GEOGRAPHICAL AREA AND ITS EFFECTIVE UTILIZATION

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Abstract: This paper deals with how geographical area covering both land and water bodies are presently used in India and how transformation of the entire area utilization in future, would contribute to the prosperity without major conflict with nature / ecology.

The Geographical area of India is only 2.5% of the worlds land area with 16.7% of the global population. It has only 0.5% of worlds grazing lands with 18% of global live stock population. The forest area of India is only 1.8% of the world forest area. To enhance the productivity of the limited available surface resources, it is needless to say that both land and water areas, are to be brought under multi purpose utilization.

Japan was also in similar situation like India and how Japan has overcome its disadvantages is an example to India. Japan has high population density comparable to that of India with only 12% arable land area. Most of the area in Japan is rugged & mountainous covered with forests. The staple food of Japan is fish and not rice. Japan has exploited international sea waters to meet its food requirement. Japan accounts for 15% of global fish catch with nearly 2% of world population.

Geographical area includes both land area and surface area of water bodies. In our country most of the land area is falling under agriculture lands or forest lands. Nearly 10% of geographical area is water covered mostly during monsoon season. India does not have major natural water bodies / lakes other than few medium sized back water lagoons. It has substantial area (nearly 7% of total area) under natural streams and river beds / flood pans. The man made water bodies such as tanks and reservoirs, occupy less than 1% of the total area. The present area utilization is shown in Table-1.

TABLE - 1

S.no	Classification	In million hectares	% of total
1	Geographical area	328.73	
2	Total reported area	304.92	100
3	Forest area	68.86	22.6
4	Area not available for cultivation:	41.56	
a)	Barren and uncultivable land	22.53	6.2
b)	Land under non agricultural use	19.93	7.4
5	Permanent pastures and other grazing lands	10.91	3.6
6	Land under misc. tree crops and groves	3.57	1.2
7	Culturable waste land	13.88	4.6
8	Fallow lands:	24.12	
a)	Current fallow lands	14.36	4.7
b)	Other fallows lands	9.76	3.2
9	Net sown area.	142.02	46.6
10	Net irrigated area	54.57	
11	Gross cropped area.	190.76	
12	Gross irrigated area	72.78	

Source: Agricultural statistics at a glance, 2001-Directorate of economics & Statistics, Ministry of Agriculture, GoI.

DEFINITION OF TERMINOLOGY

Geographical Area: The latest figure of geographical area for the State/Union Territory/Districts furnished by the Office of the Surveyor General of India's data. *Geographical area* is the sum of all land and water areas delimited by international boundaries and/or coastlines. *Land area* is the aggregate of all surfaces delimited by international boundaries and/or coastlines, excluding inland water bodies (lakes, reservoirs, rivers). *Water area* is the sum of the surfaces of all inland water bodies, such as lakes, reservoirs, or rivers, as delimited by international boundaries and/or coastlines.

Reporting Area for Land Utilization Statistics: The Reporting area stands for the area for which data on land use classification of area are available.

Area under forests: The Forest areas are classified in to 1) Reserved Forest, 2) Protected Forest and 3) Unclassified Forest.

> Reserved Forest: An area notified under provisions of Indian Forest Act having full degree of protection. In reserved forests, all activities are prohibited unless permitted.
> Protected forest: An area notified under provisions of Indian Forest Act having limited degree of protection. In protected forests, all activities are permitted unless prohibited.
> Unclassified Forest: An area recorded as forest but not included in reserved or protected category. Ownership status of such forests varies from State to State.

It includes all lands whether state-owned or private, and whether wooded or maintained as potential forest land. The area of crops raised in the forest and grazing lands or areas open for grazing within the forests remain included under the forest area.

Area under non agricultural use: This category includes all lands occupied by buildings, industries, roads, railways, air ports/strips, under water (e.g. rivers, streams, canals, reservoirs, water tanks), etc. which are put to uses other than agriculture.

