mha
Water	103.90
Wind	13.10
Physical Agents	12.23
Chemical Agents	10.30
Other Agents	7.20

Source: National Bureau of Soil Survey and Land Use Planning

The rising trend in land use degradation can be attributed to the following reasons

1. Deforestation
2. Inadequate land use

3. Unsustainable farming and grazing practices
4. Demographic pressure
5. Lack of adequate technology implementation
6. Markets and legal instruments
7. Climate fluctuation

Demographic Pressure

Demographic pressure is one of the foremost reasons of land degradation as increasing population puts more pressure on arable land, grazing, forestry, wild life, tourism and development. Not surprisingly, population pressure affects 35% of the productive land. The population demands for food, fuel and employment is going to double in the next five decades. This will involve expansion of fragile marginal lands for utility in developing countries as poverty is endemic and institutional capacity for land management is weak. Urbanisation and industrialisation outstrips land capacity. There are serious concerns about land, environmental degradation, decreased productivity and growth rate in the developing world. The population of 1.3 billion living on fragile land is set to double. The vulnerable segment of the population notably the rural poor with moderate assets, land, tradition social capital, human capital and indigenous knowledge are not developed by the institutions. These invisible millions living in disperse settlements in an informal economy are not picked up by the development juggernaut. They lay neglected along with the environmental distress signals.

Land degradation as a result of External features

The net value of land is the sum of two factors- the present value of the revenue stream and the present value of the terminal value of land. There are a number of factors that diminishes the value of land. Intensive farming practices are the foremost among these. Green revolution in India brought in petrochemical technology, pest intensive agricultural method, cross breeding and single species forest

plantations which were mindlessly adopted from other parts of the world. Over application of nitrates has led to groundwater contamination, soil degradation and an imbalance in micro nutrients. The extension of area under irrigation has jumped from 19% to 38% in terms of net sown area in four decades. This has led to water logging and salinity. National Remote Sensing Agency and Forest Survey of India has brought out the fact that 60% of the total area under cultivation is degraded. More than one source of irrigation has increased the salinity and alkalinity of soil. Low precipitation coupled with unscientific use of water and drainage facilities take a toll on water resources. Improper cropping patterns and intensive farming practices degrade the quality and value of land.

The consequences of large scale land degradation are two-folded

Approximately 5-7 million hectares of usable land is lost every year through land degradation. The relative influence of land degradation is 39% in Asia.

The on-site costs- The technological break through that the Green Revolution offered led us to produce short duration high yielding crops. Intensive land use, increased area under irrigation, prolific use of chemicals to raise the efficiency of production also brought in on-site costs like soil erosion, alkalinity, salinity, micro nutrient deficiency, water logging, depletion and contamination of ground water.

The off-site costs- The off-site costs include river and dam siltation, damage to roadways and sewers, siltation of harbours and channels, loss of reservoir storage, disruption of stream ecology, damage to public health and increased frequency of flooding.

Policy Intervention

The rationale for policy intervention should be based on two factors

- i) The significance of off-site costs as a result of land degradation
- ii) The costs of on-site degradation even when it is not apparent in the immediate context

This requires a foresight and vision for long term sustainable development through policies, action and awareness brought out through education, training and extension programmes. The objective of the policy intervention should be the following

- i) Restore efficiency to meet the growing consumption needs
- ii) Suitable mechanism for scientific management, conservation and development of land resource
- iii) Expansion of forest cover to restore ecological balance
- iv) Conjunctive use of surface and ground water
- v) Preservation of agricultural land

The Integrated Approach

For effective and efficient use of land we need eminently practical plans for land use management. This is included in the integrated approach. To reduce the conflicts and to make trade-offs link social and economic development with environmental protection, sustainable development is the key. The essence of integrated approach is the sectoral planning management. There are a number of issues to consider while adopting approaches and policies. For land use pattern through sectoral approach, we need to plan linkages, formulate economically viable project for each sector and use technology. This would include making Land Use Atlases, system database on land utilisation and management, computerised and updated land records at district, state and national levels. Better legal, political and administrative will is also the key.

We need strict laws for land use conversion, survey of land based on climate, water and soil particulars to improve investment and training orientation, publicity and awareness based on local needs. Effective reclamation is needed to check degeneration. This can be done through effective watershed management, reduction of

regional imbalances and diversification of land use. Preventive measures on adverse effects from industrial wastes and effluent and development of agro-based industries are also keys to developing an integrated approach.

To monitor the better use of land, Remote sensing satellite technology like Geographical Information System and Global Positioning System can be used. One of the problems frequently encountered while measuring the loss of land value is the difficulty in measurement itself as there are so many variables involved. Empirical or process based models have to be so complex to take into consideration the effects of all the variables. One of the methods is to estimate long term average annual soil loss from arable land using Universal Soil Loss Equation (USLE) or its revised form (RUSLE). There are various mathematical simulation models based on physical process involved in soil

detachment, transportation and deposition. Use of Iso-erosion rate map (Singh et.al, 1992) is an example. Soil erodability factor can also be measured. Loss of soil value due to land degradation is needed to understand the environmental costs of agriculture. Production approach that assesses the impact, preventive cost approach that focuses on conservation and defensive

expenditure and replacement cost approach that relies on the cost of restoration are the different ways to measure this. There are various econometrics models that can include and evaluate the inputs for alteration and cropping pattern. In India, soil and land survey conducted by Department of Agriculture and co-operation developed land degeneration mapping in the eighth five-year plan through District Information System where soil information system of 30 districts in diverse agro-climatic zones were formulated. Similarly, the Department of Land Resources, Ministry of Rural Development has brought out the Wasteland Atlas of India 2000 after studying different types of degraded wastelands in the country.

Reclamation of wasteland is one of the most important aspects of sustainable land use. Agrarian

Effective reclamation is needed to check degeneration. This can be done through effective watershed management, reduction of regional imbalances and diversification of land use.

practices can be modified for reclaiming wasteland. For example, application of gypsum consecutively for three years with reduced application in the second and third year will reduce salinity. Integrated watershed management is a preventive method in which soil and water is conserved and cropping pattern is altered to improve land use. Percolation of water into subsoil, reduction of surface water run-off, elimination of soil erosion and increase water availability are the chief aims of such sustainable management practices. For attaining these objectives, check dams along gullies are constructed, bench terracing, contour bunding, land levelling, planting grass along the contours, good vegetal cover on the watershed are deployed. Difference can be brought through Governmental Intervention and policy making. The Soil and Water Conservation Division, Ministry of Agriculture plans to manage 86mha under 30 projects through Integrated Water Management. 30,000 hectares of shifting and semi-stable land dunes have been treated with shelter belts and strip cropping as a conservation measure (TERI Report, 1997).

The National Land Use and Wasteland Development Council (1985) was set up with the objective of formulating a National Policy and Perspective Plan for Conservation and Management of Land Strategy. It is time to set right some policies unsuitable for sustainable development. For example, the governmental policy of heavily subsidising electricity for tube well irrigation and chemicals led to poor land quality and eventual abandoning of land. Similarly, the New Economic Policy that encouraged relaxation on land acquired by Non Resident Indians, conversion of agricultural land into non-agricultural land, ceiling of agricultural land holdings eventually led to distorted market value due to speculation. The encouragement given to export oriented agriculture and concessions given to agro-processing industry adversely affected Indian agriculture by increasing the investment costs. Rational Policies to face regional imbalances should be brought in. The commitments of Tropical Forestry Action Plan, World Food Programme, UNCED led Forest Principles and the Government of India's National Conservation Plan should be adhered to. Rational Pricing Policy combined with resource efficiency in agro-processing industry is the need of the hour.

Economic incentives for soil conservation practices, conjunctive use of chemicals with biological inputs, classification of Land use statistics and studying the land use impact on agriculture will help at the macro level. Use of remote sensing technology to study different dimensions of the problem is mandatory. Legislation is in place for conservation of bio-diversity and forests but not to protect soil relations. Such gaps in law should be filled in with appropriate legal protection. New technology and crop management practices should emphasise the integrated systems approach. Meaningful farm research practices will address the concept of linking agriculture with environment. The aim of agriculture should be sustainable crop production with enhanced production envisioned for the long term. Diversification of agriculture should be encouraged. Farming oilseeds and pulses in place of cereals and horticulture wherever applicable demand less water and encourage crop rotation. This permits an understanding of agro climatic conditions, favourable topographic conditions, efficient land use, conservation of soil and maximum use of land resources. Integration of farm forestry with agro forestry will reduce the tremendous pressure on land. Growing a combination of species like agri- silviculture, farm and grove system will make management approach complementary, improve biomass production, regeneration of land resources and increased generation of employment and income.

Thus integrated and sustainable land use comprises prioritisation of critical land sensitivity, understanding land use and forest response, integrated strategy for forest and pest management, diversification of agriculture, crop combination, use of people's indigenous knowledge to attain food and nutritional security, increased productivity and address the environmental concerns. This is the way forward towards an evergreen revolution.

[Francis Kuriakose is former Assistant Professor of Commerce & Management, Mar Ivanios College, University of Kerala, Thiruvananthapuram and Deepa Kylasam Iyer is a contributing Editor with a web portal based in Paris for the people of indian origin.]



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LAND MANAGEMENT CAN IMPROVE RURAL ECONOMY

Nivedita Thapliyal

Land degradation indicates temporary or permanent long-term decline in ecosystem function and productive capacity. It may refer to the destruction or deterioration in health of terrestrial ecosystems, thus affecting the associated biodiversity, natural ecological processes and ecosystem resilience. It also considers the reduction or loss of biological/economic productivity and complexity of croplands, pasture, woodland, forest, etc.

Land degradation is increasing in severity and extent in many parts of the world, with more than 20% of all cultivated areas, 30% of forests and 10% of grasslands undergoing degradation (Bai et al., 2008). Millions of hectares of land per year are being degraded in all climatic regions. It is estimated that 2.6 billion people are affected by land degradation and desertification in more than a hundred countries, influencing over 33% of the earth's land surface (Adams and Eswaran, 2000). This is a global development and environmental issue highlighted at the United Nations Convention to Combat Desertification, the Convention on Biodiversity, the

Kyoto protocol on global climate change and the millennium development goal (UNCED, 1992; UNEP, 2008).

The decline in land quality caused by human activities has been a major global issue since the 20th century and will remain high on the international agenda in the 21st century (Eswaran et al., 2001). The immediate causes of land degradation are inappropriate land use that leads to degradation of soil, water and vegetative cover and loss of both soil and vegetative biological diversity, affecting ecosystem structure and functions (Snel and Bot, 2003). Degraded lands are more susceptible to the adverse effects of climatic change such as increased temperature and more severe droughts.

Land degradation encompasses the whole environment but includes individual factors concerning soils, water resources (surface, ground), forests (woodlands), grasslands (rangelands), croplands (rain fed, irrigated) and biodiversity (animals, vegetative cover, soil) (FAO, 2005). On the other hand the NRC (1994) stressed that land



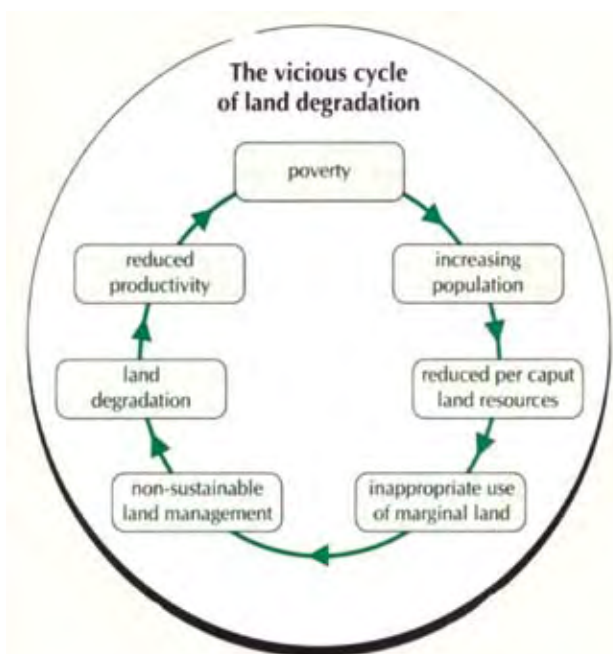
degradation is complex and involves the interaction of changes in the physical, chemical and biological properties of the soil and vegetation. The complexity of land degradation means its definition differs from area to area, depending on the subject to be emphasized.

Dryland

The phenomenon is most pronounced in the dryland, which cover more than 40% of the earth's surface (Dobie, 2001). Around 73% of rangelands in dryland areas are currently degraded, together with 47% of marginal rain-fed croplands and a significant percentage of irrigated croplands (UNCCD Agenda 21, 1992; UNCCD, 1994). Overgrazing has damaged about 20% of the world's pastures and rangelands (FAO, 1996).

The degradation of land may be the result of numerous factors or a combination thereof, including anthropogenic (human-related) activities such as unsustainable land management practices and climatic variations. Note that degradation processes e.g. erosion do occur naturally, and are generally balanced by the rate of soil formation. However accelerated degradation is typically associated with human modification of the environment. The underlying causative factors of land degradation and environment are poverty and undervaluing of natural resources. In both cases people focus on immediate economic gain irrespective of damage to the same resources they are dependent on. The latter in particular promotes inefficient use and wastage of resources.

Land degradation, resulting from unsustainable land management practices, is a threat to the environment as well as to livelihoods, where the majority of people directly depend on agricultural production. There is a potentially devastating downward spiral of overexploitation and degradation, enhanced by the negative impacts of climate change - leading in turn to reduce availability of natural resources and declining productivity: this jeopardizes food security and increases poverty. Sustainable land and Ecosystem management (SLEM) project is rooted in the rational that food security through enhanced agricultural productivity can be achieved through sustainable management of the country's natural and agro-ecosystem.



