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Conceptual Framework of Land Suitability Analysis for Slum Redevelopment Initiatives

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Abstract

The fast pace of urbanization exerts considerable pressure on land, which indeed is a scarce natural resource pushing less privileged section of urban population in areas with inadequacy of infrastructure and amenities often termed as slums. In spite of continuous efforts of the government since its first Five Year Plan and even after more than six decades of independence almost one third of urban population in India is forced to reside in slums. Though the slum rehabilitation initiatives had been top on priority, it was only in 2005 when it was realized by the national commission on urbanization that the cities are the economic engines of growth and there by the focus was shifted on provision of urban infrastructure and basic services for urban poor. The land is a limited natural resource and when talking of sustainability it directly or indirectly remains the prime issue amongst the dimensions of sustainability physical, social, economical or environmental. The urban planning which directs the growth towards development has failed due to time lag and its limited human resource. The second important issue is scarcity of land, incompatible land use and sky rocketing land value. After the launching of most ambitious mission i.e. the Jawaharlal Nehru Urban Renewal Mission (JNNURM) in 2005 and thereby subsequent Rajeev Awas Yojna (RAY) which is an indeed in attempt to achieve the Million Development Goal of slum free cities number of models are being developed for slum redevelopment, rehabilitation and renewal. The present paper attempts to identify the issues pertaining to land using the land suitability analysis for slum redevelopment. The focus of the paper is to identify the factors of land associated with physical redevelopment; however the socio-cultural, environmental and economical aspects shall also be taken care of. The outcome will be in the form of framework using land suitability analysis for slum redevelopment.

Keywords: Land, Land suitability analysis and Slum redevelopment.

Introduction

The rapid increase in population, urbanization and the change in socio-economic pattern in developing country like India over last few decades have resulted in rapid increase in housing demands. This demand is also associated with need of land for provision of services and amenities[1]. The conventional master planning approach lacks in incorporation of provisions for providing necessary housing and supporting services for informal sector. The policies, regulation and controls dose not envisage for the overcrowding and migrating population. On the contrary they even fail to check the growth of slums on government land and mushrooming of slums irrespective of land use leading to incompatible land uses. The constraints faced by urban poor and even the lower and middle income group in accessing a respectable shelter are finance, affordability, land tenureship, and legal system.

In last two decades after economics liberalization and globalization the informal sector has emerged as a major service industry. Unfortunately their income is not taken into consideration while assessing the economic health of the cities. Therefore the facilities like housing loan, subsidies on housing, loan to purchase house/land is not available for informal sector. Due to the lack of stable long term sources of funds and narrow based financial institution engaged in housing finance the slum dwellers generally obtain the loan from relatives, employers and money lenders[2]. These peoples are deprived of loan as they cannot provide security. Even if funds are arranged by some means the land cannot be purchased on the desired locations because of high land value.

It has been observed that the problem of shelterlessness and poor shelter for a large group of people living in cities cannot be improved even if the outside support is provided to them. The outside support like subsidies in land cost or construction cost, providing legal title of land and incentives are no more lucrative. Eventually the houses constructed for low income group are occupied by middle income group or are sold for higher premium.

Though the issue of slum rehabilitation was always on priority on the radar of Indian policy, but it was only in 2005 when the land tenureship was considered in seven point charter as one of the essential basic services for urban poor. The importance of land issue in particular the urban land tenure and property rights have been gaining significance amongst academician and professionals recently. The states like Madhya Pradesh have formulated the patta act in 1984 and many such effort were

made by state government from time to time. However such attempt has resulted in wholesale inclusion of vast number of people from access to legally sanction settlements. In most of the cities large proportion of slum dweller are living in unauthorised settlement which expose them to permanent insecurity and also denied them to access formal credit and services. The leasehold system was followed to exercise a strict control over the use of land by resulted transformation of plot illegally and in the process the government system fails to address the loss from transfer. Thus the system of land tenureship need to be developed within cultural and legal system to improve the equality and efficiency of land market to all sections of population. Land for housing the poor is thus becoming an insurmountable obstacle in the development facing the growing cities while the development actions of many governments continue to focus on technical, financial and administrative aspects of the housing problem, failing to act decisively on land issues or deliberately avoiding or evading them wherever possible[3].

