

Participatory Land Use Planning as a tool for Disaster Risk Mitigation and Sustainable Land Management: A Case Study

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Abstract

Participatory land use planning (PLUP) generates actual opportunities for the diversity of stakeholders to articulate their concerns, requirements and proposals, and to test and evaluate their own solutions accordingly. This paper describes the practical steps of a participatory land use planning process undertaken as a pilot in three different VDCs in Nepal. This study analyzes the strength of the process and demonstrates the participatory process as an effective tool of land use planning under the guidelines of the National Land Use Policy 2012. It highlights the value in hazard risk management at the local level in addition to a rational use of land for sustainable land management. The critical driving factors in the process are discussed in the paper. The work also responds to local needs in rationalizing use rights of resources amongst competing local groups such as farmers, livestock keepers, squatters, businessmen and land developers. Consequently the study identifies the VDC level land use change dynamics and enables local people to be fully involved in facilitating their own planning process in data collection, land use zoning and documentation. The study recognizes land and resources, challenges, opportunities and solutions of the study area and documents a needs-driven land use planning and implementation process. The study confirmed the importance of a participatory land use planning and management process as a tool for disaster risk reduction and sustainable development. In the aftermath of the devastating 2015 Nepal earthquake a large-scale rehabilitation needs are foreseen. While environmental and economic aspects are important in this respect the socio-cultural and human aspects need equal attention and this can be catered through a participatory land use planning process. The experience of the PLUP project in the three VDCs discussed here is considered valuable.

1. INTRODUCTION

Participatory land use planning (PLUP) is an iterative process based on the dialogue amongst all stakeholders aiming at the negotiation and decision for a sustainable form of land use in rural as well as urban areas for initiating and monitoring its implementation (GTZ 1999). It is also based on stakeholder differentiation and gender sensitivity and to identify all relevant stakeholders, a gender differentiated analysis of

all actors also becomes necessary (GIZ, 2011). As an activity that envisages future land management through a mix of top-down and bottom-up approach, such a land-use planning is recognized not only as a key instrument for achieving sustainable development but also as a tool to mitigate risks due to natural disasters and man-made disasters like conflicts on usage and tenure of land. Land-use planning policies are very much recognized for their capacity to improve the livelihoods of informal settlers, the forest-dwelling communities and rural poor by ensuring sustainable land-uses prerequisite to poverty alleviation (FAO, 1993).

PLUP can be a powerful tool for capacity building, empowerment and conflict resolution when communities are really partners in the process and their interests are central. For external facilitators, such ‘bottom-up’ processes require deep levels of local knowledge, long-term relationships, and a well-established physical presence. Decentralized organizational structures, for example the use of field officers from target communities, can help promote meaningful local participation and control of development processes as well as the sustainability of external forms of support.

PLUP is meant to ensure that local land users are given the opportunity to play a central role in decision –making processes concerned with the land and resources they use and do depend upon. PLUP brings stakeholders together to develop a common vision and to agree upon a way forward – and as part of this process land-use conflicts could be resolved. In particular, it provides an opportunity for marginalized groups including women and vulnerable groups to take part in decisions regarding optimal and effective use of their personal and communal land.

As part of a catalytic support on land issues a participatory land use planning process was developed and tested in Nepal. This study analyzes the strength of the process and demonstrates the participatory process as an effective tool of land use planning under the guidelines of the National Land Use Policy 2012. It highlights the value in hazard risk management at the local level in addition to a rational use of land for sustainable land management. The critical driving factors in the process are discussed in the paper.