The cycle of processes leading to and perpetuating land degradation (Source: FAO)

Poverty in India

Poverty is one of the main problems which have attracted attention of sociologists and economists. It indicates a condition in which a person fails to maintain a living standard adequate for his physical and mental efficiency.

According to 2010 data from the United Nations Development Programme, an estimated 37.2% of Indians live below the country's national poverty line. A recent report by the Oxford Poverty and Human Development Initiative (OPHI) states that 8 Indian states have more poor than 26 poorest African nations combined which totals to more than 410 million poor in the poorest African countries.

According to a new UN Millennium Development Goals Report, as many as 320 million people in India and China are expected to come out of extreme poverty in the next four years, while India's poverty rate is projected to drop to 22% in 2015. The report also indicates that in Southern Asia, however, only India, where the poverty rate is projected to fall from 51% in 1990 to about 22% in 2015, is on track to cut poverty half by the 2015 target date. The latest UNICEF data shows that one in three malnourished children worldwide are found in India. 42 percent of children under five were underweight. It also showed that a total of 58 percent of children under five surveyed were stunted. The 2011 Global Hunger Index (GHI) Report ranked India 45th, amongst

leading countries with hunger situation. It also places India amongst the three countries where the GHI between 1996 and 2011 went up from 22.9 to 23.7, while 78 out of the 81 developing countries studied, including Pakistan, Nepal, Bangladesh, Vietnam, Kenya, Nigeria, Myanmar, Uganda, Zimbabwe and Malawi, succeeded in improving hunger condition.

Initiatives by SLEM Projects in India

With the support of the Sustainable Land and Ecosystem Management (SLEM), Technical Facilitation Organization and its partners have taken up socio economic as one of the key issues which include Poverty, Malnutrition, Agricultural GDP and livestock. The main focus of the SLEM projects has always been to the support the target groups in taking up activities for land management and subsequently improving the socio-economic condition. The partners have developed alternative land management strategies, often based on land use practices that rest on local knowledge and local traditions that have stood the test of time. Many of these approaches have achieved noteworthy successes. However, these successes are often not published and need to be brought to the attention of colleagues in other countries as well as policy makers. SLEM-CPP is devoted to the analysis and publication of these cases and supports the exchange of learning experiences amongst the national as well as global context. The Project Partners of SLEM-CPP have documented various case studies which has improved the living condition with the introduction of improved sustainable livelihood.

SLEM has apply “options analysis” for land management where different possible solutions are explored for their effectiveness in addressing the causes and impacts of land degradation as well as improving the standard of living of the poor. Key questions are: why do land users employ inappropriate practices, or what inhibits them from applying more appropriate technologies? Frequently, resource users are aware of degradation but are not in a position to rectify it, often due to political and economic circumstances e.g. insecure land tenure, misuse of subsidies and incentives, market price distortions, etc. These complementary paths help to form solutions from political, technical and economic perspectives. The complex inter-related causes of or contributors to land degradation must be identified to effectively design remedial interventions. Activities to be considered must also include those which support training and education;



(Photo: Courtesy MP Forest Division of Sidhi District)

improve knowledge, local planning procedures and land management skills; create awareness; enhance institutional development; and address pertinent policy issues. Such measures would ensure that the work done to combat land degradation is not reversed because people and governments continue in their old practices, but that they would acquire new knowledge and skills, and make policy improvements.

Several tools are available to assess the costs and impacts of land degradation and the changes and benefits of implementing SLM. These would aid more informed decision making and strategic planning regarding the approach to SLM that should be taken. These include assessing ecosystem services and economic valuation. A major component common to all the projects working on SLEM is the emphasis on capacity building and inter-agency integration of functions and activities to address several of the barriers listed above.

- A framework for action
- Improving land use
- Involving the people participation
- Developing local and national programme integrated with land management and socio-economic parameters
- Strengthening State/Regional/District level Institution dealing with land management issues
- Coordinating international action

Some of the case studies included below which has focused on the land management and social and economic improvement by changing the pattern of practice and knowledge.

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LAND RECORDS MODERNIZATION

Land as an asset plays an important role both in rural and urban areas. In fact our people attach significant social and cultural values to it. Therefore, it is important that a landholder should have an authentic and tamper proof record of the land. In India since time immemorial, rulers have been mapping land for various purposes like collection of taxes, military purposes, demarcating political boundaries, settling disputes etc.

As the population increased, the land parcels became small & valuable, and different agencies like Panchayats, Consolidation Department, Survey Department, Revenue and Registration Department etc. came into existence. The manual system of land records maintenance was not able to cope up with this situation. There is growing demand for easy accessibility to up-to-date and accurate land records. The advent of computers in the country in the eighties provided a solution to this problem. As a follow up of the decision in the Conference of the State Revenue Ministers in 1985, the Government of India initiated two Centrally-sponsored schemes –Strengthening of Revenue

Administration & Updating of Land Records (SRA& ULR) and Computerization of Land Records (CLR).

The scheme of SRA & ULR was launched in the year 1987-88 to help the States and UTs in updating and maintaining the land records, setting up and strengthening of the survey and settlement organizations and the survey training infrastructure, modernization of the survey & settlement operations, and strengthening of the revenue machinery. The Scheme was approved by the Cabinet in the year 1987-88 for the States of Bihar and Orissa. This was subsequently extended to cover rest of the country. The funding pattern was 50: 50 between the Centre and the States and 100 % for UTs.

Centrally sponsored scheme of Computerization of Land Records was started in 1988-89 with 100% central assistance as a pilot project in eight districts of the States such as Rangareddy in Andhra Pradesh, Sonitpur in Assam, Singhbhum in Bihar, Gandhinagar in Gujarat, Morena in Madhya Pradesh, Wardha in Maharashtra, Mayurbhanj in Orissa, and Dungarpur in Rajasthan. This was subsequently



extended to cover the rest of the country. The main objectives of the scheme were:

- Computerization of ownership and plot-wise details for issue of timely and accurate copy of the Record of Rights (RoR) to the land owners.
- To store the records with the latest digital technology for long time.
- To provide fast and efficient retrieval of information both graphical and textual.
- To provide database for agricultural census.

These two schemes have been merged and replaced with a modified Centrally-sponsored scheme of the National Land Records Modernization Programme (NLRMP) in the year 2008-2009. The ultimate aim of the scheme is to usher in the system of conclusive titles in the country replacing the presumptive titles system as is prevalent today. For this purpose, the Department has prepared a Model Land Titling Bill which has been circulated to the States/UTs for comments/suggestions.

District has been taken as a unit of implementation under the NLRMP and all the activities are supposed to converge in the district.

The citizen is expected to benefit from the NLRMP in one or more of the following ways;

- i. Real-time land ownership records will be available to the citizen
- ii. Since the records will be placed on the websites with proper security IDs, property owners will have free access to their records without any compromise in regard to confidentiality of the information
- iii. Free accessibility to the records will reduce

interface between the citizen and the Government functionaries

- iv. Public-private partnership (PPP) mode of service delivery will further reduce citizen interface with Govt. machinery, while adding to the convenience
- v. Abolition of stamp papers and payment of stamp duty and registration fees through banks, etc. will also reduce interface with the Registration machinery
- vi. With the use of IT inter linkages; the time for obtaining RoRs, etc. will be drastically reduced
- vii. The single-window service or the web-enabled "anytime-anywhere" access will save the citizen time and effort in obtaining RoRs, etc.
- viii. Automatic and automated mutations will significantly reduce the scope of fraudulent property deals
- ix. Conclusive titling will also significantly reduce litigation
- x. These records will be tamper-proof
- xi. This method will permit e-linkages to credit facilities
- xii. Market value information will be available on the website to the citizen
- xiii. Certificates based on land data (e.g., domicile, caste, income, etc.) will be available to the citizen through computers
- xiv. Information on eligibility for Government programs will be available, based on the data
- xv. Issuance of land passbooks with relevant information will be facilitated

Inputs from the Department of Land Resources



Kurukshetra

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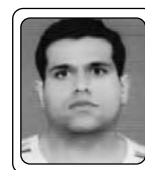
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DRYLAND CONSERVATION

Altaf Hussain

Drylands cover about 41 per cent of land surface. Characterised mostly by low, erratic and highly inconsistent rainfall, water scarcity, soil erosion and climate change are its prominent features. About half of the world food supply comes from drylands and host over half of the world's poor. Keeping in view the rich biodiversity of drylands and home land for millions of rural poor people which are directly dependent on scarce resources of drylands, different innovative technologies for conservation of drylands area adopted to ensure food security, improve productivity and maintain environmental stability. By this way dryland resources and biodiversity reserves are conserved.

Drylands are limited by rainfall, high evapo-transpiration and show a gradient increase in productivity from hyper-arid to arid and semi-arid to dry sub-humid areas, on decreasing aridity or moisture deficit. Drylands cover about 41 per cent of earth's available land surface and three quarters of world food supplies come from drylands (FAO, 1999). The challenges for global agriculture in 21st century is to produce 7 per cent more food to feed a projected population of 10 billion by 2050 by making sustainable use of existing resources and responding climate change (FAO, 2009). Drylands span over 41 per cent of earth's available land surface will need to contribute their share to this yield increase. So

improving dryland crop yield is important, both to maintain food security and to improve livelihoods of the poor.

Drylands in India contribute 70 per cent total cultivated area and about 50 per cent of the geographical area is affected by desertification). Food insecurity, extreme poverty and environmental nexus are the most challenging in the drylands. Improving crop productivity is important both to maintain food security and to improve livelihoods of the people in drylands. Investments are needed for soil and water conservation in order to improve soil fertility and soil moisture. Conservation and efficient utilization of natural resources are two key



components to achieve sustainability in drylands. Land degradation and over exploitation of resources prompted researchers and policy makers to evolve innovative technologies which halt degradation and restore productivity. A number of technological innovations are used which include cultural practices, engineering methods, sustainable agricultural practices, precision conservation and agroforestry. Hence transforming drylands is necessary to achieve second green revolution.

Every continent contains dryland regions. Drylands are most extensive in Africa (13 M km²) and Asia (11 M km²). About three quarters of the world food supplies consisting of wheat, maize, sorghum, pulses, oilseeds, potato and fruits are grown of drylands (FAO, 1999). According to the Millennium Assessment (MA) report there are 2.3 billion people living in the drylands, out of which 1 billion are below poverty line accounting half of the world's poor (MA, 2005). Millions of rural dryland dwellers are directly dependent on local dryland ecosystem services for their daily survival. Therefore, any shortfall in any one of such services will create food insecurity, famines, conflicts and vulnerability of millions of rural poor. Climate change will have a disproportionate effect of dryland areas, contributing to desertification and increasing the vulnerability of people in drylands. We need to put the conservation of dryland ecosystem services at the heart of development policy, if we want to reduce poverty and achieve the millennium development goals.

Background

Definition and characteristics

Drylands are generally defined as lands with limited rainfall. Mainly their dryness is due to the negative balance between precipitation and evapotranspiration rates. Drylands are thus been

defined in terms of water stress as areas where mean annual precipitation (P) is less than half of the potential evapotranspiration (PET). According to the FAO (1993), drylands are agroclimatic zones having short growing periods, which is defined as the period when both water and temperature permit crop growth. So drylands are zones falling between 1-74, 75-119 and 120-180 growing days representing arid, semi-arid and dry sub-humid lands, respectively.

Drylands are characterised by low (100-600 mm annually) erratic and highly inconstant and unreliable rainfall levels. Precipitation is low concentrated during short periods, resulting much of the rainfall to be lost in evaporation and the usual intensity of storms ensures that much of the rainfall runs-off in floods. Fragile environments and unpredictable drought and floods are common features of dryland ecosystems.

Classification of drylands

Dryland ecosystems are mainly categorised into four subtypes according to aridity index and annual rainfall levels into hyperarid, arid, semi-arid and dry sub-humid areas as shown in Table-1.

World drylands

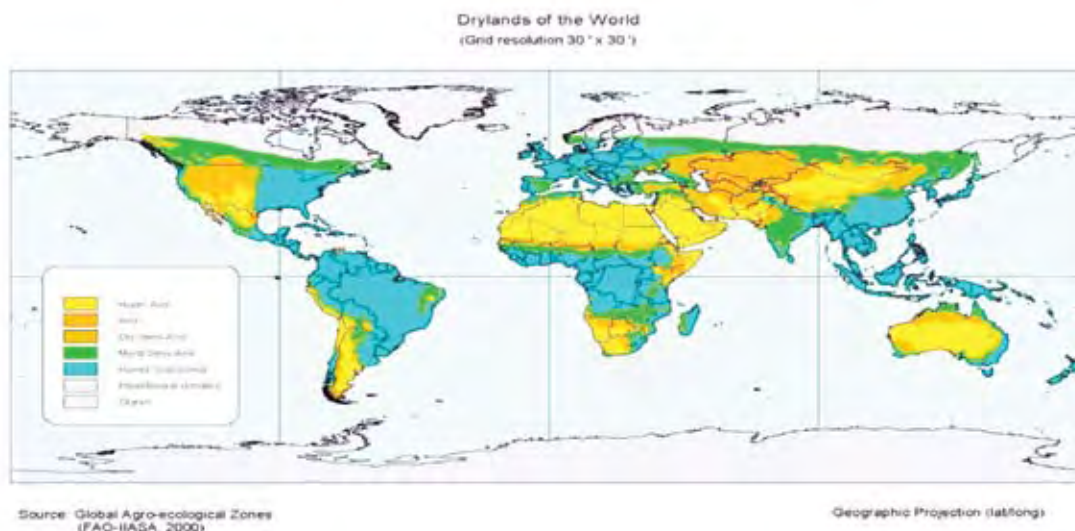
Dryland ecosystems occupy over 41 per cent of the earth's land surface. Desertification affects 70 per cent of the world drylands, amounting to 3.6 billion ha or one-fourth of worlds land surface (IFAD, 1995).