Barren and Un-culturable Land: Land which can not be brought under cultivation except at an exorbitant cost whether such land is in isolated blocks or within cultivated holdings. Rocky mountains / hills, rock outcrops, deserts, saline lands such as Rann of Kutch, alkaline lands in UP, sandy coastal beeches, weed infected ravine lands of MP, etc fall in this category.

Permanent Pastures and other Grazing Lands: This includes all grazing lands whether they are permanent pastures and meadows or not. Village common grazing land is included under this head.

Land under Miscellaneous Tree Crops, etc.: This includes all cultivable land which is not included in 'Net area sowed' but is put to some agricultural uses. Lands under Casurina trees, thatching grasses, bamboo bushes and other groves for fuel, etc. which are not included under 'Orchards' are classed under this category.

Culturable Waste Land: This includes lands available for cultivation, whether not taken up for cultivation or taken up for cultivation once but not cultivated during the current year and the last five years or more in succession for one reason or other. Such lands may be either fallow or covered with

shrubs and jungles which are not put to any use. They may be assessed or un-assessed and may lie in isolated blocks or within cultivated holdings. Land once cultivated but not cultivated for five years in succession is also included in this category at the end of the five years.

Fallow Lands other than Current Fallows: This includes all lands which were taken up for cultivation but are temporarily out of cultivation for a period of not less than one year and not more than five years.

Current Fallows: This represents cropped area which is kept fallow during the current year. For example, if any seeding area is not cropped against the same year it may be treated as current fallow.

Net Area Sown: This represents the total area sown with crops and orchards. Area sown more than once; in the same year is counted only once.

Total Cropped Area: This represents the total area covered with crops, i.e. the sum total of areas covered by all the individual crops; areas sown with crops more than once during the year being counted as separate areas for each crop.

Area Sown more than once: This is obtained by deducting 'Net Area Sown' from 'Total Cropped Area'.

Total Cultivable Area / Agriculture Land / Total Culturable Land: This consists of net area sown, current fallows, fallow lands other than current fallows, culturable waste land and land under miscellaneous tree crops.

Total Cultivated Area: This consists of net area sown and current fallows.

Arable land: Land cultivated for crops like wheat, maize, and rice that are replanted after each harvest.

FOREST LANDS:

At present forest areas are serving the following purposes

- Habitat to flora and fauna such as wild animals/birds/insects, native plants, etc.
- Source of lively hood to the local tribes
- Source of wild medicinal herbs,
- Source of fire wood, timber, bamboo, fodder, etc.
- Major forest products such as beedi leaves, honey, gums, lacquer, silk cocoons, tamarind, etc.

Presently, the tribal are unable to survive on traditional forest produce alone and resorting to forest cutting for creating farm lands. Many times, forests are over exploited for grazing and industrial raw materials causing permanent damage. The forests are being exploited by human activity in excess of its sustainable capacity. The population of wild animals is dwindling to alarming levels in forests. The forest departments of both state and central governments still implement archaic laws and regulations without reaping maximum productivity from these lands.

The following measures should be taken on war footing to improve productivity from forests.

Forest cover:
The quality of forests (canopy area) is deteriorating over a period of time due to excessive logging activity. Majority of our forests are shrubs and dry deciduous forests located in semi arid areas. The tree cover growth is slow due to shortage of soil moisture during dry season. The trees face water stress during summer months. It is very much essential that available water resources in forest areas are conserved and made available to bio mass / trees growth.

It is possible to improve the ground water reserves by constructing contour bunds in the forest area wherever feasible. Contour bunds are nearly one foot high earth bunds along the one foot contour lines. The rain water stagnates between adjacent contour bunds and seeps gradually in to soil, thus increasing soil moisture and ground water. This would drastically improve the greenery of forests & their biomass generation productivity, enhance sustainability of wild life many folds and substantially reduce river flooding during monsoon season.

Wild life:
During summer months, the available water sources dry up and all the animals congregate near few water holes / tanks for quenching thirst. Near the water holes, the weak and calf-stage herbivorous animals become easy pray to carnivorous animals. Some times, grown up puppies of carnivorous animal also become easy prey to other animals. Premature death of reproductive animals will lessen the population growth of wild animals. Sufficient number of perennial water holes/sources free from harmful bacteria, are to be ensured by forest officials to prevent excessive congregation of wild animals.