1.1 Project Background and Project Area

UN-HABITAT in association with UNDP and IOM is implementing a UN Peace Building Fund (UNPBF) funded *Catalytic Support on Land Issues* project aimed at contributing to the development of a mechanism to peacefully address disputes due to competition for access to land and the use of the limited resources as well as creating conducive environment for political leaders to develop a national transition plan for implementation of land reform and land return in order to reduce land related conflicts in the country. The UN Peace Building Fund is a global UN multi-donor trust fund supported by over 50 international donors and these funds are managed through the UN Peace Fund for Nepal (UNPFN). As part of the project Participatory Land Use Planning and Implementation in Latikoili VDC of Surkhet, Amrout VDC of Nawalparasi and Jhorahat VDC of Morang under a hierarchy of national, district and local level planning were conducted. The land use planning was proposed to be developed under the framework of the National Land Use Policy (NLUP) adopted by

the Government of Nepal in 2012. This study was undertaken as a test-bed for implementing NLUP and in compliance with the international best practices. The main stakeholders at the central level are the Ministry of Land Reform and Management, Ministry of Peace and Reconstruction and the National Land Use Project while the major stakeholders at the local level include the district and Village Development Committee (VDC) level Land Use Implementation Committees and the line agencies like Land Survey Offices, Land Revenue Offices, Land Reform Offices, Forest Offices etc additional to the land owners, land users, local communities and civil society in general.



Figure 1: Proect Area

1.2 Methodological approaches

Available data and information on existing land use and land cover and changes were gathered from different sources. Detailed information on and for the local land use planning was gathered and generated during the ground surveys through consultative process like enumeration, observation and questionnaire surveys.

- Collection of satellite imagery of the area of interest for the collecting of geospatial data on present land cover/use. The images were further used for preparing land use zoning map.
- Consultation with local people in order to identify their view, understanding, and aspirations regarding land use planning. Special attention was given to ensure the social and gender inclusion during the consultation. Participation of women was important because they are the major user of natural resources in Nepalese family system. These consultations helped in understanding the knowledge gap in the local community regarding the benefits of land use planning,
- Indigenous knowledge were collected on the traditional land use system for the given area through interaction with elderly persons of the respective area,
- Societal views were collected on the need of land use planning or societal aspirations regarding land use such as land consolidation,
- Thematic data were collected for the analysis of suitability of soil or stability of the land for different purposes like agriculture or residential purpose etc.
- Additional to socio-economic data produced by Central Bureau of Statistics and the VDC profile necessary disaggregated data were collected through questionnaire survey,

- Geographic Information System (GIS) and database for establishing Parcel Based Land Use Information System were developed. The GIS and the database were incorporated all set of data acquired in spatial context. Field work was required in order to verify the processed data before finalization of the database. Assessed data for the assessment of the suitability of land, alignment of local needs in the system, and prioritization of land use options. The GIS and database developed as mentioned above were used for this purpose.
- The results of the project activities are shared and advice about the use of Open Source GIS software and low cost data for the preparation of land use plan is important for developing country. In this study we have made a plan to apply open sources software and low cost or archive satellite images at least one project site that is Amraud VDC of Nawalparasi district and compared the result of NLUP and PLUP project.