Asia possesses the largest land area affected by desertification, 71 per cent of which is moderately to severely degraded. In Africa two-thirds of which is desert or drylands. 73 per cent of agricultural drylands are moderately to severely degraded (IFAD, 1995). Africa is under greatest desertification threat,

Table-1 : Total dryland categories according to FAO (1993), classification and extension (UNEP, 1992)

Subtypes	Aridity index	Current area		Dominant Biome	Current Population	
		Mk m ²	%global		*1000	%global
Hyper-arid	<0.05	9.78	6.6	Desert	101,615	1.7
Arid	0.05-0.20	15.66	10.6	Desert	222,204	3.7
Semi-arid	0.20-0.50	22.59	15.3	Grassland	828,341	13.9
Dry sub-humid	0.50-0.65	12.87	8.7	Forests	909,273	15.3

[Source : World resource institute, 2002]



with a rate of disappearance of forest cover of 3.5 to 5 million ha per year bearing down on both surface and ground water resources and with half the contents farmland suffering from soil degradation and erosion.

Causes of dryland formation

Limited rainfall, poor soil quality, fragile environments are the main factor behind dryland formation. There is always water scarcity in drylands. The dryness of drylands is due to negative balance between mean annual precipitation and potential evapotranspiration rates. Besides, limited rainfall, the soils are of poor quality, low in organic matter, hence less fertile. Harsh climates are another important issue which limits crop diversification in drylands.

What makes the drylands a difficult environment is not only less rainfall, but also its erratic distribution. Inter-annual rainfall can vary from 20-100 per cent and periodic draughts are common (Zurayk and Haider, 2002).

Problems of drylands

Water scarcity due to limited rainfall, low soil fertility, mostly deep sandy soil with poor water holding capacity, shallow and rocky soils with low organic matter content. Fragile environments with unpredictable floods and droughts are other factors limiting drylands to become productive ecosystems. Lack of technologies limitation of resources and biotic pressures contribute further in conversion of drylands into deserts.

Table-2 : Drylands of the World

Continents	Land mass (M ha)	Hyper-arid (<0.05)	Arid (0.5-<0.20)	Semi-arid (0.20-<0.50)	Dry sub-humid (0.50-<0.65)	% of world drylands
Africa	2965.6	672.0	503.5	513.8	268.7	31.9
Asia	4255.9	277.3	625.7	693.4	352.7	31.7
Australia	882.2	0.0	303.0	309.4	51.3	10.8
Europe	950.5	0.0	11.0	105.2	183.5	4.9
North America	2190.9	3.1	81.5	419.4	231.5	12.0
South America	1767.5	25.7	44.5	264.5	207.0	8.8
Total	13012.6	978.1	1569.2	2305.3	1294.7	100.0
% of world drylands		16	26	37	21	

[Source : Reynolds and Smith, 2002]

Loss of resources

In the world as a whole about 25000 million tones of soil are being washed away from land every year. In India, the figure is 6.25 thousand million tones. Due to erosion and degradation, the world is losing between 5-7 million ha of cultivated land every year which is nearly the same as the new land brought under cultivation, which means that the extent of cultivated land remains more or less same (Lazarus, 1992). According to Millennium Ecosystem Assessment (MA) Report about 10-20 per cent of world drylands are degraded accounting about 6-12 million km² (MA, 2005). Drylands in India contribute to over 70 per cent of the total cultivated area and about 50 per cent of the total geographic area is affected by desertification (Hegde, 2006). Land degradation is particularly problematic for both environmental sustainability and poverty reduction in dryland areas. The UN Convention to Combat Desertification (UNCCD) and others use “desertification” to describe dryland degradation which is caused due to several factors including climatic variations and human activities. Depending on the level of aridity, dryland biodiversity is relatively rich, still relatively secure and is critical for the provision of dryland services. Of 25 global “biodiversity hot spots” identified by Conservation International, 8 are in drylands. So to conserve dryland are very important to ensure food security, conserve rich biodiversity of drylands and improve livelihoods of dryland people. To conserve the scarce resources of drylands a number of practices or methods are used which constitute dryland conservation technologies. These technologies are agronomic or cultural practices like conservation tillage, mulching, organic manure application, contour farming, strip cropping, use of wind breaks, alley cropping, vegetative barriers etc. and mechanical or engineering methods which include basin listing, sub-soiling, terracing, contour bunding, contour trenching, use of gully plugs, check dams and water harvesting structures like community tanks, intra-terrace water harvesting and roof top water harvesting etc. In spite of these practices or methods there are several other measures which can be applied for dryland conservation. These approaches are:

- i) Sustainable farming practices
- ii) Precision conservation
- iii) Integrated watershed approach, and
- iv) Use of agroforestry

A) Agronomic or cultural practices

Agronomic or cultural practices for soil and water conservation in drylands help to intercept rain drops and reduce the splash effect, help to obtain a better intake of water by the soil by improving the organic matter content and soil structure; help to retard and reduce the surface runoff through the use of mulches, strip cropping, mixed cropping and contour cultivation. Use of vegetation on mechanical structures such as gully checks and water harvesting structures etc. enhance their strength and extend their life span.



Surface mulching with maize straw



Contour farming

B) Mechanical and engineering methods

These are permanent structures used to supplement the agronomical practices, when the later alone are not adequately effective. These measures play a vital role in controlling soil erosion and reducing runoff. These are used mostly in drylands where the slope of the soil is more than permissible limit. The main objective of the mechanical methods for controlling soil erosion are : i) to increase the time of concentration by intercepting the runoff and thereby providing an opportunity for the infiltration of water and ii) to divide a long slope into several short ones so as to reduce the velocity of the runoff and thus preventing erosion. These measures are basin listing, sub-soiling, terracing, contour bunding, contour trenching, gully plugging, check dams and water harvesting structure for hilly areas.



Check dam



Gully plug

C) Water harvesting structures for dry hilly areas

Water harvesting is a prominent and technically feasible technology in arid hilly areas. It helps in runoff

harvesting and ground water recharging. Different types of water harvesting structures are used for efficient utilization of rainfall. Such as community tanks, inter-terrace runoff harvesting, hill spring outflow harvesting and rooftop harvesting structures. Runoff utilization is increasingly becoming a common practice in dryland conservation agriculture.

There are other approaches which can be adopted for conservations of dryland ecosystems. These research based approaches are as :

Sustainable farming practices

- i) Precision conservation
- ii) Integrated watershed approach and
- iii) Use of agroforestry

1. Sustainable farming practices

The past decades have witnessed a dramatic change in agriculture with food production soaring due to green revolution. The green revolution entailed the use of improved technologies like high yielding crop varieties, expansion of irrigation, mechanization and the use of chemical fertilizers and pesticides. Sustainable agricultural practices are not new, but drawn on traditional knowledge and practices, adopted to ensure food security and maintaining productivity of dryland ecosystems on sustainable basis. These practices are conservation tillage, integrated nutrient management, agroforestry, water harvesting, livestock integration, use of FYM and mulches, green manuring and integrated pest management etc. to maximize productivity without compromising the needs of the future generations.

2 Precision conservation

Precision conservation offers an alternative to integrate the use of spatial technologies such as global position system (GPS), remote sensing (RS) and geographic information system (GIS) and the ability to analyze spatial relationship within and among mapped data to develop management plans that account for the temporal and spatial variability of flows in the environment. Hence precision conservation practices helps to maintain maximum production by improving soil and water conservation by developing efficient land use management plans.

Precision conservation is an innovative three tier approach comprising a set of spatial technologies and procedures linked to mapped variables, which is used to implement conservation management practices that take into account spatial and temporal variability across natural and agricultural systems (Berry *et al.*, 2003; 2005).

3. Integrated watershed approach

An approach towards dryland conservation. Basically a watershed is a basin like landform defined by high points and ridge lines that descend into lower elevations and stream valleys. A watershed carried a water “shed” from the land after rainfalls and snow melts. Drop by drop water is channeled into soils, groundwater, creaks and streams making its way to rivers and eventually the sea. In other words a watershed is a geohydraulic unit or piece of land that drain at a common point. The aim of watershed management is to ensure that every drop of water and every square foot of land is best utilized.

Integrated watershed approach is not only anti erosion and anti-runoff approach but also a comprehensive integrated approach of land and water resource management. This approach is preventive, progressive, corrective as well as curative.

4. Role of agroforestry in soil and water conservation in dryland ecosystems

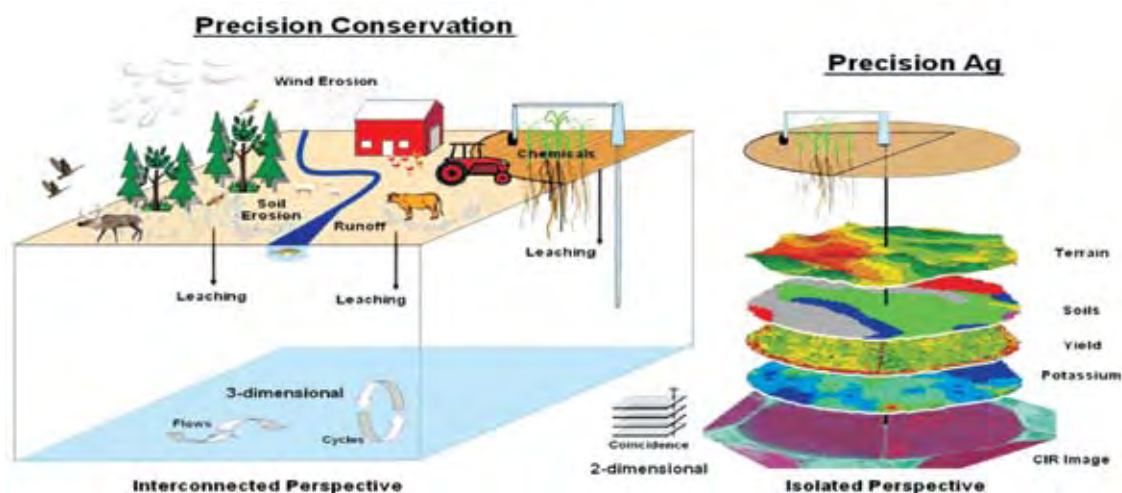
Agroforestry is the science of developing integrated self-sustainable land use systems in which trees are grown on farm lands along with field crops. It includes the introduction and/or retention of

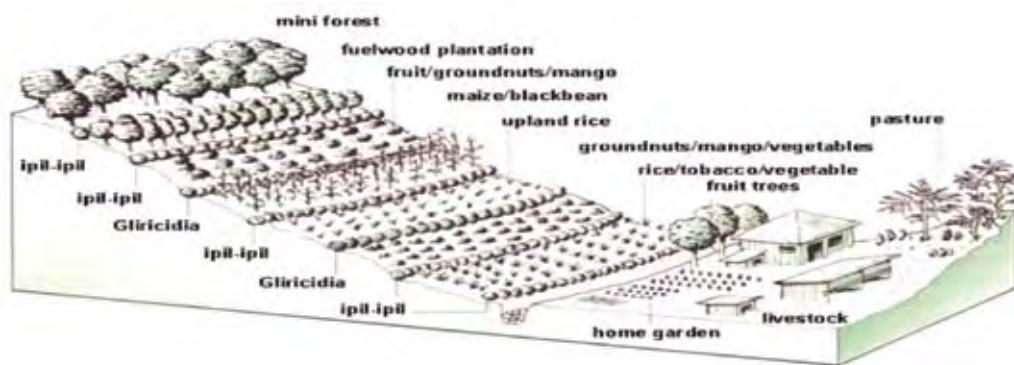
tree crops for timber and fodder, fruit trees, shrubs bamboos, canes and palms along with cultivated filed crops including pasture simultaneously or sequentially on the same piece of land and at the same time to meet the ecological and socio-economic needs of the people. A well planned and properly managed agroforestry programme substantially increase the yield of the land and maintains sustained productivity.

The following are the major agroforestry systems :

- 1) Agrisilviculture (trees + field crops)
- 2) Boundary plantation (trees on boundary + field crops)
- 3) Block plantation (sequential blocks of trees and field crops).
- 4) Energy plantation (trees + field crops during trees establishment period).
- 5) Allay cropping (hedges of economic value + field crops).
- 6) Agrihorticulture (fruit tree + field crops)
- 7) Silvipasture (trees + pasture/animal husbandry)
- 8) Forage forestry (fodder trees + pasture).

Besides above mentioned systems, two main practices are adopted with the object of intensifying farming on slopes alongwith reducing soil erosion and increasing moisture conservation. These are i) sloping agriculture land technology (SALT), ii) Biomass transfer technology (BTT).





Sloping Agriculture Land Technology (SALT)

The sloping agricultural land technology (SALT) is a farming system developed by the Mindanao Baptist Rural Life Centre in the southern Philippines during the 1970's. Basically attuned to the production needs of small-scale hill farmers. This agroforestry technology has gained wide popularity in Asia because it is culturally appropriate, economically sound and is designed to limit soil erosion. SALT is a technology package of soil conservation and food production that integrates several soil conservation measures (Tacio, 1989; Evans, 1992). Basically, the SALT method involves planting field crops and perennial crops in bands 3-5 m wide between double rows of nitrogen-fixing shrubs and trees planted along the contour. These minimize soil erosion and maintain the fertility of the soil. SALT helps considerably in the establishment of a stable ecosystem, the double hedge rows of leguminous shrubs or trees prevent soil erosion. Their branches are cut every 30-45 days and incorporated back into the soil to improve its fertility (Palmer, 1991). The crops provide permanent vegetative cover which aids the conservation of both water and soil.

