

Land Pooling: The Public Private Participatory Urban Development in Nepal

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Key words: Land Pooling, Infrastructure and block planning, contribution ratio, field book, new parcel number.

1. SUMMARY

Kathmandu was one of the beautiful cities of the world till 1960s. The urban population of Kathmandu grown 5.5 percent annually. The urban area is sprawl all over the valley and loss of prime agricultural land, lack of housing and urban infrastructures, and environmental pollution are serious problems.

In the past, urban development was carried on government land or acquired by compulsory purchase of private land on the public funding. Land pooling started in 1975 and practised since 1990s in Kathmandu valley of Nepal and developed about 200ha of urban areas and another 200 ha of land are being developed in Kathmandu valley alone.

The Town Development Act, 2045 provided the legal basis. H M Government will approve the the land pooling project on the request of land owners through local authorities and assists on planning and implementation of the project with the assistance of users' committee composed of land owners, tenants, and local representatives and intellectuals.

During the planning process, the public notification and digital cadastral and topographical surveys (at the scales of 1:500), and other surveys are carried out, infrastructures, open spaces, parcels to be returned to the owners, service plots (plots to be sold to recovered the cost of infrastructures) are assigned and marked on the ground and infrastructures are developed.

The scattered various shape parcels are consolidated to uniform shape and sizes, cost of the project are born by deducting the land- proportional to the land area and inversely proportional to land value, comfortable urban environment is developed, and cadastral land maps and records updated with public and private participation. In this article the procedures of land pooling and solutions of various problems encountered during the execution of projects are briefly described. The land pooling is most suitable way of providing housing and management of land in urban areas, especially Nepal like developing countries with scarcity of financial resources.

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1. BACKGROUND

The unplanned growth of urbanization in the Nepalese towns is creating problems of great proportions causing serious concern to all who live here and who understand its true implications. Population of the Nepal is increasing rapidly owing to an influx of migrants from other parts of the regions who come to the capital in search of employment, education, health services and security. The political unrest particularly the discrimination and insurgency has accelerated the rate of influx of the migrants. According to a recent estimate the urban population will double by the year 2030 out of which will be 30% of the total population of Nepal. Building a house regardless of where and how is the most coveted dream of most of the residents of the town who do not own a house. In the absence of a strong planning and regulating body, lack of proper housing facilities and development of economic and social activities degradation of environment and the undesirable urban sprawl is ever spreading. Houses are being built with no proper provision of road, water supply, drainage, electricity and telephone facility. Providing the necessary infrastructure in an unplanned built up area is difficult and expensive, often even impossible. Effective intervention at policy and implementation level is required to check further haphazard growth of urbanization leading to degradation of environment and undesirable aesthetic and sanitary conditions. Thus, the residents of the town, common man on the street, professionals and intellectuals are feeling the need of a planned urban environment increasingly. Town Development Committee (TDC) were formed to address this need through initiation and coordination of planned townships.

1.1 Environmental Situation

The environmental situation of Nepal is degrading annually despite about 18% of the territory is set aside for national parks, wild life sanctuaries and conservation areas. The air quality is fairly clean except along the southern border areas with India and Kathmandu valley where dust and air pollutants float during dry seasons.

The quality of ground and surface water is also potable, except stream flowing from urban areas, near surface water (30 m and above) of Kathmandu valley and some areas of terai. The pollutants in these areas are sewage and arsenic pollutions of some areas of terai.

The biodiversity and local breeds are declining due to decline of forage and habitat or forest with special species. These are also problems of loss of traditional trans-migrating route of wild life.

Many cultural heritages are corrupted; declining and sites are encroached by settlement. Integrated land development programmes generally considered these matters and urbanisation will have stress on environment and people both.

2. URBAN -RURAL INTERRELATIONSHIP

The sustainable environmental is more serious agenda for urban people due their number, lack of sufficient natural resources and its economical benefits to the local residence.