When wild animals are growing in number, more food is required in the form of other wild animals to survive. The local food sources available in the limited forest area would not be sufficient to sustain food requirements of expanding wild life (both herbivorous and carnivorous) population. External supplementation of required food is to be done by forest departments. In our country naturally dead cattle are either buried or allowed to rot in open fields after removing the hide. By this disposal method, the flesh is degenerated by harmful bacteria in to green house gasses. This is very unproductive process in usage of available proteins. The productive method of using a protein is to convert in to vivacious protein at good conversion ratio. Another food source is our dogs (both domesticated and street dogs) in cities and towns. When these dogs die naturally, the dog meat can be used as food to augment the food source to wild animals. For implementing these measures, forest departments should carry out following tasks.

- Collection of dead cattle and dogs from the cities, towns and villages,
- Separation of hide, bones, etc from the dead corpses in mobile vans,
- Sterilizing the meat by micro wave heating,
- Maintaining cold storages to store the meet.
- Distribution of meet in forests for wild life consumption.

Similarly, when fodder shortage is faced by the wild animals during summer months, dry fodder collected from the agriculture lands, can be supplied to meet their minimum requirements.

The wild life propagation is severely restricted by excessive mortality of calves and cubs (infant mortality). This is due to inability of these cubs to flee/hide from the predator animals. Infant mortality

among wild life can be minimized by providing safe hiding shelters in the forests. Safe shelters are metallic domes with small openings such that only cubs/ puppies are able to enter in to them (not even mother). These metallic domes are camouflaged to become part of natural surroundings. Generally, when a mother animal gives birth to puppies, it will try to shift the puppies to safer hide out such as borrows / caves. These dome shelters serve the same purpose as borrows / caves in a better way. The cubs / puppies slip in to the cage shelters when threatened by predators and come out of the dome shelter when mother arrives back.

In our country, the wild life animals (10 kgs and above) population is less than ten to every lackh of human population. It is very precarious imbalanced situation. If the above measures are implemented, the wild life population density could be increased by ten folds.

Forest area fencing:

Forests are surrounded by human hebetated areas and vice versa. Some times wild animals enter in to human habitats and kill people/cattle or damage the crops. People also stray in to forests to plunder the forest resources unlawfully. It would be very useful if a solution is available to these problems. This problem can be solved to a major extent by creating twenty meter wide strip of fencing plants along the forest boundary. There are many native fencing plants such as bushy, thorny, hard wood varieties if planted in combination would prevent trespassing from chickens to Elephants. It would also make human trespassing difficult and detectable.

The territorial animals such as wild cats, bears, wolfs, etc. try to survive in a limited territory by scent marking the boundaries of its territory. It will try to protect its territory from intruders. During food shortage periods, a stronger intruder drives out the existing occupier from its territory. This will lead to cascading effect, ultimately leading to intrusion of animals living in forest boundaries in to human habitats. The forest boundaries / fencing could be scent marked in dry season with urine from zoo/circus animals such that animals are scared of crossing the forest boundaries.

Tribal Welfare:

The people living in the forest areas should be involved in enhancing the productivity of forest lands as explained previously. The expenditure incurred on forest development will create necessary employment for tribals till they get educated and diversify their livelihood. The tribals would be encouraged to grow fodder crops (including paddy) in existing farm lands to meet wild life needs during dry season and remunerative price will be paid by forest department for the cultivated fodder. Milk collection centers in forest areas would be discontinued to discourage grazing in forest lands. Milk supply/ export to near by towns from forest areas should be stopped by imposing transport restrictions. The tribals would be trained and used in a proactive manner for all around productivity improvement of forest lands.