Biomass transfer technology (BTT)

Various agroforestry technologies are finding enormous application in the east and central African (ECA) region and are lifting many out of poverty and mitigating declining agricultural productivity and natural resources. One such example is biomass transfer in which trees that are rich in mineral elements (fertilizer trees), when integrated with inorganic fertilizer can double or triple crops yields in degraded lands.

Biomass transfer technology involves the growing of trees/shrubs along boundaries or contours on farms or the collection of the same from off-farm niches such as roadsides and applying the leaves on field at planting. In western Kenya, *Tithonia diversifolia* become the preferred species used by farmers to grow maize, beans or kale etc.

Conclusion

Drylands cover about 41 per cent of land surface. Characterised mostly by low, erratic and highly inconsistent rainfall, water scarcity, soil erosion and climate change are its prominent features. About half of the world food supply comes from drylands and host over half of the world's poor. Keeping in view the rich biodiversity of drylands and home land for millions of rural poor people which are directly dependent on scarce resources of drylands, different innovative technologies for conservation of drylands area adopted to ensure food security, improve productivity and maintain environmental stability. By this way dryland resources and biodiversity reserves are conserved.

Apart from soil and water conservation measures, enhancement of soil fertility is also a vital component of dryland conservation. From a high cost external input-oriented agricultural production, to an integrated nutrient management approach, soil fertility can be thought of with inputs like biofertilizers, organic manures and composts green manures and use of mulches etc.

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R

A



H



Sarva Shiksha Abhiyan

28,000 primary schools and 6000 upper primary schools opened

B



Universal Immunisation

2.5 crore children vaccinated


I




Janani - Shishu Suraksha Karyakram

More than 1 crore pregnant women benefitted


N



**Realising
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**Better
Connectivity**
Over 46,000
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through all-weather
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**Scholarship
Schemes**
63 lakh minority
students and 48 lakh
SC students receive
Scholarships
in 2011-12

**Mid Day Meal
Scheme**
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children being
provided hot cooked
meals in schools

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Ministry of Information and Broadcasting
Government of India

STRATEGY TO DEVELOP DEGRADED LAND

Dr Gopal Kalkoti

India has world's 2% of geographical area and 1.5% of forest and pasture lands to support 18% of world's population and 15% of livestock population. The increasing human and animal population has been instrumental in the reduction in the availability of land over the decades. While the per capita availability of land has declined from 0.89 hectare in 1951 to 0.37 hectare in 1991 and is projected to decline to 0.20 hectare in 2035, per capita agricultural land has declined from 0.48 hectare to 0.16 hectare and likely to decline to 0.08 hectare in respective years.

Extent of land degradation

Agencies that have so far estimated land degradation include National Commission on Agriculture [1976], Society for Promotion of Wasteland Developments [1984], National Remote Sensing Agencies [1985], Ministry of Agriculture [1985], National Bureau of Soil Survey and Land Use Planning [1985 & 2005]. The estimates on the

extent of land degradation in India vary widely from 63.9 million hectares to 187.0 million hectares due to different approaches, methodologies, defining degraded soils, adopting various criteria for delineation, among others. However, one cannot underestimate the challenging nature and extent of land degradation in India. The National Bureau of Soil Survey & Land Use Planning [NBSS&LUP] of the ICAR, Nagpur in 2005 has reported that out of 328.60 million hectares of geographical area in India Net Cultivated Area is about 141 million hectares [42.9%] of which irrigated area is about 57 million hectares [40.4%] and about 84 million hectares [59.6%] are rainfed. Area of around 146.82 million hectares [44.7%] out of 328.60 million hectares is suffering from various kinds of land degradation. In absence of comprehensive and periodic scientific surveys, the figures reported by NBSS&LUP based on studies and several estimates [2005] for various land degradation have been considered as logically concluded and are being used for various purposes.



Land degradation is caused by several factors viz. water and wind erosion, water logging, salinity/alkalinity, soil acidity, among others. India has been experiencing a very high degree of land degradation as 44.7% of its geographical area is classified as degraded. Of this 93.68 million hectares [63.8%] are affected by water erosion, 16.03 million hectares [10.9%] by soil acidity, 14.30 million hectares [9.7%] by water logging, 9.48 million hectares [6.5%] by wind erosion, 5.94 million hectares [4.1%] by salinity/alkalinity and 7.38 million hectares [5.0%] by complex problems.

Across regions, all six regions had very high percentage of geographical area as degraded ranging from as high as 56.3% for Central region to 35.4% for Northern region and even 29.5% for Delhi and Union Territories. Among States, 11 States had extremely

high percentage of geographical area degraded above mean value of 44.7% ranging from 52.0% to 89.2% and other 15 States too had significantly high percentage of geographical area degraded varying from 25.4% to 43.9%. In particular Mizoram [89.2%] Himachal [75.0%] Nagaland [60.0%] Madhya Pradesh and Chhatisgarh combined [59.1%] were States with very severe intensity of degradation.

Policy and Programs

Acknowledging the acute problem of land degradation, the Government, in its efforts to sustain ecological environment, agricultural productivity and production, has initiated from time to time several policies and programs to prevent land degradation on one hand and take remedial measures to improve the quality of degraded land on the other.

Table 1: Region-wise extent of Land Degradation in India

[Area in '000 ha]

Region	Water erosion	Wind erosion	Water logging	Salinity/alkalinity	Soil acidity	Complex problem	Degraded area	Geographical area	8 as % of 9
1	2	3	4	5	6	7	8	9	10
Northern	12002 [47.4] [12.8]*	8828 [34.9] [93.1]*	2040 [8.1] [14.3]*	1962 [7.7] [33.0]*	157 [0.6] [1.0]*	324 [1.3] [4.4]*	25313 [100] [17.2]*	71472 [21.7]*	35.4
North-East	4146 [32.8] [4.4]*	00	522 [4.1] [3.6]*	00	5534 [43.9] [34.5]*	2422 [19.2] [32.8]*	12614 [100] [8.6]*	26219 [8.0]*	48.1
Eastern	9249 [61.0] [9.9]*	00	3392 [22.4] [23.7]*	474 [3.1] [8.0]*	1848 [12.2] [11.5]*	194 [1.3] [2.6]*	15157 [100] [10.3]*	41833 [12.7]*	36.2
Southern	22330 [73.1] [23.8]*	00	5031 [16.5] [35.2]*	723 [2.4] [12.2]*	1179 [3.9] [7.3]*	1302 [4.3] [17.6]*	30565 [100] [20.8]*	63576 [19.3]*	48.1
Western	16446 [77.0] [17.5]*	443 [2.1] [4.7]*	599 [2.8] [4.2]*	1350 [6.3] [22.7]*	519 [2.4] [3.2]*	1993 [9.3] [27.0]*	21350 [100] [14.5]*	50743 [15.4]*	42.1
Central	29275 [70.5] [31.2]*	212 [0.5] [2.2]*	2709 [6.5] [18.9]*	1416 [3.4] [23.8]*	6796 [16.4] [42.4]*	1126 [2.7] [15.2]*	41534 [100] [28.3]*	73786 [22.4]*	56.3
Delhi +UTs	242 [84.3] [0.3]*	00	06 [2.1] [0.1]*	19 [6.6] [0.3]*	00	20 [7.0] [0.3]*	287 [100] [0.2]*	973 [0.3]*	29.5
Total	93680 [63.8] [100]*	9483 [6.5] [100]*	14299 [9.7] [100]*	5944 [4.0] [100]*	16033 [10.9] [100]*	7381 [5.0] [100]*	146820 [100] [100]*	328602 [100]*	44.7

Figures in parentheses indicate percentage share of concerned category of degradation to the total degraded area. Figures in parentheses with * indicate percentage share of the region in the total

Institutional Support

In order to facilitate the understanding of the problems, nature and magnitude of land degradation and initiate measures to remedy the situation by formulating national policy and programs the Government has created institutional infrastructure, viz. [i] Soil and Land Use Survey of India [SLUSI] was established in 1958 at IARI, New Delhi with seven centers located at Noida, Kolkata, Bengaluru, Nagpur, Hyderabad, Ahmedabad and Ranchi. SLUSI has a mandate to provide detailed scientific database on soil and land characteristics to various States for planning and implementation of programs relating to soil and water conservation and natural resource management. During 2011-12, SLUSI had targets of 101 lakh hectares of Rapid Reconnaissance Surveys, 3.62 lakh hectares of Detailed Soil Surveys and 121 lakh hectares of Soil Resource Mapping against which it has completed soil surveys of 82.15 lakh hectares [81.3%], 1.65 lakh hectares [45.6%] and 52.25 lakh hectares [43.2%] respectively till January 2012.[ii] It has also established Remote Sensing Center in 1982 for application of advanced technologies in soil survey [iii] Detailed Soil Survey of “very high” and “high” priority watersheds to provide detailed soil data base for planning and execution of soil conservation projects and for scientific land use planning using large scale base map [iv] District-wise Soil Resource Mapping to create repository of soil data base in the country [v] Development of Digital Spatial Data Base on Hydrologic Units, Soil and Land Information using Geographic Information System, Rational Data Base Management System for GIS based Web Services [vi] Development of State-wise Micro watershed Atlas of India [vii] Creation of Platform Free State-wise Micro-watershed Atlas for dissemination of watershed information [viii] Organization of short term training courses on Soil and Land Resource Data Base for integrated Watershed Development planning. Soil Conservation Training Center, DVC, Hazaribagh, Jharkhand organizes medium and short term training courses for field functionaries and project staff of State Governments engaged in implementation of soil and water conservation programs.

Programs and Performance

Three ministries, viz. Ministry of Agriculture, Ministry of Rural Development and Ministry of

Environment and Forest are implementing various watershed development programs for development of degraded lands. Since inception up to Tenth Plan [2002-07] 50.89 million hectares have been developed at a cost of Rs.19251.22 crore [Rs.3783/ha]. Parts of such developed lands are brought under cultivation to maintain balance in different types of land uses. Following are among a few ongoing programs under implementation with physical performance data for 2011-12.

- **Soil Conservation in the Catchment of River Valley Project and Flood Prone River scheme:** This was launched in 1961-62 and from November 2000 onwards is being implemented through Macro Management of Agriculture [MMA] scheme in 60 selected inter-state catchments spread over all States [except Goa]. Its objectives are [i] prevention of land degradation by adopting a multi-disciplinary approach to soil conservation and watershed management in catchment areas [ii] improvement of land capability and moisture regime in watersheds [iii] promotion of land use to match land capability [iv] prevention of soil loss from catchments to reduce siltation of multipurpose reservoirs and enhancing in-situ moisture conservation and surface rainwater, storage in catchments to reduce flood peaks and volume of runoff. To assess impact of soil and water conservation measures, system of continuous monitoring of rainfall, runoff and sediment parameters [prior to, during and after treatment] is followed by establishing Sediment Monitoring Stations at outlet of watershed. Since inception till 2010-11, an area of 78.85 lakh hectares [26.1%] against priority area of 301.50 lakh hectares needing urgent treatment have been treated. During 2011-12, 1.78 lakh hectares are targeted for treatment against which 1.26 lakh hectares [70.8%] have been treated till January 2012.
- **Reclamation and Development of Alkali and Acid Soils [RADAS]:** This program was launched in 1985-86 and was restructured during 2007-12 for development of alkali and acid soils. Currently this program is being implemented through MMA scheme in seven States of Arunachal Pradesh, Mizoram, Gujarat, Haryana, Punjab, Karnataka

and Rajasthan. It aims at improving physical conditions and productivity status of alkali and acid soils for restoring optimum crop production. Under the program, up to 2010-11, 8.41 lakh hectares have been developed at the cost of Rs.166.49 crore. During 2011-12, 22000 hectares were targeted for reclamation and development against which 16000 hectares [72.7%] have been reclaimed up to January 2012.

- **Watershed Development Projects in shifting cultivation areas:** These projects are being implemented from 1992-93 in seven States of North Eastern Region with objectives to [i] protect hill slopes of jhum areas through soil and water conservation measures on watershed basis and to reduce further land degradation [ii] encourage and assist jhumia families to develop jhum land for productive uses with package of practices leading to settled cultivation [iii] improve socio-economic status of jhumia families through household/land based activities [iv] mitigate ill-effects of shifting cultivation by introducing appropriate land use according to land capability and improved technologies. Under the scheme, arable and non-arable land is treated through various measures. Rehabilitation components include improvement in production system of households with land and enhancing income of households without land/asset through provision of income generating activities and assets. Since inception up to 2010-11, an area of 5.49 lakh hectares has been developed at a cost of Rs.455.79 crore. During 2011-12, 38000 hectares [90.5%] of jhum land has been developed up to January 2012 against target of 42,000 hectares.
- **World Bank Aided Sodic Land Reclamation and Development project:** In June 2009, technical and financial assistance was sought from World Bank for reclamation and development of 1.35 lakh hectares of degraded land comprising 1.30 lakh hectares of sodic land and 5000 hectares of ravine area at estimated cost of Rs.1,224 crore for six years. During 2010-11, 20,000 hectares were reclaimed at the cost of Rs.85.18 crore. During 2011-12, 26000 hectares have been developed up to January 2012 as against target of 25,000 hectares [104%].