The food, water and other natural products are sold to urban market from rural areas, further processed and sold to urban and deficient rural areas. National parks, open spaces and natural forest, fauna and flora are maintained in rural area and it will create sustainable natural environment, provide spaces for recreation and opportunity to study the nature and income to local people.

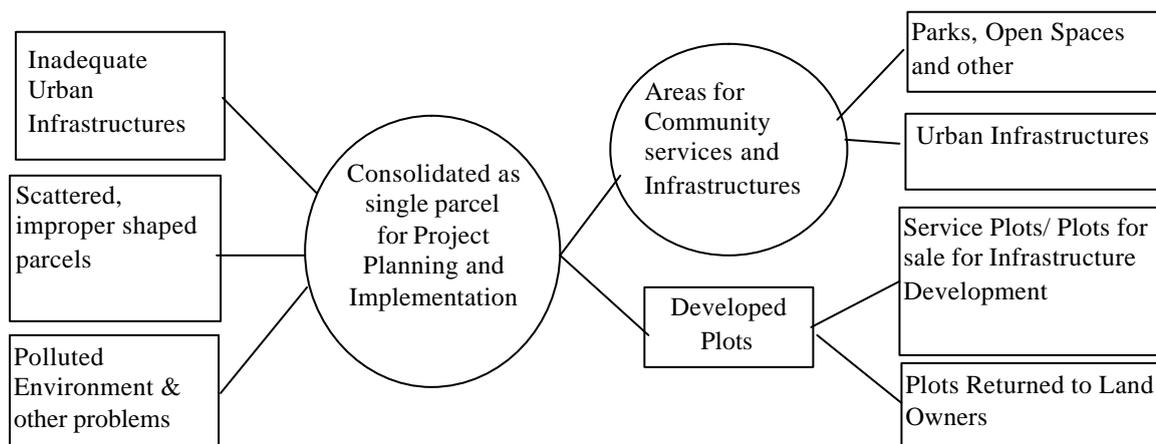
Similarly rural land is planned for housing and other facilities and the disposal and treatment of urban wastage and recycled as fertilizer.

The rural land use was sustainable in traditional system. The new crops, higher intensity of cultivation, extension of areas and modern means production affected the sustainability. The soil fertility, quality and quantity of water, air and agriculture production declined and some natural flora and fauna disappeared due loss their forage and habitat. The planning work also is considered these matters as well as comfortable housing and economic benefits.

3. INTRODUCTION TO LAND POOLING

The urban development in Nepal is being carried out the following ways:

- Land acquisition, infrastructures development and distribution back to local residence and other people.
- Guided land development
- Land pooling and
- Land development by private organisation.



Prompted by this urgent need of adequate shelter with comfortable urban infrastructures to all citizens, conservation of prime agricultural land and environment, land consolidation, and planned urban growth, the municipalities have no resources to carry out planning and development of infrastructures, have resorted to the concept of land pooling.

3.1 Concept of Land Pooling

The land-pooling scheme is regarded as one of the best readjustment technique for planned provision of urban environmental infrastructures and supply of urban land without external investment. It is a proven and successful land development scheme in the country with a history of more than a dozen successfully implemented projects within the Kathmandu Valley only. The concept of land-pooling consists in acquisition of a plot of land divided into a large number of small parcels belonging to an equally large number of land owners; plan and provide all necessary infrastructure such as road, water supply, drainage, electricity and telephone, open spaces, community service area; consolidate and replot the parcels and give back to the owners. The cost of planning and providing infrastructure is covered from the land itself to be contributed by each landowner. Thus the owner gets back about 12- 30% smaller piece of land but with all necessary infrastructure including parks and open spaces. Moreover, the original irregular shape plot is converted into a nice regular geometric shape. Thus, land-pooling can be defined as a land management technique for carrying out unified design, servicing and sub-division of a group of separate land parcels for their planned urban development with the sharing of the project costs and benefits between the land owners and recovery of the project costs by the sale of some of the developed plots.