Re-defining Forest Department responsibilities:

Presently, all erstwhile forest products except wild life and bio-diversity are cultivated in farms to meet their human consumption. The productivity / wealth created from the forest area which is 22% of total area, is abysmally low. At present, the forest department is serving two functions mainly. 1) To police the forest areas and 2) To generate modest income from forests. Gradually the forest resources are depleting causing irreversibly damage to flora and fauna. The functions and performance of forest department should be reviewed critically and reoriented to achieve from the vast forest lands enhanced productivity beyond traditional expectations. The government should allot more funds for forest

development schemes to generate more wealth from the forest lands. Forest department should be transformed in to a corporate / cooperative estate to reap high productivity from the vast forest areas.

BARREN AND UN-CULTURABLE LAND:

These lands are difficult to cultivate but are source of many construction materials such as gravel, sand, stones, soil, etc. These minerals importance has been increasing with the boom in the construction industry.

Gravel / metal chips production is electricity intensive and highly polluting industry. This industry could be transformed in to a cottage industry for generating extra rural employment during non agriculture season. Instead of quarrying the hills, the boulders in the agriculture lands are to be removed and supplied to rural labor at their door steps. Removing the unwanted stones / boulders from the agriculture lands will create more agriculture land. The metal chips of various sizes produced by the rural people by breaking the boulders, would be purchased by government / private agencies for onward consumption. Metal chips are non perishable and can be stocked in open yards. Thus seasonal unemployment of rural labor is solved and extra agriculture land is created.

TOTAL CULTIVABLE AREA:

India is blessed with vast area of arable land (49% of its area), water resources and tropical climate. The per capita availability of arable land in India is quite high compared to that of total Asia. India is also blessed with tropical climate to cultivate crops through out the year. The productivity of agriculture land is low compared to international norms. Some areas are not suitable for agriculture due to soil problems which can be rectified. Being tropical country, the water demand by the crops is very high. In most parts of India, irrigation water is required through out the year for cultivating multiple crops. Soil moisture and soil enrichment are crucial factors for improving the productivity from agriculture land. This can be achieved by fully exploiting water resources and investing more funds in soil enrichment.

Irrigation: The irrigation is done generally by surface canals using river water or by lift irrigation using ground water. The land irrigated by ground water lift irrigation exceeds that of surface water. The water pumped from the ground exceeds the total rain fall in many parts of India. Most of the under ground water pumped goes back to the under ground due to high porosity of course soils. The subsidized / freely supplied pumping power is wasted with out economical sense. This type of course soils should be treated with locally available black cotton / alluvial soils to enhance the fertility of soil and reduce excessive seepage.

In this way, the excessive seepage encountered in irrigation canals could also be reduced drastically, by covering canal surface with six inches of black cotton soil to fill the soil pores. This method is very cheep and long lasting than canal lining.

Similarly, many black cotton soils will not allow water to seep down and prevent the plant root penetration and its aeration. These soils are to be either treated with fine sand / waste fly ash produced from coal power stations to eliminate the disadvantages. Thus black cotton soils can be enriched to enhance productivity.

Conjunctive irrigation (using both ground water and canal water) should be targeted for growing three crops in a year. When canal water is used for irrigation during monsoon months, the ground water is replenished and available for subsequent crops by lift irrigation.

Pest control: It is often found that crops are severely affected by insects/ pest. The pest menace repeats in aggravated way with the use of chemical pesticides. In many agriculture lands surrounded by wooded areas, (ex: Kerala) the pest menace is naturally under control without appreciable crop damage. When highly poisonous pesticides are used on crops, not only harmful pest but also predators of these pests perish. When birds feed on poisonous dead insects, their population also dwindles. When pesticides seep in to ground through water, the benign insects which feed upon harm full eggs/larvae of unwanted pest also die leaving the soil devoid of biological activity. To keep the pest damage under control naturally, every village must have a bird sanctuary for providing bird nesting sanctuaries and protection from predators such as snakes, falcons, etc. Only carnivorous small birds would be given shelter in these bird sanctuaries to control the herbivorous insects / pest. Generally, the populations of grain eating birds such as pigeons, parrots, etc, are proliferating causing damage to crops/ orchards. Bird sanctuaries can be established by growing suitable thorny trees and bushes for the insect eating bird species.