Strategic Actions

In order to mitigate the threat of the severity of 146.82 million hectares of degraded land [44.7% of country's geographical area] to environment, agricultural productivity and human survival, need is to [i] formulate a Vision 2025 document detailing comprehensive strategy to develop at least 110 million hectares [75%] of degraded land [ii] review current status of land degradation by end of 2013 [iii] formulate strategic action plans with sharp focus, inter alia, on [a] disseminating proven and demonstrated technology among farmers [b] understanding local constraints inhibiting acceptability of existing technologies through action research program [iii] invest adequately to strengthen State-wise research institutions, human resources, training facilities and mechanism to effectively transfer technology to users [iv] institute comprehensive survey once in five years to scientifically assess the status of land degradation [v] initiate policy and programs based on local requirements in the districts of each State in light of the nature and magnitude of land degradation caused by factors, viz. water and wind erosion, water logging, salinity/alkalinity, soil acidity, among others [vi] design robust Management Information System to provide quarterly progress district-wise to understand gaps between planning and implementation [vii] install effective monitoring and review system at district level to quarterly monitor the implementation process [viii] undertake once in three years comprehensive evaluation State-wise through independent professional team to sharply bring out the inadequacies in the policy, planning and implementation process that could not yield expected results and suggest measures to improve performance and arrest land degradation assigning annual targets with measurable performance indicators [ix] train program implementers and users to meticulously implement programs on the basis of new guidelines for watershed development recommended by the Hanumantha Rao Committee, emphasizing the bottom up approach whereby the User Groups themselves decide their work program the Government acts as a facilitator and the people at the grass root level become the real executioner of the program.

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LAND ACQUISITION IN INDIA NEED FOR A PARADIGM SHIFT

Dr. L. Rathakrishnan & K. Ravi Kumar

Land for land is a difficult demand in land acquisition in India. Normally with present land system in India, conceding to this demand will create a vicious cycle of land acquisition and there will be no end to it.

Land is the base for economic development and poverty alleviation of a country. In recent years, land acquisition for private sector projects and Public-Private Partnership (PPP) projects like Singur, Nandigram, Yamuna Expressway, POSCO, etc created a lot of noise. Few lakhs crores rupees of investment is hanging in balance in the country from both domestic and Foreign Direct Investment (FDI) sources because of failure of government to provide land for the projects and also failure of the land-market to provide sufficient land for development. Is land acquisition process in India seriously flawed? Is The Right to Fair Compensation Resettlement Rehabilitation and Transparency in Land Acquisition Bill 2012 (RFCRRTLA Bill 2012) solution to this problem? Are land institutions of India not market friendly in the post 1991 economic reform era? These questions, which provide the basis for this paper, are examined

through field observation and field experience of the authors.

Doctrine of Eminent Domain

The power of the sovereign state to acquire or expropriate private property for public use/purpose is driven from doctrine of Eminent Domain. The origin of the term "Eminent Domain" can be traced to the legal treatise written by the Dutch Jurist Hugo Grotius in 1625 and described as follows:

"The property of subjects is under the eminent domain of the state, so that the state or he who acts for it may use and even alienate and destroy such property, not only in the case of extreme necessity, in which even private persons have a right over the property of others but for ends of public utility, to which ends those who founded civil society must be supposed to have intended that private end



should give way. But it is to be added that when this done the state is bound to make good the loss to those who lose their property” (Neil:2009).

Almost all sovereign states in the world have law for land acquisition or expropriation. Pakistan and Bangladesh are using the same Land Acquisition Act 1894 (LA Act 1894). Even though all sovereign states are acquiring or expropriating private properties, why land acquisition becomes a hindrance for economic development in India? The fundamental conceptual difference is defining the purpose of land acquisition: public use Vs public purpose. Most of the western countries acquire land for public use like roads, public safety, health, etc and not for the project in which private profit motive is involved even though project has public purpose. On the other hand in UK common law system, land is acquired for public purpose, which is followed throughout all Commonwealth Nations including India.

In Indian Jurisprudence also, when LA Act 1894 was enacted public purpose included in the definition was roads, canals and social purpose of state-run schools and hospitals. By an amendment in 1933, railway companies were included in public purpose. But the amendments introduced in 1984 in the LA Act 1894 by amending section of the original act to insert the words “or for a Company” after “any public purpose”. This opened the floodgates to acquisition of land by the state for private and public sector companies and again this is embellished in the proposed bill. If we put ban on land acquisition for private projects and PPP project with present land system in India, we strongly believe, the economic development of India will be seriously affected because of inherent problem in our land institutions.

Land System of India

The problem of land acquisition in India can be better appreciated by understanding the land system of India. Modern day land system of India has its base from the land revenue system introduced by Akbar’s revenues minister Todar Mal. The salient features of Todar Mal’s systems

were measurement of land, classification of land and fixation of rates (Appu 1996). After the decline of Mughal dynasty, East India Company and the British Raj were established extractive land institutions on the Todar Mal principle called *Zamindari* system, *Mahalwari* system and *Raiyatwari* system to extract maximum land revenue from peasants, which was the major source of revenue. In the *Zamindari* area, British had not hold elaborate administrative arrangement and lowest functionary level was sub-divisional level and no proper land records maintained either by British administration or by *Zamindars*. Only land record maintained was land record created after each survey and settlement operation and again by revisional settlement. Because of this reason, elsewhere *Zamindari* area does not have proper land records and weak administration. In *Mahalwari* areas, the land revenues were fixed for each or group of villages in which one family or person who was responsible to collect and pay land revenue.

The *Raiyatwari* system covered the erstwhile Madras (except North Madras) and Bombay Presidencies and part of the central provinces and Barer. The *Raiyatwari* System was based on the assessment of land revenue on sight fields or holdings, surveyed, numbered and marked out on the ground (Appu 1996). Because of elaborate arrangement for revenue collection and administrative step created during British Raj, these areas of India is having better land records than rest of India even today. Another wisdom of British was creation of primitive land institutions in excluded and partially excluded areas to separate tribal and others deprived people of these areas with plain and Hindu population by perpetuating divide and rule policy. This primitive land institutions created by British was responsible for creation of Scheduled V and VI areas and poverty and deprivation of these regions.

During the first four five year plan periods, India introduced radical land reform on socialism land reform model to increase agricultural production and to provide social justice without

any role for market forces. During this land reform period, there was no respect for private property rights and no land institutions were created for allocation of land resources for industrialisation and urbanisation through market forces. Till date, land system of India is suited for subsistence agriculture using manual labour and does not have major provision for industrialisation, urbanisation and mining activities. By introducing *Zamindari* abolition law and ceiling law on agriculture land and also on urban land into the India's land system, Indian land holding became too small and restriction on transfer and lease, which further reduced the size of holding. In the name of distribution of government land and redistribution of surplus land, we distributed waste land, barren land and dry land for agriculture which could have been kept as construction land. This led to non-availability of large plots of land in thousands of acres for industrialisation and urbanisation.

Since 1980s, the land reform in India was abandoned as a lost cause. Only visible activity in land resources is computerisation of land records, that too also happening only in already developed states. Through tenancy or tenure system reform, the land market of India became more of a socialist model and became less suitable for a market economy. For example, under the Santhal Pargana Tenancy Act 1949, no land is transferable, leaseable, mortgageable in six districts of Jharkhand. Under the Bombay Tenancy and Agricultural Land Act 1963, only farmers can own agriculture land in Maharashtra. Land system of India is not friendly for industrialisation, urbanisation, mining etc. Thus, land acquisition through government is the only option for large private sector projects and PPP projects. In short, land acquisition procedure can't be seen in isolation from the land system of India. By orienting the old age land system designed during British Raj and socialism period toward a market economy, we can allocate land resource for industry, mining, infrastructure projects and urbanisation without creating much noise in our democracy. Can we design a land system for India which can allocate just three per

cent of its geographical area for industrialisation which amounts to 2.43 crores acres of land?

Multiple Land Acquisition Laws and Multiple Authority of Land Acquisition

On the basis of Doctrine of Eminent Domain many land acquisition laws were enacted in India. The Central and State Acts are:

- (1) The Land Acquisition (Mines) Act 1885
- (2) The Indian Tramways Act 1886
- (3) The Land Acquisition Act 1894
- (4) The Works of Defence Act 1903
- (5) The Damodar Valley Corporation Act 1948
- (6) The Resettlement of Displaced Persons (Land Acquisition) Act 1948
- (7) The Requisitioning and Acquisition of Immovable Property Act 1952
- (8) The National Highways Act 1956
- (9) The Madhya Pradesh Municipal Corporation Act 1956
- (10) The Coal Bearing Areas Acquisition and Development Act 1957
- (11) The Ancient Monuments and Archaeological Sites and Remains Act 1958
- (12) The Atomic Energy Act 1962
- (13) The Petroleum and Minerals Pipelines (Acquisition of Right of User in Land) Act 1962
- (14) The Metro Railways (Construction of Works) Act 1978
- (15) The Railways Act 1989
- (16) The Electricity Act 2003 read along with The Indian Telegraph Act 1885
- (17) The Special Economic Zones Act 2005 and
- (18) The Cantonments Act 2006

Beyond this knowledge, there are some state laws for acquisition of land for state highways and also these acts have undergone number of

amendments. Multiple acts in India lead to multiple authority for land acquisition. All legislation had its own procedure for acquisition and calculation of compensation and this led to confusion in the ground zero and also multiple land records of land acquisition. Multiple land acquisition in one district under different acts at the same time not only creates confusion among land losers and requesting agency and also revenue departmental officials and staff in the district.

Some of the acts listed above are not in tune with market economy and out-dated. When The Coal Bearing Areas Acquisition and Development Act 1957 enacted, India was a Socialist country and factors of production are mostly nationalised including coal mining. The Coal India Ltd was given authority to acquire land and rehabilitate the affected persons through appropriate compensation. After disinvestment in the post 1991 economic reform, The Coal India Ltd., is a listed company in the stock exchange; it has one of the highest market capitalisation in the country. The Rehabilitation and Resettlement (R&R) policy of the Coal India Ltd., and its subsidiaries are decided at their board meeting. The motto of a listed company in the stock exchange in any market economy can be maximisation of production at minimum cost. It can't be expected that the welfare activity to the projected affected people is one of the main function of the company. We do not understand the rational of retaining the power of eminent domain with a listed company which is a prerogative of a sovereign state. Again, The Power Grid Corporation of India Ltd has authority to erect and pass – over anybody land without paying any compensation to the land except damage for crop under electric wire (The Electricity Act 2003 read along with the Indian Telegraph Act 1885). Once the high transmission tower is erected, land owner can't grow trees below the transmission lines and can't construct building. Again, each transmission tower is erected on the land, which occupies around two decimals of land but the land owner is not eligible for any compensation for land and he

is eligible only for damage to standing crops of that season only.

Just Compensation for Land

Calculating just compensation for land in land acquisition is a very difficult process throughout the world because there should be a balance between land losers demand and willingness of requesting body to pay. Under Indian land acquisition process, land price is calculated without any negotiations between land losers and requesting body and it is done through mechanical calculation. One of the important highlight of the proposed RFCRRTLA Bill 2012 is that the land owner in the rural areas will get four times the market value and the land owners in the urban area will get two times the market value. When we see these promises in the contest of land system in India, it is very difficult to realize practically. Just assume, the highlights of compensation of four times and two times of market value is true, as the case may be, then, this compensated land owners in rural areas can purchase four times the land of similar nature in the same locality and also land owners in a urban area can purchase two times the land of similar nature in the some locality. But this assumption is false because of the following field reality in the land system of India:

- (1) Clause 26 of the RFCRRTLA Bill 2012 authorises the District Collector to determine the market value. Value mentioned in clause 26(1) (a) is not market value but what is known in common parlance as the circle value. This circle value can by no means be called as the market value and it is always much lesser than the market value.
- (2) As soon as notification is issued, land registration / sale in that area are stopped. As per the proposed bill, the land acquisition process has to be completed within two years from the date of notification excluding the days wasted in court proceedings. Again, the District Collector will calculate this price average of 50 per cent of highest sales deed

of last three years preceding this notification. Assume that there is no court cases, the price arrived by the District Collector will be at least more than 3.5 years older sales deed values. In other words, what this District Collector calculated is 3.5 years old historical sales deed value but the demand of the land owners are the present market value of land.

- (3) In order to avoid stamp duty, income-tax payable and also to park black money, the value of land /property mentioned in the sales deed is always much below the actual price paid. Even if the land looser able to purchase a land / property using the compensation money, the purchaser has to pay stamp duty, registration fee, land broker charges in the un-organised land market, speed money at the registration office and other miscellaneous expenses related with document registration. After this document registration, the land loser has to approach the revenue authority for mutation of land in order to create *patta* in his name. For this mutation, he has to pay the mutation fee, speed money to revenue authorities and other miscellaneous expenses related to this mutation process.
- (4) Land market in India is un-organised and speculative market. The land price in the locality increases as soon as a new project is announced. Very few projects in India, which led to fall in land price. Due to long gap between the announcement of project and actual receiving of compensation amount, the land losers will find it difficult to purchase land in the locality by that time land price might have increased many fold.
- (5) All land acquisition for urbanisation involves re-classification of land from agricultural category into commercial using the discretionary power given to government which led to many fold increase in land price without doing any development work on the land. This price increase led to allegation of quick money and ministers, builders and

bureaucracy nexus and farmers got cheated in terms of paying less.