As the slums are the outcome of inefficient planning and inadequate resources slums occupy less preferred locations in city. These locations are foothill, marshy land, nallahs and hazardous location in proximity to polluting industries, railway track and socially secluded areas. The slums are vulnerable to urban flood because of the topographical conditions. The lack of services like proper road surface, storm water and waste water drain and inadequate provision of garbage collection leads to ground water, soil and air contamination. Water logging due to rainy season, insufficient sewer system and contaminated drinking water is the route cost of disease amongst the slum dwellers. The growth of slums is organic that is no defined street pattern the organic that is pattern which is not legible creates problem for movement of ambulance, fire brigade and such vehicle during emergency. Proper identification of the housing unit or the numbering becomes difficult for identification and other purposes. It has been observed that slum dweller preferred to live in clusters of same ethnic groups. These enabled social cohesion but are volatile during social, racial and communal conflicts. For livelihood these slum dwellers living in group of ethnic clusters are engaged in same nature of work and face the problem of recession during off season. In this manner the slum are physically, socially and economically unsafe and vulnerable.

Slum redevelopment

The term urban renewal and redevelopment has been used in different context in urban planning. The term urban renewal is used in America as synonym to what is regeneration in UK this refers to large scale renewal of inner city and down town. The term redevelopment is commonly used in south Asia and it refers to demolishing the obsolete housing stock with high tack, high rise building high density. In Indian context, it is difficult to adopt either of the strategies as Indian cities are built in multiple layers of different period unlike their western counter part. In Indian cities slums are integral part of urban fabric irrespective of locations, slum can be in the inner core or on the periphery and some time the morphological study of city pattern reflects amalgamation of these patches with rest of the city. In such scenario the situation is complex for redeveloping the slum area.

When critically examined the policy intervention were made to combat problem of slums which, shows that the focus of most of the slum rehabilitation policies was to provide affordable housing to the economically weaker section, to improve health and hygiene in slums, to relive the government land which is encroached by slums, to provide tenure rights and to prevent the future growth of slums. In the era of economic liberalization and globalisation it was realised by national commission of urbanisation that the cities are engines of economic growth. There is paradigm shift in role of government from facilitator to provider. In 2005 the launching of JNNURM and the Millennium Development Goal (MDG) of United Nations envisaged that in coming 25 years the city will be slum free. In order to make city slum free the two pre requisite are to eradicate the slums and to prevent the formation of slums.

Issues of slum redevelopment

The success of any attempt to rehabilitate/ revitalize/ regenerate/ renew or redevelop any area there should be clear understanding of slum inhabitants aspirations and their perception of wellbeing their needs willingness, choices and their inclusiveness in the process. In the current scheme of RAY the scope of the project is extended from large scale slums to squatters or units. This ambitious project is launched by central government, the state Government and the urban local bodies are expected to prepare action plans and later the detail project reports (DPRs) for individual slums. Provisions are to be made for preventions of slums in future as well. Such type of projects demands overhauling of the entire planning process and mechanism as it requires interventions from regional level to micro level the smallest unit been the individual hutment of any slum.

The multiplicity of socioeconomic layers of cities, varied dimensions of complexities of cities and overcrowding population does not allow a single or uniform strategy to tackle the problem of slums. It is obvious that the interventions made for slum rehabilitation has to be slum specific with respect to notified/un-notified by the urban local body, ownership of the land on which the slum is situated vis government land private property or barren land, land use allocated in the master plan, prevailing market land value and socioeconomic aspects. Presently the action plans are been prepared on the basis of priority matrix of 3x3x3. The three components of this matrix are poverty, housing shortage and lack of physical and social infrastructure. It is perpetual for the planners to suggest appropriate models for redevelopment which are sustainable; the dimensions of sustainability are physical, social, economical, environmental and cultural. Unfortunately

sustainability in context of government projects is misinterpreted in terms of repayment of project cost tangible or quantifiable benefits whereas the beneficiaries' perception of aspirations is largely ignored.

The process for preparation of slum redevelopment plan, typically includes identification of tenability of the slums. Tenability can be classified on the basis of natural features, ownership and vulnerability to hazard or danger owing to location. The slums which are located on eco-sensitive areas like catchment of water-bodies, forest and green belts, marshy and wet lands, areas prone to disaster like earthquake, landslides and floods etc. Further the slums on land belonging to military, railway or even on private properties are untenable as tenureship or the right of ownership cannot be transferred to the slum dwellers. The third category of untenable slums refers to slums which are located on dangerous and hazardous locations. These include slums in proximity to industries releasing harmful emissions, effluents and are source of noise pollution. Similarly industries using explosives, radiations and mining may be dangerous for the nearby slums.