The concept of land pooling can be explained with the help of two key words, *unification* and *partnership*. Unification indicates the consolidation of separate land parcels, the unified design, infrastructure provision and subdivision of these parcels and a unified preparation and implementation of the scheme under a single management. The word partnership indicates the partnership between government, private and community for urban land development.

It should be borne in mind that for any scheme to be successful, it should offer sufficient benefit to the stakeholders so that they are willing to actively participate to make the project successful. In this context the land-pooling scheme offers the following benefits to the landowners.

- A significant net increase in the market value of his land
- Well-serviced housing plots easy to sell if needed.
- A government agency / local government use its governmental power and status to benefit him.
- Retain part of his original land after its conversion from rural / semi rural to urban uses.
- All of the above could never be possible by individual effort.

3.2 Objective of the Land Pooling

The objective of the Land pooling is to prepare a master plan, providing basic infrastructure such as road, electricity, telephone, drainage, potable water supply, open spaces, parks

making it suitable for an ideal urban residential, commercial and other or mixed blocks and redistribute the planned plots to the land owners who agree to share the cost of development by contributing a part of their land parcel. The main objectives of urban planning by land pooling are:

- To provide maximum number of developed plots and to conserve agricultural land, cultural heritage and environment.
- Maximum participation of local people in the process of urban planning making them aware of the importance of planned urban development.
- To control the rapid unplanned urban growth and its impact on environment and to emphasize the importance of the concept of planning in modern urbanization.
- To provide employment opportunity to local people.
- To set an example that unified development efforts are successful only through active participation of the local people.
- To set an example of a planned urban residential area with all necessary infrastructure and clean environment.

4. LEGISLATIONS

It is a simple concept but its success calls for careful project preparation and efficient implementation. The formulation of present legislation started in 1954 enacting Development Committee Act 2013. The Town Development Act 2045, Para 12, and Land Reform Act 2021 and Byelaw 2060, regulates the land pooling activities.

5. PROCEDURE

The major steps of the activities are schematically given in the task flow diagram in Figure 2. The short description of each of the activities follows.

5.1 Approval

After receiving the requested of the landowners for land pooling of the areas through the concerned municipality and in concurrence of local offices, the Ministry of Transport and Public works approves the land pooling of the area and constitutes the users committee, representing the stakeholders and the management committee, representing experts and local officials.

5.2 Surveys and Mapping

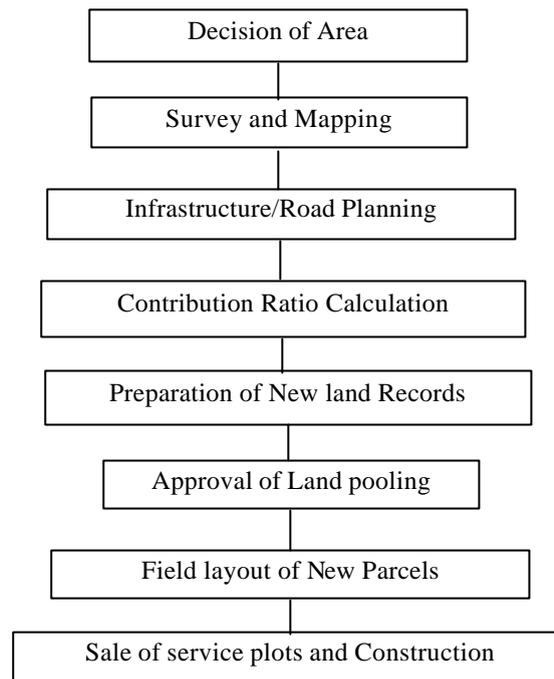


Figure 2

5.2.1 Topographical Survey

The methodology adopted to carry out the topographical survey is as per the specification of Survey Dept. Nepal which is briefly outlined below.