Taking all above five factors into consideration, we doubt, the land losers can be able to find a property of equal nature in the similar locality or nearby. Again when we look at the land institutions in the scheduled V and VI areas of constitution of India and other tribal areas, there is no proper land market. This area includes Jharkhand, Chhattisgarh, Orissa, part of Madhya Pradesh, six districts of Andhra Pradesh, tribal belt of East Gujarat, and the whole of North – Eastern India, which are poorest region in the country. In general, lands in scheduled V areas are inheritable, only partially transferable with lot of condition. Lands in scheduled VI areas are inheritable, not transferable and land is owned by Clans / Community. Land laws in other tribal area like Manipur, Nagaland is also similar. Again, the RFCRRTLA Bill 2012 says, land value of scheduled V and VI areas will be decided by state government. In principle, any price fixation administratively and arbitatively by a government is not prudent in market economy and these process of land price fixation does not reflect the real value of the land. Having negatively criticised the fixation of compensation, we strongly believe that the compensation proposed in RFCRRTLA Bill 2012 is much better than the LA Act 1894 and other acts in the country. However, the misleading word “market value” in the RFCRRTLA Bill 2012 should be replaced by “circle rate”, “sales deed price” and ‘just compensation” at the appropriate places.

Lack of Developed Land Market

Land institutions of India do not support developed land market for allocation of large plots of land for industry, urbanisation and even for large scale commercial farming. Elements like ceiling on agricultural land and urban land, restriction on lease-in and lease-out of land, restriction and even ban on transfer of land, tribal tenure/tenancy system, restriction on transfer of land by land reform beneficiaries of ceiling and surplus land, ban on transfer of allottees of government waste land,

changing the nature/classification of land are acting as hindrance for development of land market in market driven economy. Industrialist and Builders are dependent on government for allocation of large plot of land for development purpose. In Scheduled V and VI areas, there is no land market-at-all and these regions are poorest region of the country. There is no provision for allocation of land for other sectors of economy through market forces like industry, urbanisation, lack of movement of land resources from inefficient user to efficient users and credit market incompatibility in these areas.

Land for Land Demand

Land for land is a difficult demand in land acquisition in India. Normally with present land system in India, conceding to this demand will create a vicious cycle of land acquisition and there will be no end to it. RFCRRTLA Bill 2012 tried to address this issue by providing one acres of land in command area for each irrigation project affected families and 20 per cent of developed land from urbanisation project in cost basis. When we go deep into irrigation projects, in general more land is acquired in catchment area, which is normally located in hilly terrain areas for water storage and construction of dam, and less land is acquired in command area for canals and distributaries. Providing one acre of land in command area by again acquiring land means, the land loser in hilly terrain has to be shifted to plain area where land is allotted. Is this proposal will be acceptable to hilly terrain people? It will again start the cycle of land acquisition in command area. In case of urbanisation project, 20 per cent of developed land will be given to land losers on cost basis, then who will pocket the profit of the rest 80 per cent of developed land in the urbanisation project, which is having less gestation period project and less cost involved in development of land. When we again analyses this issue and being working in this field, the demand for land for land arise due to two major reasons, namely;

- (i) Most of the land for land demand arises from scheduled V and VI areas of Constitution of

India and other tribal areas. Land in these areas is mostly inheritable and it has little or no transferability. Most of the land looser, land once lost is lost forever, neither they themselves nor their future generation can purchase land from the land market, because there is no developed land market or land market at-all. For example in Jharkhand, The Santhal Pargana Tenancy Act 1949 (SPT Act) covers six district of Jharkhand namely, Sahibganj, Pakur, Godda, Dumka, Deoghar and Jamtara. Section (20)(1) of SPT Act says “no transfer by a raiyat of his right in his holding or any portion here of, by sale, gift, mortgage, will, lease, or any other contract or agreement, expressed or implied, shall be valid unless the right to transfer has been recorded in the record-of-rights, and then only to this extent to which such right is so record” (Prasad:2007). Law like this makes impossible for a land loser to purchase another piece of land using the compensation amount. Everyone knows the story that a court in the Uttar Pradesh ruled that Amitabh Baachan is not a farmer and hence he is ineligibles to purchase agricultural land. Here, there is mutual consent of both parties for consideration, why should state intervene? This distortion in land market is making land acquisition difficult and strengthening demand land for land.

- (ii) As discussed in just compensation for land, the amount compensation paid in land acquisition is not sufficient to purchase same amount of similar nature land in similar location, in many cases.

False Food Security Alarm

Again, whenever any land is acquired or government decision is taken for declassification of any land from agriculture to commercial use, there is point that agricultural land is being acquired or declassified; it will lead to food insecurity. Problem of food security in India is not due to unavailability of agricultural land, but due to low

productivity, lack of storage and transportation facility, lack of access of poor person to food grains and lack of incentive for farmers to cultivate. As industry and urbanisation needs large amount of land in thousands of acres in single stretch, land acquisition and declassification agricultural land is inevitable. On the other hand, agricultural land with irrigation facility is costly; a well-meaning business man will not prefer an agricultural land when he has option to purchase a waste land or dry land.

Rehabilitation and Resettlement

Rehabilitation and resettlement is a pet topic for civil society activists, public interest litigants and mass media. As a nation, we have to confess that we are doing a raw deal to our land losers in land acquisition in the name of economic development and public purpose. RFCRRTLA Bill 2012 included components of R&R in the land acquisition legislation. However, there is a legal discussion, whether parliament has jurisdiction to legislate on transfer and alienation of agricultural land, which is a state subject under item 18 of state list in the seventh schedule of constitution. It is very difficult for us to understand the rationale for inclusion of R&R in land acquisition legislation. First, India's diversity of land laws is much more than the diversity of the country and needs of the project affected people varies from project to project and region to region. Second, law on any system/subject brings in rigidity to the system. These issues can be better handled by guidelines and policy, which is more flexible.

We have to understand that the states are governed by democratically elected governments and responsible to their electorate directly. They are closer to the pulse of the people and have greater familiarity with the ground level situation. They can better safeguard the interest of the communities whose land is being acquired on the one hand and the requirement of the project conceived in the national interest on the other hand. When we compare the Jharkhand Voluntary land Acquisition Rule 2010 enacted under section 11 (2) of LA Act 1894 along with the

Jharkhand Rehabilitation and Resettlement policy 2008 on the one hand and recently introduced RFCRRTLA Bill 2012 on the other hand, former will be more suitable for local ground condition and flexible to the demand of local community and the requirements of the specific projects. In the post-economic reform period, there is a fierce competition between states to attract investment into their state. Wisdom of state government will be in better position to balance between incentive for industrialist to attract investment and fulfilling the aspiration of electorate taking into consideration of ground reality.

RFCRRTLA Bill 2012 also included the private company which purchases land directly from market without government support if the area of land is more than 100 acres in rural area and 50 acres in the urban area within the ambit of R & R package. This provision not only violated The Indian Contract Act 1872 and The Transfer of property Act but also failed to understand the competition of industry in the globalisation era. In this globalisation era, new industries with R & R package not only have to compete with other similar industry in India without R & R condition and also similar industry throughout the world. This provision takes back us into the socialist era and it will create a new type of dispute called project affected people disputes for which we do not have specialised body for dispute resolution. And in addition to this, the RFCRRTLA Bill 2012 included non-land losers under R & R ambit, which will make the identification of beneficiary difficult and local unrest will be order of the day.

Transparency and Accountability

It is quite often said in land acquisition discussion that agriculture land or farmers lands are being looted at cheap rate and exploitation of poor land owners. In the proposed RFCRRTLA Bill 2012, there is a proposal to establish new institutions like National LA & RR Dispute Settlement Authority, National Monitoring Committee, State LA & RR Dispute Settlement Authority, Chief Secretary Committee, State Commissioner for RR, District Collector Committee, Administrator for RR, RR

Committee and new documentary requirements like Social Impact Assessment Report, Expert Group Report, Collectors Report about non-availability of waste land for industry location . In the process of establishing these institutions we forgot about single window system of clearance and hassle free clearance for industrial projects in the name of transparency and public participation. We believe, this mandatory provision will lead to more corruption and delay at all levels. Mischief mongers will become very active in land acquisition process and it will lead to increase in number of judicial intervention on blimpish grounds. The whole system will lead to delay in payment of compensation to land owners and economic development will slow down. In India, we are having a large number of transparency enforcing institutions like CBI, CVC, State Vigilance Dept., Information Commission, Enforcement Directorate, Committees of legislative bodies, Departmental Proceedings if civil servant is erroneous, High Courts and Supreme Court, etc. Have we lost faith in these institutions? This issue reminds us a unwritten law (flaw) in the Indian bureaucracy, "Corruption and delay are proportional to number of *dharogas* (Inspectors) appointed but never failed to appoint *dharogas*, otherwise you will be blamed for lack of vigilance" .

Giving complete recipe for an inclusive land institution in a short article is very difficult, however, the following summarisation of foregoing discussion on land acquisition and related issue for allocation of land resources for industrialisation, mining, infrastructure projects and urbanisation will provide a bird's eye view.

- (i) Combine all central and state land acquisition legislation into one land acquisition legislation with power to state government to bring amendments according to their diversity in land laws and local conditions. Public purpose/use should be well defined. R&R should be delinked from LA Act.
- (ii) Strengthening the provision of section 11(2) of LA Act 1894 which provides for consent award. Some redundant sections of LA Act

1894 should be removed to reduce delay in payment of compensation to land owners.

- (iii) qLong term lease of land for 15 to 30 years should be provided in land acquisition procedure for purposes like mining or temporary purpose in which land can be return to the land owner. If land is not returned after expiry of lease period, again compensation has to be paid at current market rate.
- (iv) Purchase of land directly from land owners by requesting agency for development projects. Making land owners as partners or share holder of the project wherever possible. Sale/ lease of government land without going to cabinet approval as practiced in some states. Transfer of community land with consent of Gram Sabha/Gram Panchayat with adequate compensation and also replacement of community property wherever possible, reclassification of land usage by local authorities with permission of local revenue authorities may be permitted.
- (v) Transfer of tribal and non-tribal land in Scheduled V and VI areas for public use like education, health, large scale employment generation activities, urbanization, infrastructure development, etc through market forces should be allowed. This public use transfer is necessary to reduce economic deprivation and marginalization of tribal themselves.

Last but not the least, government should free land institutions of India from outdated socialism model land legislations and, industrialists and builders should try to create inclusive land institutions rather than purchasing land through forceful land acquisition.

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INITIATIVES TO SUSTAIN LAND RESOURCE DEVELOPMENT

Arpita Sharma

Inappropriate land management, particularly in areas with high population densities and growth rates, further increases loss of productivity. This in turn affects food security and the potential for rural on and off-farm income generation.

Land includes benefits to arise out of land, and things attached to the earth or permanently fastened to anything attached to the earth.” Land is one of the most critical resources for the rural poor dependent on farming for their livelihoods. Today, about 2 million hectares of rainfed and irrigated agricultural lands are lost to production every year due to severe land degradation, among other factors. This degradation is a critical link in a downward spiral with respect to poverty. Poor land quality compromises farm incomes, resulting in ongoing poverty and a lack of resources to invest in increasing land and labor productivity, condemning farmers to repeat the cycle often worsening degradation. Inappropriate land management, particularly in areas with high population densities and growth rates, further

increases loss of productivity. This in turn affects food security and the potential for rural on and off-farm income generation. The challenge for developing countries is to develop land management programs to increase the availability of high-quality fertile lands in areas where population growth is high, poverty is endemic, and existing institutional capacity is weak.

Land laws in post-Independent India:

1956: Before 1956 devolution of both acquired and inherited property was governed by the personal laws of the community. Although equal rights were granted to women in acquired property through the Hindu Succession Act of 1956, rights in inherited agricultural land were specifically exempted from the Act, and were



made subject to tenancy and land reform laws of the states.

1950: In India, agrarian reforms through the 1950s took place at a time when gender equality was marginal to the policy agenda and women's organisations lacked their current visibility. Hence, in most government land reform programmes and land transfers, women's land rights remained a non-issue.

1980: From the 1980s onwards gender equality was talked about, but restricted only to land distributed by government. The Plans called for titles to spouses in productive assets, houses, house sites and directed state governments to register government allotted wasteland/ceiling surplus lands in joint names, but remained silent on the inequities in devolution laws as regards women. However, the potential of wasteland distribution in future is extremely limited, as the cultivable waste has already been allotted or encroached. Hence the main source of land title in the years to come is not through distribution of government land or leasing, but through inheritance.

The main source of tenure has always been through inheritance and will be more so in future and therefore we need to examine the tenancy laws and the extent of discrimination inherent in such laws.

Other laws: As already stated, the Hindu Succession Act left the question of devolution of inherited agricultural land and property to be decided by the respective state tenancy laws. For example, in the tenorial laws of Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Delhi and Uttar Pradesh, the specified rules of devolution show a strong preference for agnatic succession, with a priority for agnatic males. In all these states the tenancy develops in the first instance on male lineal descendants in the male line of descent. The widow inherits only in the absence of these male heirs. In addition, in the first four states mentioned, daughters and sisters are totally excluded as heirs. In Delhi and Uttar Pradesh, daughters and sisters are recognised but come very low in the order of heirs.

States where the tenorial laws explicitly mention that the devolution of tenanted land will

be according to personal law are very few and include Rajasthan and Madhya Pradesh where the personal law applies for all communities. Also in the Telangana region of Andhra Pradesh, the commentary following Section 40 of the relevant Act clarifies that for Hindu tenants the Hindu Succession Act will apply. In practice, however, even in Rajasthan daughters have been recognized as heirs only in some judgments, while in others male heirs alone have received recognition. In addition, there are states which do not specify the order of devolution in their laws dealing with tenancy land, such as Gujarat, the Bombay region of Maharashtra, West Bengal, Karnataka, Kerala, the Andhra region of Andhra Pradesh and Tamil Nadu. In these states we can presume that the personal laws automatically apply. Then there are states such as Bihar and Orissa for which the tenancy acts specify that occupancy rights shall devolve in the same manner as other immovable property, "subject to any custom to the contrary". This leaves open the possibility of admitting gender – inequalitarian customs if established, especially for the tribal communities in these regions.