Many of the crops damaging insects are nocturnal (i.e. active during night). Insect eating Bats are the natural predators of nocturnal insects. These Bats population has almost wiped out from the agriculture land regions. It is high time that artificial nesting structures are to be installed in many village areas to create adequate population of these Bats.

PERMANENT PASTURES AND OTHER GRAZING LANDS:

These lands are only 3.6% of total area. India has only 0.5% of worlds grazing lands with 18% of global live stock population. This is a misleading statement because live stock production is mainly dependant on crop residues and crop by products. The total supply of feed and fodder was straw 398 million tons, green fodder 573.5 million tons and concentrates 42 million tons in the year 1993. The fodder crop production exceeds by weight sum total of all other agriculture products and all mined minerals in India. Less than one third of feed requirements of live stock are met from Permanent Pastures and other Grazing Lands at enormous loss of green cover in country side. Open grazing of live stock is detrimental to plants growth and makes afforesting efforts unsuccessful. Open grazing / allowing live stock outside their farms should not be allowed. Open area grazing also causes traffic problems on high ways and in cities. Permanent Pastures and other Grazing Lands could be easily converted in to cattle farms / bird sanctuaries.

EFFECTIVE UTILIZATION OF WATER AREA:

Some times, not only agriculture land, decommissioned reservoirs / tanks can be lucratively converted in to next higher level usage for industries and residential towns. In the outskirts of Hyderabad city, there are two old medium size water reservoirs (i.e. Osman Sagar and Himayat sagar) covering total area of 4000 hectares. These water storage reservoirs constructed nearly 90 years back, meet less than 10% of present water requirements of Hyderabad city. The near by catchment area of these reservoirs is also restricted for industries and residential purpose other than farms and farm houses. These restrictions are imposed to prevent the contamination of water collected in these reservoirs by sewage and industrial pollutants. These reservoirs could be decommissioned and the reclaimed land can be used for locating industrial/commercial complexes and residential towns since these dams have outlived their life & become unsafe. Hyderabad city is being provided with adequate water from other reliable water sources for present and future needs. This would fetch at least 100 billion rupees to the state government for spending on new infrastructure projects.

Similarly, the Nizamsagar reservoir lands in Nizamabad district of Andhra Pradesh, could be reclaimed partly by reducing the water storage level / effective dam height. Reducing the dam height would not affect water supply to Nizamsagar irrigation systems. This reservoir is nearly 80 years old and not receiving adequate water to fill the reservoir in nine out of ten years. The upstream Singoor reservoir is found adequate to store the available water in most of the years. This reclaimed land (nearly 10,000 hectares) can be used for industrial (SEZ) purpose or for relocating displaced population by new reservoir projects.

Many times, controversies erupt in allocating forest lands for construction of water reservoir projects/ dams. It is argued that precious forest lands are submerged by reservoirs. Forests and reservoirs can occupy same area and exist symbiotically. In Amazon river basin of South America, vast areas of fresh water inundated forests are existing. The tree species in these forests can grow up to 20 meters height with 4 meters deep water logging for more than four months in a year. The climatic conditions of Amazon river basin are similar to Indian climate. It is possible to grow thick forests in the rim of existing water reservoirs up to four meters water depth. New reservoir projects could be created with out any loss of forest area by growing compensatory inundated forests in existing reservoirs/tanks. Thus water bodies are put to multipurpose productive usage.

Some times reservoir projects are avoided since the water submerged area are found to contain coal reserves. Presently, in-situ coal mine gasification technology is well developed to extract the available coal in the form of gaseous fuel. This technology is useful where coal reserves are located under sea water, deep in underground, under rivers / reservoirs. In this way, the available area can be used for both storing river water and also coal mining purpose.

In India, rice is cultivated in irrigated lands on large scale. Presently, the cost of providing irrigation water to rice fields is of the order of two lackh rupees per acre. Rice/paddy plant grows in marshy / water logged lands with shallow depth root penetration (nearly one foot). It is feasible to grow three paddy crops in a year in farms created on rafts floating on reservoir's water. The reservoir water could be pumped for rice cultivation through out the year. The cost incurred would be less than the sum of market rates of paddy fields and the subsidized water supply cost. The dead storage reservoir water area can be allotted to displaced people of the reservoir for paddy cultivation by providing barge mounted paddy fields. Interest free loans can be provided for the barge mounted paddy fields. These paddy farmers can also live in boat houses if required. Thus the requirement of additional farm land for rehabilitating displaced population is solved to major extent.