- Instrument Used: - Total Station or other EDM instruments are used for the topographical survey. The data storing are downloaded in AutoCAD environment, and maps are prepared in AutoCAD.
- Control Points: - The control points trig points and benchmarks established by Geodetic Survey Branch within the project area are obtained, identified and used in the field with the help of the description cards. The coordinates are in modified UTM projection system and the Bench Mark heights are. Mean sea level height of Bay of Bangal. The new additional control are established at an accuracy of about 1:50000. The accuracy of existing geodetic control points are also checked found reliable of ? 10cm.
- Contours: - The topographical survey is planned to produce final maps at 1:500 and with contour interval of 0.50 m.
- Features: - All the man made and natural features is shown in the topographical map.
- Boundary: - Boundary of the project area is identified clearly with the help of the users Committee and delineated on the maps. Any minor controversy regarding the boundary is resolved at the time of survey in the field itself.

5.2.2 Cadastral Survey

- Existing Cadastral Map: - Existing Cadastral Maps of the project area is available from the District Survey Section and the records of the land holding, certificates are available with the district Land Revenue Office. The cadastral maps are in 38 districts out of 75 districts and at the scale of 1 inch = 100 ft (1:1200) to 1 inch = 400 ft and 1:500 to 1:2500, surveyed during 1965-1997. They are scanned and joined into one sheet electronically. The surveying method used the chain survey for distance measurement and plain table with or without geodetic control points. Therefore, it is natural to expect error in both area computation and the shape of the plot in the map
- New Cadastral Survey: - A new cadastral survey was carried out with cooperation with Cadastral Survey Party (Napi Goswara) using geodetic control points as described above. The new cadastral plans of the area are prepared at the scale of 1:500, digitized and overlaid on the topographical map. The surveying method used are tapes for distance measurement and plain table surveying for the preparation of the cadastral maps. These plans with existing plots and topographical details are used for planning.

5.2.3 Land Records

The land records are field book, plot register and ownership records, and cadastral plans. The field book consists of the records of parcel number by each ward of Municipality or Panchayat (VDC now), name and signature of tenant, name and signature of land owners, adjoining parcel numbers land use, land class, area, date of survey and remarks by tenant and survey office (in remarks column).

The Photocopy of field books and plots register and list of owners were received from respective offices e.g. survey office and Land Revenue Office of the district. The area of parcel and owners are checked with records as well as re-measuring the areas from existing maps and new maps.

The average size of parcels is calculated and generally landowner or tenants has 2-4 parcels either in one location or in different locations. The parcel sizes and their distribution are used to decide the plot depth of the block.

5.3 **Planning of Infrastructures**

The process of planning started by dividing the entire area into blocks by roads. Plots for open spaces, parks, and community facilities are delineated. Other service industries like hotels, entertainment catering tourism, market place, IT parks be added to create job opportunities. The total area of such open spaces will be in the range of 3 to 5% of the total project area. The remaining area will be the residential mixed and commercial areas and future housing reserve area, which will be divided into smaller block areas by providing smaller roads. These smaller blocks will be subdivided into individual housing plots in such a way that each plot will have access to road, drainage, water supply, electricity, telephone.

5.4 Infrastructures

5.4.1 Roads

The width and right of way of the roads are designed based on the available norms and standards and are finalized after discussion with the users committee. The pavements are designed based on prevailing engineering practices. Thickness of the base course will depend on the property of the sub-grade. Construction works are carried out without disturbing the environmental situations. The stakeholders will decide which costs are to include for the purpose of deriving the contribution ratio.

The design speed is of 60km/hr and 40km/hr for main road and other roads respectively and maximum gradient of the road is 1:10. The road will be planned on the basis of land use, road type (one way or both way) and number of service plots on the road hierarchy basis. The 9 m diameter and 12 m. hammerhead will be maintained to junction of road longer than 25 m. The width of road on commercial and institutional areas will be better than 9 m.

The road hierarchy will be as following: -

- Main Road 11 m.
- Secondary Road 9 m.
- Small Road 7.5 m.

5.5 Drainage and Sewerage

The storm water drainage and domestic sewage both will have to be taken care of by providing sewers along each road. There will be serious problem of flooding by rainwater in the southern part of country during the monsoon period. Adjoining to town have problem of sewerage and waste pollution problems. Many culverts along the main roads and highways require to be fully operational during the period. It is required to separate the drain water and sewerage and treat them before interring into the stream or river. The suitable methods of treatment and locations Sewerage Treatment Plants are planned. It is required to reserve land for settlement of the persons affected from the plant. The sewerage line will run mostly along centre of the road.