According to the Hindu Personal Law, sons and daughters are entitled to equal shares in the deceased man's "notional" share in *Mitaksara* joint family property. But sons, as coparceners in the joint family property *additionally* had a direct birth right to an independent share; while female heirs (e.g. daughter, widow, mother) had claims only in the deceased's "notional" portion. This meant that if a man had four acres of land and a son is born, he is left only with two acres and the rest has notionally gone to the new born son. But if a daughter is born she gets nothing unless her father dies, that too from the remaining two acres of land of which the son will also get his share in addition to two acres that was his since birth. Also, sons could demand partition; daughters could not. In actual practice, daughters get nothing, as mutation of land is generally done in favour of male heirs. In some cases they are asked to give a letter in favour of the sons.

2005: Little effort was made until 2005 to do away with these discriminatory laws. Finally after 50 years of the 1956 Hindu Succession Act (HSA), the Government addressed some persisting

gender inequalities in the HSA by bringing in the Hindu Succession (Amendment) Act, 2005. One of the most significant amendments in the 2005 Act is deleting the gender discriminatory Section 4(2) of the 1956 HSA. Section 4(2) exempted from the purview of the HSA significant interests in agricultural land, the inheritance of which was subject to the devolution rules specified in State-level tenurial laws. The 2005 Act brings all agricultural land on par with other property and makes Hindu women's inheritance rights in land legally equal to men's across States, overriding any inconsistent State laws. This can benefit millions of women dependent on agriculture for survival. The second major achievement lies in including all daughters, especially married daughters, as coparceners in joint family property. They can also demand partition in the life time of their father just as sons could. Third, the Act deletes Section 23 of the 1956 HSA, thereby giving all daughters (married or not) the same rights as sons to reside in or seek partition of the family dwelling house. Section 23 did not allow married daughters (unless separated, deserted or widowed) even residence rights in the parental home. Unmarried daughters had residence rights but could not demand partition. Fourth, the Act deletes Section 24 of the 1956 HSA, which barred certain widows, such as those of predeceased sons, from inheriting the deceased's property if they had remarried. Now they too can inherit.

The Central Government persuades and incentivizes the States through schemes or policy initiatives. India faces tremendous challenges on the issues related to land governance. The following data will make it clearer: India has approximately 2.16 million sq. km. of cultivable area [1] India has about 18 percent of world's population; [2] 15 percent of world's live stock population is to be supported from this land [3] India has about 2 percent of world's geographical area and 1.5 Percent of forest and pasture land [4] The per capita availability of land has declined from 0.89 hectares in 1951 to 0.37 hectares in 1991 [5] The average agriculture land holding has declined from 0.48 hectares in 1951 to 0.16 hectares in 1991 [6] 95.65 percent of the farmers are within small and the marginal category owning about 62 percent of the land, while the medium and the large farmers who constitute 3.5 percent own about 37.72 percent of the total area [7] Most of the cases pending in the

Courts relate to land disputes; 7.9 million persons are without dwelling units to live in [8] In the rural areas alone, there are more than 140 million land owners, owning more than 430 million records [9] There are approximately 55 million urban households [10] In most of the States last cadastral survey was done around 70 to 80 years ago. In fact in some States, e.g., North Eastern States this survey has not been done till now. The issues related to land may be described in following five divisions.

Land Management: Land figures as Entry 18 in the State list of the Constitution as "Land, that is to say, right in or over land, land tenures including the relation of landlord and tenant, and the collection of rents; transfer and alienation of agricultural land; land improvement, and agricultural loans; colonization." Entry 45 in the State list is "Land revenue, including the assessment and collection of revenue, the maintenance of land records, survey for revenue purposes and records of rights, and alienation of revenues". So, the land and its management fall in the exclusive domain of the States. Each State has a different set up for land and land records management. In most of the States Revenue Department handles the land records along with the other issues related to land management. Survey Department deals with the survey of lands, Consolidation Department deals with the consolidation of the lands, and Gram Panchayats do undisputed mutations in some States. The change of the land records by any one of them makes the records of another obsolete. So, the records are out of date in most of the States and they do not reflect the ground reality. Before independence, the revenue from the lands was a major consideration for the proper management of land and land records. But after independence as revenue from the lands dwindled, the land and land records management was also neglected. In fact in some of the States the land revenue has been abolished altogether. The surprising fact is that the States hardly give any priority to this subject and most of the initiatives have been taken at the Central Level.

Government laws and rules for land development

[1] Watershed Development Project [1989]: The Watershed approach has conventionally aimed

at treating degraded lands with the help of low cost and locally accessed technologies such as in-situ soil and moisture conservation measures, afforestation etc. and through a participatory approach that seeks to secure close involvement of the user-communities. The broad objective was the promotion of the overall economic development and improvement of the socio-economic conditions of the resource poor sections of people inhabiting the programme areas. Many projects designed within this approach were, at different points of time, taken up by the Government of India. The Drought Prone Areas Programme (DPAP) and the Desert Development Programme (DDP) were brought into the watershed mode in 1987. The Integrated Wasteland Development Programme (IWDP) launched in 1989 under the aegis of the National Wasteland Development Board also aimed at the development of wastelands on watershed basis. All these three programmes were brought under the Guidelines for Watershed Development with effect from 1.4.1995.

Other major programmes now being implemented through this approach are the National Watershed Development Project in Rainfed Areas (NWDPA) and the Watershed Development in Shifting Cultivation Areas (WDSCA) of the Ministry of Agriculture (MoA). The objectives of Watershed Development Projects will be: - [1] Developing wastelands/degraded lands, drought-prone and desert areas on watershed basis, keeping in view the capability of land, site-conditions and local needs. [2] Promoting the overall economic development and improving the socio-economic condition of the resource poor and disadvantaged sections inhabiting the programme areas. [3] Mitigating the adverse effects of extreme climatic conditions such as drought and desertification on crops, human and livestock population for their overall improvement. [4] Restoring ecological balance by harnessing, conserving and developing natural resources i.e. land, water, vegetative cover. Encouraging village community for : [1] Sustained community action for the operation and maintenance of assets created and further development of the potential of the natural resources in the watershed. [2] Simple, easy and affordable technological solutions and institutional arrangements that make use of, and build upon, local technical knowledge and available materials. [3] Employment generation,

poverty alleviation, community empowerment and development of human and other economic resources of the village.

[2] Drought Prone Areas programme [1994]:

The basic objective of the programme is to minimise the adverse effects of drought on production of crops and livestock and productivity of land, water and human resources ultimately leading to drought proofing of the affected areas. The programme also aims to promote overall economic development and improving the socio-economic conditions of the resource poor and disadvantaged sections inhabiting the programme areas. Upto 1994-95, DPAP was in operation in 627 blocks of 96 districts in 13 States. Prof. C.H. Hanumantha Rao Committee recommended: [1] Exclusion of 245 existing blocks; [2] Including of 384 new blocks; and Transfer of 64 blocks from DPAP to DDP. The Government did not agreed for exclusion of existing DDP blocks. However, inclusion of new blocks and transfer of blocks from DPAP to DDP was agreed to. Thus, from 1995-96 total blocks covered under DPAP became 947. These 947 blocks were in 164 districts in 13 States. Subsequently, with the re-organization of States, Districts and Blocks, the programme is now covered in 972 blocks of 183 districts in 16 States. These States are Andhra Pradesh, Bihar, Chattisgarh, Gujarat, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttaranchal and West Bengal. The identified dry sub humid area under the programme is about 7.46 lakh sqkms (74.6 million has.).

[3] Desert Development Programme (DDP):

The basic object of the programme is to minimise the adverse effect of drought and control desertification through rejuvenation of natural resource base of the identified desert areas. The programme strives to achieve ecological balance in the long run. The programme also aims at promoting overall economic development and improving the socio-economic conditions of the resource poor and disadvantaged sections inhabiting the programme areas. Upto 1994-95, Desert Development Programme was under implementation in 131 blocks of 21 districts in 5 States. The Hanumantha Rao Committee recommended:- [1] Inclusion of 32 new blocks; and [2] Transfer of 64 blocks from DPAP to DDP. Inclusion

of new blocks and transfer of blocks from DPAP to DDP was agreed to. Thus, from 1995-96 total blocks covered under DDP became 227 in 40 districts of 7 States. Subsequently, with the re-organization of Districts and Blocks, the programme is now covered in 235 blocks of 40 districts in 7 States. The corresponding physical area under the programme is about 4.57 lakh sq. kms.

[4]Technology development extension and training' for wastelands development in non-forest areas: The Department of Wastelands Development was set up in July 1992 and placed under the Ministry of Rural Development. The restructured National Wastelands Development Board (NWDB) was given the specific responsibility to evolve mechanisms for integrated development of non-forest wastelands through systematic planning and implementation, in a cost effective manner, specially to meet the needs for the people in the rural areas in respect of fuel wood and fodder. As part of its activities in fulfillment of its mandate the NWDB sponsors research and extension of research findings to disseminate new and appropriate technologies for wastelands development.

[5] Hariyali (2003): To involve village communities in the implementation of watershed projects under all the area development programmes namely, Integrated Wastelands Development Programme (IWDP), Drought Prone Areas Programme (DPAP) and Desert Development Programme (DDP), the Guidelines for Watershed Development were adopted w.e.f.1.4.1995, and subsequently revised in August 2001. To further simplify procedures and involve the Panchayat Raj Institutions (PRIs) more meaningfully in planning, implementation and management of economic development activities in rural areas, these new Guidelines called Guidelines for Hariyali are being issued.

Rural Land Resources Management (LRM) Program: The Rural Land Resources Management (LRM) Program, at the World Bank, develops and promotes knowledge-based technical, social, institutional and policy choices for our clients, which improve management of this critical resource. These choices focus on: [1] Developing sustainable land management through improved

land tenure systems and community natural resources management; [2] Raising the profile of the risk and vulnerability impacts of climate change on communities' natural resources, (land/water) and promote appropriate adaptation mechanisms; [3] Mainstreaming of integrated approaches to Land and Water resources management for food security and poverty reduction [4] Creating and strengthening an enabling environment, which will enhance national, regional, and global capacities to implement the convention to combat desertification and restore degraded lands.

Sustainable Land Management (SLM): SLM is defined as a knowledge-based procedure that helps integrate land, water, biodiversity, and environmental management (including input and output externalities) to meet rising food and fiber demands while sustaining ecosystem services and livelihoods. SLM is necessary to meet the requirements of a growing population. Improper land management leads to land degradation and a reduction in the productive and service (biodiversity niches, hydrology, carbon sequestration) functions of watersheds and landscapes. In layman's terms, SLM involves: [1] Preserving and enhancing the productive capabilities of land in cropped and grazed areas—that is, upland areas, down slope areas, and flat and bottom lands; sustaining productive forest areas and potentially commercial and noncommercial forest reserves; and maintaining the integrity of watersheds for water supply and hydropower generation needs and water conservation zones and the capability of aquifers to serve farm and other productive activities. [2] Actions to stop and reverse degradation—or at least to mitigate the adverse effects of earlier misuse—which is increasingly important in the uplands and watersheds, especially those where pressure from the resident populations is severe and where the destructive consequences of upland degradation are being felt in far more densely populated areas "downstream."

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WASTELAND DEVELOPMENT INITIATIVES A REVIEW

K. K. Tripathy

It is estimated that approximately half of the wastelands in India which are not covered under forests of any kind can be made productive if treated properly. It is the unprotected and unpreserved non-forestlands, which are subjected to constant degradation.

The burgeoning population growth of India coupled with rapid urban development has led to an increasing demand on the country's land resources. An indication of this burden on the natural resources is a simple comparison between India's share in total world land area and in the total world population. While the former is a meagre 2 per cent of the world geographical area, the latter constitutes 16 per cent of world's population. Land resources provide livelihood to two-thirds of India's population. The increasing pressure on land, relentless exploitation of this valuable resource for agricultural and allied, housing, industrial and manufacturing activities has made the productive farm lands less productive, leading to its constant degradation.

The total geographical area of the country is around 329 million hectares out of which only 264 million hectares (80 per cent) are fit for vegetation.

While 142 million hectares are covered under all types of crops, 67 million hectares of land are under forest cover and 68.35 million hectare area of land is lying as wastelands in India. The Government of India (GoI) defines wastelands as the degraded land which is currently under-utilised and can be brought under vegetative cover, with reasonable effort by resorting to effective and appropriate water and soil management.

It is estimated that approximately half of the wastelands in India which are not covered under forests of any kind can be made productive if treated properly. It is the unprotected and unpreserved non-forestlands, which are subjected to constant degradation. The tremendously increasing biotic pressure on the land resources, in the last six decades, have promoted deforestation and done irreversible damage to the soil and environment. Land degradation is not only impacting the livelihoods of



the land-dependent communities but also disrupting the ecosystem as a whole. Keeping this in view the government created the Department of Wasteland Development (presently renamed as Department of Land Resources) in July 1992 under the Ministry of Rural Development to restore ecological imbalance through development of degraded non-forest wastelands.

Status of Wasteland in India

The status of wastelands in India between 1986-2000 and 2003 is highlighted in Table 1. During 1986-2000, 6.38 lakh square KMs of land was categorised as total wasteland. This fell by 2.71

per cent by 2003. As can be seen from the Table, there were 5.52 lakh square KMs of land which required treatment to become productive. While wastelands under the category of sands (either in the coastal region or inland), shifting cultivation, degraded notified forestland witnessed a sharp fall, the wastelands in the category of mining and industrial and steep sloping areas increased.