As stated earlier land is a natural scares resource and should be utilized judiciously to remove the imbalance between the inhabitants living in the city. These imbalances are reflected in varying population densities across the city, apart from the density unplanned and scattered growth also needs to be organised for stream lining the services and amenities. The concentration of high value land to certain pockets of city can be attributed to the land use, accessibility and sometimes to speculations also. The slum situated on such high value lands are reasons of unutilized potential of that piece of land. Not only they occupy the high value land and simultaneously they are on incompatible land use. The up-gradation of such slums releases high value land and also bears the rehabilitation cost of the slum dwellers living there in. This includes transfer of property rights to the slum dwellers and provision of services. The level of inadequacy of services, housing situation and issue of tenureship defer from slum to slum. There are slums which can be improved by provision of basic services as the housing conditions remains good and vice versa. Thus before making any interventions, the housing condition, level of services and status of tenureship needs to be ascertained.

A careful observation of typology of slums reveals that there are slums which mushroomed in and around the industrial area housing the labours employed in these industries. The second type of slums are in the core of the city which are abandoned by the elite class and later occupied by disadvantaged section, these areas face distress and congestion. Another type of slums, which in real sense cannot be termed as slums are actually the unauthorized colonies which grow outside the planning boundaries as people are attracted by low cost land and there are no stringent building bye laws. These types of slums have good housing stock but lacks in development regulations and proper infrastructure.

On the basis of classification of slums, issues pertaining to slum formation and to make the slums integral part of urban fabric following slum redevelopment models are suggested and are mentioned in guidelines for preparation of action plan for slum free cities. The very first model implies to relocation that is displacement of slum to a new location, this strategy is widely adopted for the slums which are untenable. Secondly this strategy can also be implemented if the land value is very high and the redevelopment project is self sufficient to bear the cost of relocation at erstwhile place. If high density construction is permitted then the slum dwellers can be rehabilitated in-situ and the remaining land can be used for other intended purpose. The slums on medium land value may not be able to fetch up feasible project cost ratio in terms of input and output, however up gradation can be done by government agencies by providing subsidized loans and grants for the slums which are on even lesser land value co-operative societies can be formed and can be provided with financial support and technical expertise so that they can improve their conditions on their own. The parameters pertaining to land of slums are identified and presented in table-1.

Land Suitability Analysis

A systematic approach should be used to develop an integrated plan to determine the optimal land use suitability for future sustainable development in city[4]. The land suitability analysis is a GIS based popular technique implied in the field of physical planning. The focus is present paper is to utilize its potential for slum redevelopment. As redevelopment essentially refers to existing slums the LSA will help in assessing the status of slum for appropriate interventions and in case of relocation or redevelopment at other location will help in identifying suitable sites. The land suitability technique is used widely used to determine the fitness of the given piece of land for a particular use. It has been used in urban planning and the GIS further reinforced with multi-criterion analysis made this more useful. The parameters of land pertaining to slum redevelopment helps in first identifying the problems and potential of existing slums and further gives direction for redevelopment. The optimal use of land using land suitability analysis will inter weave the grey patches of urban slums in the city fabric. In order to use the multi- criterion analysis of land, the parameters need to be identified and prioritize in order, further they need to be weighed properly to achieve a rational solution.

Conceptual framework

The success of the interventions made for slum redevelopment depends upon the synchronization of strategy adopted for a particular slum with the problems and potential of that slum and beneficiaries perception. The present research attempts to identify the factors of slum redevelopment with respect to land. The table 2 suggests the conceptual framework to be adopted for using land suitability analysis for redevelopment of slums.