5.5.1 Electricity

The supply of electricity and high-tension lines are critical for planning. The electricity authorities are requested to provide sufficient electric power and generally, single pole 11 KVA lines are translocated along the main road. The roads and open spaces are planned along the HT lines.

5.5.2 Drinking Water

The existing ancient stone waterspouts are repaired and used. The potable (drinking water) are supplied from existing system, however, it is usually the municipality lacks capacity of reservoirs and; hence it needs land for water tank. The land pooling areas have population of

about 300 population/ha, which needs about 100 litre/day/person of potable water. The pipeline will be placed along the footpath / sidewalk area.

5.5.3 Other Infrastructure Facility

Telephone: -The telephone line will be provided along the footpaths of along the main road. The main lines with cabinets will be extended to the area.

Education: - The land for schools is allocated as per standard norms which required quite high quantity of land.

Health centre: - It is propose to have land for health centre with OPD and emergency check ups and have referral facilities to the nearest hospital. It will have 1-2 plots at the centre of the areas.

Open spaces: - There will be land for open spaces at the central every major block. As per requirement 3- 5% percent of area will be assigned for open spaces and green belt the steep sloping areas as well as other places. The green belt will be planned around the river banks and steep sloping areas.

Community area: - The following community area like, temple, library, auditorium, market places, will be assigned. The information technology area, market areas, bus/ car parks area sae assigned. The open spaces near the temples for cultural activities like marriage and other ceremonies, cemetery/ crematory and inns for mourning near waterspout. The archaeological, religions monument and sites like historical temple, inns, spouts, wells are renovated and conserved with the participation of local people as well.

5.6 Block Planning

5.6.1 Project Approach

The land pooling is done on the approach of land consolidation principle after analysis of topography, parcel size and consolidation of scattered parcels of a family. The block are divided on the basis of

- Plot size
- Number of Houses
- Pressure of urbanization and
- Reserve area.

The special emphasis will be given to the following matter to layout block and plots.

- Access to highway and planned roads
- Junction points
- Existed buildings and infrastructures
- Natural topography and slopes

- Environmental situation (greenery, open space, canals)

The blocks are generally designed longitudinal direction of main roads and the distance between two open spaces will be 100-200m. The width of road will be at least 7.5 m. except the existing houses with 1.5m set back. Very few houses will be demolished.

5.6.2 Sub Division

The blocks are subdivided to provide access road to each plot and open spaces are located centrally and planned clusterly in order to have social harmony.

5.6.3 Block Layout

The blocks are laid out to have plots of minimum size 80 sq m and frontage of 6 m and the depths of the blocks varies 30m to 50m depending on the parcel sizes of land owners. The frontage also depends upon the plot size. Generally plot depth will be 2.2-2.5 times of frontage and will not exceed of the 3 times of frontage.

5.7 Contribution Ratios

Each landowner will share the cost of the project by contributing part of his land area. How much land he will have to contribute will depend upon the total cost to be shared by all the landowners, value of the land after the project and the land covered by the infrastructure and the open spaces. The net area of the developed land plots to be distributed back to the owners will be the total original area less the area occupied by the infrastructure and open spaces less the area of the service plots. The contribution ratio is the ratio of the net area to be returned back to the total original area.

Contribution Ratio (CR) = Net area to be returned back / Total original area.