At present every district, is having one major / medium water reservoir in India. The dead storage area of these water bodies can be used as district level air ports by using amphibious aero plains which can land and take off on water. Thus there is no requirement of land area for these medium airports and substantial cost is saved in creating these facilities.

MULTI PURPOSE WATER USE

Renowned philosopher and great Telugu poet, Yogi Vemana said that the best place for locating a residential village / city is where perennial water source, banking services and medical services are available. In this modern age, banking and medical facilities can be easily established by people themselves whereas adequate perennial water sources are not easily available everywhere. The measure of well being in present age is the extent of urbanization and the available comforts / standard

of living in the cities/towns. Adequate piped water supply to the people is an essential basic requirement.

When water is used for industrial & domestic purpose, nearly 20% is actually consumed and the rest 80% is available as waste / effluent water. Effluent water is treated and diluted with 300 times of natural river water, to make it fit again for domestic use. However, this effluent water can be directly used for irrigation with minor treatment. It is more economical to use the domestic & industrial effluent water for irrigation purpose in nearby area rather polluting the long stretch of down stream river during dry season.

When big residential & industrial towns (SEZs) are to be established, the required water is frequently planned to be brought from distant major rivers at exorbitant cost. In every district, there are few medium size water storage reservoirs whose water is presently used for irrigation only. It would be better to locate the major residential & industrial towns close to these reservoirs. The water stored in these reservoirs will be first used for the residential & industrial purpose and the generated effluent water after treatment is further used by gravity flow / by pumping in the existing irrigated area. Thus the existing limited perennial water sources are put to multipurpose usage. Also water supply charges and pollution cess can be collected from industries and townships as source of revenue.

Only 25% of the water resources of the country are harnessed till now. In India, the total industrial and domestic water requirements by its people, cattle & wild life works out to equal to already harnessed 500 billion cubic meters surface water resources. However 80% of this water will be available for reuse in agriculture. Thus the estimated net water requirement for non agriculture uses is only 20% (100 billion cubic meters) of the already harnessed potential. The multipurpose usage of available water is the best method to establish new cities and towns with lesser infrastructure cost in a thickly populated country like India.

COASTAL VS INLAND CITIES

Energy starvation is defined as people living in surroundings where the temperature is less than 20˚C and more than 30˚C. When natural ambient temperature is not in the range of 20˚–30˚C and surrounding temperature is not controlled, it is considered that energy starvation conditions are prevailing. This can be while in house or in work place or in commercial establishment or in mobile vehicle. The per capita energy starvation duration in India is in excess of 70%.

The ambient temperature decreases by 1˚C for every 200 meters increase in altitude. If a place is located at higher altitude, its energy requirements for climate control is less compared to energy needs of a place located at lower altitude. However it needs more energy for transporting goods and water from lower elevation places. Prima fascia, a city located at reasonably high altitude (700 to 1200 m above sea level) is preferable if adequate water resources are available without the need of pumping from lower altitude. Nearly two thirds of geographical area in India is located below the 200 meters altitude above sea level.

India is blessed with more arable land with hot dry tropical climate unlike in many developed countries. Lot of water is required for irrigation in tropical climate. The available water resources are just adequate for its ultimate water requirements. If future cities / towns are located on the sea coast, the water used by the people and industries can not be reused further for irrigation needs without being pumped to upstream lands. Thus additional power is needed to pump the effluent water generated in

coastal cities for further usage in uplands irrigation. Coastal areas are also more prone to flooding, cyclones, tsunamis, hot humid climate and corrosive atmosphere which are not favorable for locating industrial and residential cities. In India, inland citied are preferred to coastal cities unless specific requirement is called for.