Table-1
Parameters of Land for Slum redevelopment

Location			
Near Natural feature	**Near Dangerous / hazardous location**	**Location with respect to city**	**Proximity of slums to**
Eco sensitive Forest Water bodies Catchment areas Flood prone areas Coastal areas Rich bio-diversity Living heritage Built heritage Natural heritage	Railway track High tension line Airport Industries Explosive Mining	Inner city Down town Near airport/ railway station/ bus terminus Peri-urban area CBD Heritage zone Near administrative building Near community buildings	Workplace Health facilities Education Recreational facilities Social facilities Community facilities Cultural facilities
Physiographic features			
Soil condition	**Hydrology**	**Vegetation**	**Topography**
Suitability for building construction Fertility Potential for contamination Porosity for rainwater harvesting Use of soil as building material	Surface water bodies Ground water tables Potential for contamination Potential for rain water recharge Potential source of portable water Water quality Potential for irrigation and industrial use	Native trees Extinct species Exotic trees Ground cover Potential to prevent erosion Potential grazing grounds	Surface drainage Natural slope Ridge and valleys Swamp prone areas Natural and manmade features Latitude Special feature (if any)
Planning aspects			
Land use	**Population density**	**Land value**	**Administrative boundary**
Green areas Hard surfaces Soft surfaces Horticulture Circulation spaces	Ground coverage Building heights FAR used MOS	Rental value Collector rate Market rate Condition of structure Ownership status	Ward/zone Planning boundary Urban area limit Tenureship rights

Table-2
Conceptual Framework for Land suitability analysis for slum redevelopment strategies

S. No.	**Parameter**	**Objectives**	**Implications on slum redevelopment strategies**
1	Location Eco sensitive Forest Water bodies Catchment areas Flood prone areas Coastal areas Rich bio-diversity Living heritage Built heritage Natural heritage	The eco sensitive areas should be retained and no construction should be allowed.	i. Low density development ii.Relocation of slums iii. Land should be declared untenable.
2	Near Dangerous / hazardous location Railway track	Protection of inhabitant against hazardous	i.Adherence to safety regulation ii. check for tenability

	High tension line Airport Industries Explosive Mining	Preparedness for disaster	iii.prefered model for relocation
3	Location with respect to city Inner city Down town Near airport/ railway station/ bus terminus Peri-urban area CBD Heritage zone Near administrative building Near community buildings	Integration with urban fabric adherence to urban design regeneration Enhancing interdependency of informal sector with formal sector	i.livlihood oriented strategies like rehabilitation ii. building bye laws in coordination with existing urban fabric and not disturbing the skyline.
4.	Proximity of slums to Workplace Health facilities Education Recreational facilities Social facilities Community facilities Cultural facilities	Ensure social infrastructure	Redevelopment model should take into account the existing social infrastructure
5	Soil condition Suitability for building construction Fertility Potential for contamination Porosity for rainwater harvesting Use of soil as building material	Promote low cost sustainable construction.	Incorporate green technologies
6	Hydrology Surface water bodies Ground water tables Potential for contamination Potential for rain water recharge Potential source of portable water Water quality Potential for irrigation and industrial use	Prevent environmental degradation and use water resources.	Protection of natural resources- soil, water.
7	Vegetation Native trees Extinct species Exotic trees Ground cover Potential to prevent erosion Potential grazing grounds	Conservation of native trees	Due consideration to bio diversity
8	Topography Surface drainage Natural slope Ridge and valleys Swamp prone areas Natural and manmade features Latitude Special feature (if any)	Rain water harvesting Prevention of urban floods, ground water contamination	Development with respect to natural topography

9	Planning aspect Land use Green areas Hard surfaces Soft surfaces Horticulture Circulation spaces	Adherence to land use plan	Suitability of land for proposed development.
10	Population density Ground coverage Building heights FAR	To re-densify /decongest as per prescribed population density. To regulate building bye law accordingly.	Re-densification should merge with un morphology
11	Land value Land value Rental value Collector rate Market rate Condition of structure Ownership status	Reappropriateness of development intervention With respect to prevailing market value Reappropriateness of tenureship period/nature	Incentives to developers for PPP/use of TDR/land acquisition Policy amendments
12	Administrative boundary Ward/zone Planning boundary Urban area limit Tenureship rights	Co-ordination amongst parastatal agencies and the play boundaries should irrespective with development of jurisdiction line	Proposal for relocation/ rehabilitation should be prioritised in same localities or vicinity.

Conclusion

Land suitability is a technique of quantifying the suitability of land for a proposed development. As slums are cause of social and economic phenomenon leading into environmental problem, attempt has been made to redefined sustainability of land integrating social, environmental and cultural aspects with the physical character/ properties of land. The identified parameter addressed in the framework incorporate all tangible and intangible measures. The priorities of slum redevelopment strategies should incorporate the suitability of land with respect to identified factor.

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