Government Intervention

In 1985, the government created the National Wasteland Development Board (NWDB) under the Ministry of Forests and Environment with a view to tackle the problem of degradation of lands,

Table 1: Waste Lands of India (1986-2000 to 2003)

S. No.	Category	Wastelands (Area in sq. km.)		Change in Waste land 1986-2003 (per cent)
		1986-2000	2003	
1	Gullied and/or Ravenous land	20,553.35	19,039.34	-0.05
2	Land with or without scrub	194,014.29	187,949.49	-0.19
3	Waterlogged and Marshy land	16,568.45	9,744.97	-0.22
4	Land affected by salinity/alkalinity-coastal/inland	20,477.38	12,024.05	-0.27
5	Shifting Cultivation Area	3,5142.2	18,765.86	-0.52
6	Under utilised/degraded notified forest land	140,652.31	126,551.81	-0.45
7	Degraded pastures/grazing land	25,978.91	1,9344.3	-0.21
8	Degraded land under plantation	5,828.09	2,138.24	-0.12
9	Sands-Inland/Coastal	50,021.65	3,3984.2	-0.51
10	Mining/Industrial wastelands	1,252.13	1,977.35	0.02
11	Barren rocky/stony waste/sheet rock area	64,584.77	57,747.11	-0.22
12	Steep sloping area	7,656.29	9,097.38	0.05
13	Snow covered and/or glacial area	55,788.49	54,328.16	-0.05
Total Wasteland Area		638,518.31	552,692.26	-2.71

Source: Dept. of Land Resources, M/o Rural Development, Gol (www.dolr.nic.in)

The State-wise estimates of wasteland are presented in Table 2.

Table 2: State-wise Estimates of Wasteland

States/UTs	Saline & Alkaline Land	Wind Eroded Area	Water Eroded Area	Non Forest Degraded Area	Forest Degraded Area	Total	(in Million Hect.)
							Land degraded to total waste land (per cent)
Andhra Pradesh	0.024	-	0.7442	0.7682	0.3734	1.1416	8.81
Assam	-	-	0.0935	0.0935	0.0795	0.173	1.34
Bihar	0.0004	-	0.3892	0.3896	0.1562	0.5458	4.21
Gujarat	0.1214	0.0704	0.5235	0.7153	0.0683	0.7836	6.05
Haryana	0.0526	0.1599	0.0276	0.2404	0.0074	0.2478	1.91
Himachal Pradesh	-	-	0.1424	0.1424	0.0534	0.1958	1.51
Jammu & Kashmir	-	-	0.0531	0.0531	0.1034	0.1565	1.21
Karnataka	0.0404	-	0.6718	0.7122	0.2043	0.9165	7.07

Kerala	0.0016	-	0.1037	0.1053	0.0226	0.1279	0.99
Madhya Pradesh	0.0242	-	1.2705	1.2947	0.7195	2.0142	15.54
Maharashtra	0.0534	-	1.1026	1.156	0.2841	1.4401	11.11
Manipur	-	-	0.0014	0.0014	0.1424	0.1438	1.11
Meghalaya	-	-	0.0815	0.0815	0.1103	0.1918	1.48
Nagaland	-	-	0.0508	0.0508	0.0878	0.1386	1.07
Orissa	0.0404	-	0.2753	0.3157	0.3227	0.6384	4.93
Punjab	0.0688	-	0.0463	0.1151	0.0079	0.123	0.95
Rajasthan	0.0728	1.0623	0.6659	1.801	0.1933	1.9934	15.38
Sikkim	-	-	0.0131	0.0131	0.015	0.0281	0.22
Tamil Nadu	0.0004	-	0.3388	0.3392	0.1009	0.4401	3.40
Tripura	-	-	0.0108	0.0108	0.0865	0.0973	0.75
Uttar Pradesh	0.1295	-	0.534	0.6635	0.1426	0.8061	6.22
West Bengal	0.085	-	0.1327	0.2177	0.0359	0.2536	1.96
UTs	0.0016	-	0.0873	0.0889	0.2715	0.3604	2.78
India	0.7165	1.2926	7.36	9.3691	3.5889	12.958	100.00

Source : Agricultural Research, Data Book 2002 (available at www.indiastat.com)

restoration of ecology and to meet the growing demands of fuel wood and fodder at the national level. In 1992, the NWDB was reconstituted and placed under the Ministry of Rural Development, where emphasis was laid on treating wastelands in non-forest areas with active involvement of the community. The programmes designed and implemented by this Board aimed at improving productivity of waste and degraded lands.

Integrated Wastelands Development Project (IWDP) Scheme, designed specially to develop wastelands has been under implementation in the country since 1989. Besides taking up the development of non-forest wastelands, this Scheme provides for the development of an entire micro watershed in a holistic and integrated manner. The basic objective of this scheme is an integrated wastelands development based on village/micro watershed plans which are prepared after taking into consideration the land capability, site condition and local needs of the people. The scheme also aims at rural employment besides enhancing the contents of people's participation in the wastelands development programmes at all stages, which is ensured by providing modalities for equitable and sustainable sharing of benefits and usufructs arising from such projects.

Under the Five Year Plans a lot of wasteland development related activities have been designed and implemented by various Ministries/Departments of the government. Table 3 highlights the status of the development of degraded lands during the Plan periods till the Tenth Five Year Plan (2002-2007).

Conclusion

Growing population, unsustainable land use practices, extensive deforestation, increased demand on land-based agro activities are leading to the fast degradation of world's scarce land resources and affecting productivity in agriculture. While over exploitation of natural resources like land has a direct bearing on agricultural productivity and food security, the treatment of wastelands and protection of farm lands from constant degradation through integrated land management procedures is the need of the hour. In spite of large public investments, the innovative and integrated land management practices have not been able to show satisfactory results in bringing degraded lands of the country into the cultivable land fold. Integrated watershed management, due to its inbuilt emphasis on social mobilization and community involvement, have been successful in somewhat preventing wastelands from further degradation and have also been successful in developing barren lands for productive agricultural use in various arid and semi-arid areas of the country. Thus, there is an immediate need to identify and list land treatment processes and procedures already in vogue under various land development programmes and to build awareness on these techniques amongst the community in villages so as to ensure sustainable wasteland management.

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LINKING RURAL RESOURCES WITH DEVELOPMENT PLANNING

Anupam Hazra

Research shows that rural India bears a rich content of natural resources which carries every potentiality to provide a burly pedestal for any rural developmental initiative at the grassroot-level; natural assets of an Indian village like land, ponds, rivers, forests, wildlife offer unique opportunities for sustainable rural growth

Countries across the globe are obsessed with development and in this regard the agenda of resource mobilisation holds a special significance especially in the context of developing as well as rural countries like India. In a very simple way, the term 'resource' can be defined as anything that is of use to human society. For any kind of developmental initiatives, even if I take into consideration the instance of any rural developmental initiative at the village level - the resources, that the development planners or policy makers use to earmark for such kind of initiative, are limited; so keeping in view this limitation the success of that particular program lies on how efficiently the allocated resources

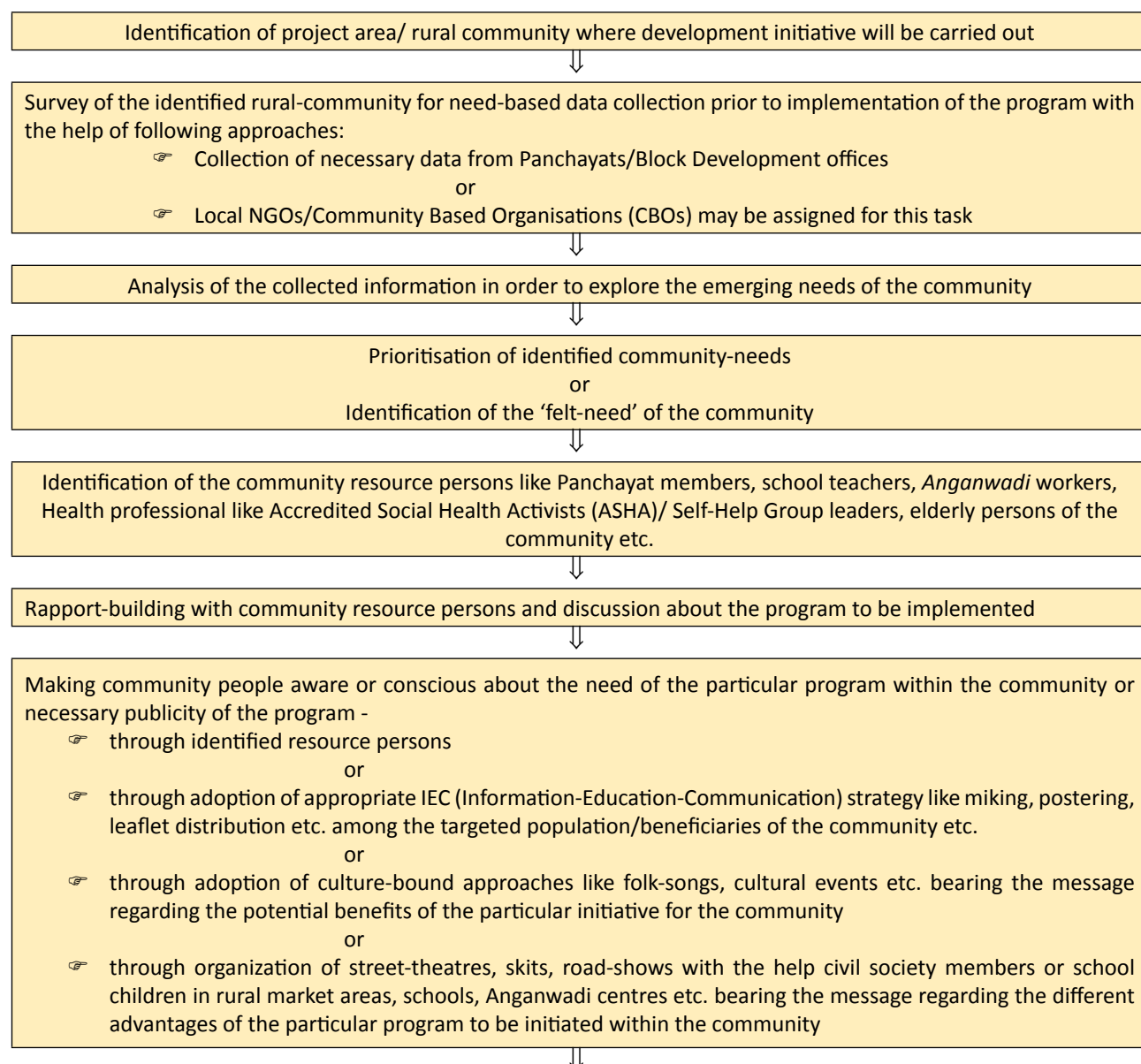
are utilised at an optimum level to bring out the maximum welfare-outcomes for the people of the community. But unfortunately, from different studies and researches, it becomes quite apparent that very often the component of 'rural resource mobilisation' has been ignored or has hardly been considered as one of the integral parts of planning or implementation process, which sometimes puts a big question mark for the success of that particular initiative.

If I go by recent statistics, I must say that India still remains overwhelmingly rural, with nearly 69% of its population still residing in villages; Out of the total of 1210.2 million populations in India, the size of rural population is 833.1 million



which forms 68.84% of our total population and at the same time as per the latest Census data, during last decade, the total number of villages in India has increased from 6, 38,588 (2001 Census) to 6, 40,867 (2011 Census); an Increase of 2,279 villages; on the other hand, rural India is regarded to be the source of untapped energy and resources; and various experiments and pilot projects have proved that the success of any rural development initiative depend on how we make use of these resources without exploiting the rural environment. Keeping in view these translucent evidences and facts, it is I think needless to argue that ultimately the overall progress of our nation still solely depends on the prosperity of rural India,

and for this particular reason it almost becomes obligatory that while designing or implementing any rural developmental program, the resources of the particular village where the program is supposed to be implemented, needs to be utilised effectively and efficiently; it is also the need of the hour that the Government should make every possible effort to develop community stakeholder-ship while initiating any developmental move at the village level; in this direction, I think the following few steps, will be quite effective – not only to guarantee an optimum utilisation of community resources but also will encourage a participatory approach in program implementation process at the grassroot-level:



Identification of the community resource institutions like Anganwadi Centre/Primary Health Centre (PHC)/ Primary School/youth clubs/SHGs/local NGOs working within the community etc. which bear a strong potentiality to influence/catalyse the program implementation process, through application of PRA (Participatory Rural Appraisal) or PLA (Participatory Learning Action) method



Initiating the program-implementation process involving community resource persons, ensuring an optimum utilisation of identified community resources/ resource institutions



Developing suitable monitoring-mechanism at the village-level for time-to-time supervision of the program implementation process to ensure proper implementation of the program as well as for collection of feedback in regular intervals from the targeted beneficiaries of the community for need-based modification (if required) in future course of actions

Research shows that rural India bears a rich content of natural resources which carries every potentiality to provide a burly pedestal for any rural developmental initiative at the grassroot-level; natural assets of an Indian village like land, ponds, rivers, forests, wildlife offer unique opportunities for sustainable rural growth. The Government through Gram Panchayats and other community-based-organisations, should make rural mass conscious about the essence and proper usage of rural resources for mass welfare initiatives – which will not only control wastage of community resources but also will ensure their utilisation at an optimum level. At the end, I would like to

conclude that taking into account the current dynamics of rural developmental scenario and the growing inability and limitation of the state to ensure required welfare services for every village of India, I think, very soon the time will come when the Government will start encouraging rural mass towards shouldering the adverse consequences of the economic downturn through mobilising and galvanising their own resources in the quest for improving their own standard of living.

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