CHANGE IN USAGE OF LAND FOR HIGHER PRODUCTIVITY

Nearly 85% of the area is used presently for agriculture, animal husbandry and forestry. The infrastructure, residential and industries occupy 7.4% of the area only. Slowly, India is transforming from agrarian economy in to industrial economy which is the natural course of any developing country. More and more land would be occupied by industries, mines, residential places such as towns, cities, etc. It means some of the present agriculture land needs to be diverted to these sectors. It is not true that any barren & uncultivable land wherever available can be used for these upcoming sectors due to following reasons.

- Mines can only be located where minerals / ores are available.
- Multi purpose dam reservoirs for irrigation and hydro electricity projects, can only be located wherever it is feasible.
- Industries or industrial towns at suitable locations

Industries can be established with profitability where requisite raw materials, skilled man power, nearness of markets to sell products, infrastructure like roads, rail, harbor, air port, water, communication links and community facilities such as housing, etc. are available. Some times the land development cost such as leveling of land above the local flood level and additional foundations in the form of piling and soil treatment would cost nearly 10 times the land acquisition cost of an industrial project. If the industry is located in an active seismic or high gale wind zones, additional cost will be incurred to meet these site specific requirements. Moreover, industries and infrastructure projects, are required to comply statutory requirements such as environment and pollution control acts. It is rare to find an ideal site for an industry meeting all the above requirements favorably.

Agricultural land prices are higher in India compared to many developed countries. The annual land lease / rental component is minimum 25% of the produced crop value. Farmers are reluctant to sell their lands. They fear that disposing land would deprive them lively hood in the back ground of rampant unemployment.

Whenever, an entrepreneur comes forward to establish an industry at particular site, it is the duty of local people and government, to welcome the new industry and negotiate a proper price for the sale of land and compensation for the effected people in terms of cash and kind. Rarely, the cost of land acquisition and compensation to displaced persons exceed 3% of installed cost of an industrial project. If an industrialist correctly evaluates the site related advantages, it is not difficult to pay the demanded price for land acquisition for the required site. If the land price is felt on higher side, the entrepreneur can look for alternate site which is cheaply available in near by vicinity.

Only economic consideration should be the criteria for siting any industry keeping aside sentimental and emotional factors of stake holders. The entrepreneur must induce the land owners and effected population by offering attractive price and government should facilitate the deal without taking sides. Also local governments need to establish transparent land acquisition policy to prevent misuse on both sides.

Every area has some natural advantages & disadvantages for its utilization. Some of the disadvantages could be over come by investing additional expenditure. Some of the main natural factors are given below which are to be considered as risky and high cost elements.

- Cyclones, typhoons, tornadoes incident areas
- Earth quake prone areas
- Tsunami prone area,
- Hail storm prone areas
- Contaminated ground water areas
- Corrosive coastal atmosphere
- Very high and low ambient temperature areas
- Dusty desert conditions,

AREA UTILIZATION PRIORITIES:

The following order of priorities should be implemented for productive utilization of land / water areas.

1. Areas identified for rare and rich bio diversity and wild life.
2. Areas occupied by historical, archeological and ancient sites / monuments
3. Areas with ores/mineral reserves other than energy related minerals,
4. Areas suitable for river water harnessing such as reservoirs, canals, hydro power stations, etc.
5. Infrastructure projects such as roads, railway lines, aerodromes/ air strips, harbors, water treatment plants, sewage treatment plants, various pipelines (oil products, gas, water, etc.), power lines, communication lines, etc.
6. Forest areas
7. Industries including thermal power stations
8. Purely residential & commercial areas
9. Dairy farms, aquaculture, etc
10. Agriculture lands and others.

For the potential areas falling in first four priority areas, there should be blanket ban in establishing new industries, orchards, aquaculture and big residential & commercial complexes. This would facilitate / protect these potential areas to use for the identified purpose in future.

By implementing these area utilization priorities and unbiased land acquisition policy, substantial time and investment could be saved. Transparent and effective area utilization policies would attract both foreign and local capital for faster improvement of living standards in India.

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(Note: copy and paste the links in the browser if not working directly)