Contribution ratio and land to be returned to land owners/tenant will be as following:

1. Land be returned same locality/ place
2. The minimum parcel area and frontage should be less than 125 m² and 8m respectively
3. The land less than 80 m² will be added to make more than 80m² with more than 6m frontage and returned to related owners on the price fixed price by the project.
4. The frontage of corner plot will be assigned as per the contribution by the larger road and smaller road. The contribution will be deducted from the calculation of both roads.
5. Corner plot assigning will be done as far as possible the original corner place.
The contribution for the road will be calculated on the basis of additional land required for the road. e.g. the existing road is 3m and new and new road is developed 11m. Hence the plot required to contribute will be =(width of new road-width of existing road) x the frontage of the plot.
6. The set back area of 1.5 m is kept for the existing houses along the window sides.
7. The contribution ratio will be calculated on the basis of plot depth/frontage and table will be prepared. The generally plot depth will be generally 18- 25 m.

8. The contribution ratio will be calculated by reducing existing road up to the plot depth and after ward equivalent reduction of exactly of footpath.
9. Community area and owners plot will be assigned first and sales plots will be decided later.
10. Provision on high tension line
 - The cost of moving (11 KVA, single pole) high-tension line will be borne by landowners of effected plots.
 - The non-construction of area under the high-tension line will be used for construction of roads. 10% of the land will be deducted from the owners.
 - Set back will be left as per the regulation.
11. The plot less than 200m² will be consolidated and returned to the owners.
12. The averages weightage of 1 m footpath will be given to the plot near the canal, streams and other common land.
13. Developed plots will not be allowed to subdivide the plot to the smaller than area and frontage fixed by the project.
14. The develop plots will not be allowed to provide access to the plots adjustment to the project area.
15. The adjoining plot of open spaces requires to contribute 1% of its land.

5.8 Determination Priority of Location of Plots

The land owner/ tenant will be allowed to choose his plot with the following priority:

- Land owner with existing house or land preparation,
- Land owner/tenant of corner plot of the same block,
- Owner of land of same location,
- Land owner of consolidated parcels located 2 or more than 2 different locations,
- Plot size smaller than 80 m².

5.9 Financial Analysis

5.9.1 Cost Estimates

The unit rates of labour and material were obtained from the District Development Committee. Rate analysis be carried out based on the prevailing norms using the district rates. Quantity of each of the items designed will be taken carefully and precisely. Finally cost per metre of each type of road (earth, gravel and blacktop) be found out. Cost estimates of parks and other community facilities will also be carried out.

5.9.2 Total Project Cost

After computing the cost of each of the project component, total project cost will be estimated. The cost and the mechanism for sharing the cost will be thoroughly discussed in the meeting of the stakeholders. The meeting will decide what portion of these total cost is to be borne by the users. The valuation of the developed land plots will also be decided by the meeting. Then the area of the developed plots required to cover up the cost will be worked

out. This area will be considered as the service plots and part or whole of the cost of the project will be recovered by selling these service plots.

5.10 Preparation of the Final Land Records and Map

5.10.1 Replotting of the New Cadastral Map

After the decision of contribution ratio, the final cadastral map will be prepared in consultation of landowner with the exact sizes of plots to be returned back to the landowners. The new plot numbers and area will be assigned to them. The Field Books are prepared along with the new map. The map will also be plotted with dimension and area of parcel and in colour assigning different colour to the residential plots, service plots, parks and open spaces, roads, community facilities (sports centre, entertainment centre etc.). The new land records are checked and adopted.

5.10.2 Demarcation of the Plots in the Field

The planning completed in the map will be replicated in the field by demarcating all the plots with concrete monuments about 0.5m high for the block boundary and the individual parcels as well as the area of parks and community centres.

6. PROBLEMS AND WEAKNESSES

The land pooling is a time consuming work and is carried out with consultation and concurrences of many stockholders. The approval process is long and implementation of programme is effected by various factors. The weakness of land records and efficiency of staff also effect the progress of the programme, which will further adds the inconveniencies to the land owners.

The mean weakness of this programme is that it does not consider the provision of the land to landless and poorer families of the area.

7. CONCLUSION AND REMARKS

The land pooling is one of best solution of solving problems of provision of comfortable housing and infrastructure development without external funds. Despite the hardship during the implementation phase, generally residences are always happy after implementation. The land records are updated, tenancy secured and comfortable shelter developed. More surveyors and land managers are required to train to carry out such works.

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