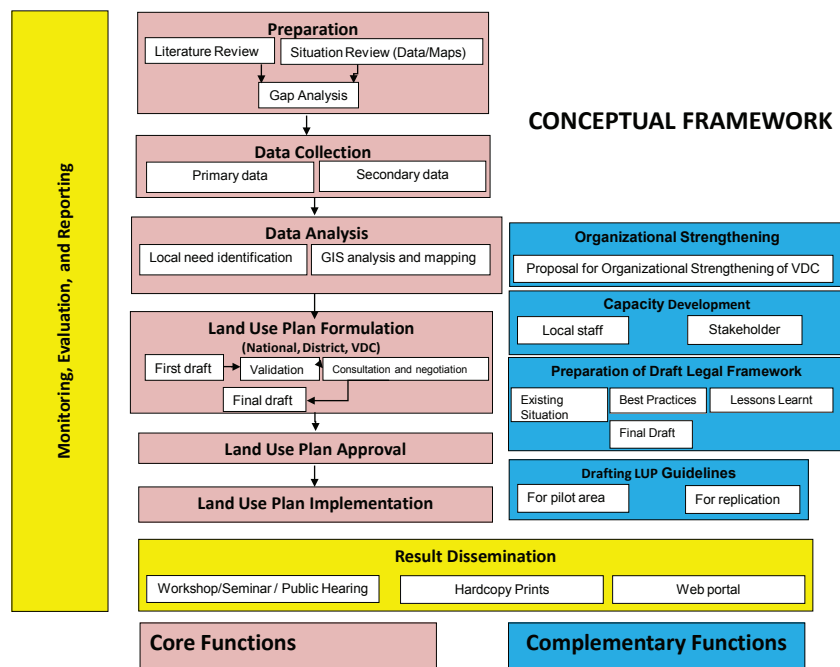


Figure 2: Conceptual framework of PLUP

There are many methods of land use planning. Many countries and authorities have experimented with top-down planning, whereby technocrats, politicians and authorities impose “plans” and measures on the local population. Quite often development agencies including Government bodies and NGO’s as well design and execute rural development plans without much involvement of the main stakeholders. Such top-down planning approach has the advantage of speedy implementation, particularly if backed-up by effective controlling state agents or by direct financial incentives. A great disadvantage is that many stakeholders may not understand the plan or not agree with it and actively or passively sabotage it.

The project areas were identified as a representative sample VDCs which could represent other areas of the country as well. Project areas were selected where we could see urgent needs of land use planning, and also representing different topography, land system, land use and land cover in the country. Similarly, to work in participatory way, with the different people with different socio-economic, cultural, regional and ethnic setting, different study areas were needed. Project made a combination of both land use planning approaches, the Top- down approach and the Bottom- up approach, called a participatory approach in all the three VDC.

1.2.1 Consultation

Enumeration of reflections from the stakeholders and community people: Mobilization of concerned stakeholders and people from the community of the project VDCs land use planning was an important component of the project. A series of consultation meetings, seminars/workshops, orientation/trainings, project review meetings, ward level interactions and field visits were organized at the center, district and VDC levels with the stakeholders and community people with a view to (i) sensitize them about the need for land use planning, (ii) involve them in land use planning by enhancing their knowledge through capacity development programs (iii) enumerate their problems, needs, and aspirations, (iv) adjudicate land zoning maps, (v) generate indigenous knowledge of land use in the project VDCs (vi) validate draft VDC land use plans, and investigate possible risks/impacts to be encountered in implementing land use plans and measures to resolve them.

1.2.2 Existing Legislative Framework

The Government of Nepal has adopted the National Land Use Policy 2012, and issued the Land Use Program Implementation Directives, 2012. Both these policy and directive were yet to be implemented successfully. People's participation is crucial in land use zoning and planning process at all levels to implement it effectively. It was essential because most of the people are yet unaware about the zoning and planning process, and they would not agree with the plan outputs being made without their participation in the process to which the land use plan is being prepared. They hesitate to "own" the plan as they are not "involved" in the planning process. Some existing legislative frameworks are:

- National Land Use Policy 2012 is adopted by the Government,
- Local Self Governance Act, 1999 and Regulations, 1999 have strong, provisions for the responsibility of local government bodies to undertake work on land use planning and its implementation,
- Land use issues have got priorities in national planning documents in recent years, such as current Three Year Plan (13th Periodic Plan) of the GoN focuses on the implementation of land use related programs,
- Land Use Programs Implementation Directives, 2012,
- Land Act 1964,

- Report of the High Level Land Reform Commission 2051 BS (Keshav Badal) submitted in 1996,
- Report of the High Level Land Reform Commission 2065 BS (Haribol Gajurel) submitted 2011,
- Report of the High Level Scientific Land Reform Commission 2067 BS (Ghanendra Basnet) submitted 2010.

2. PREPARATION OF LAND USE PLAN

The land use plan of Latikoili VDC is formulated by using participatory planning approach with intensive involvement of community people and all VDC level stakeholders concerned with the issues of land use under the professional guidance of land use planner and other sector-specific experts associated with the project and the members of district project team. The land use plan of this VDC provides an insight into the present level of misuse, overuse and under use of land and depicts a five year vision of opportunities and potentials to be exploited for the benefit of local community people. Specifically, the plan has also detailed out innovative schemes such as land consolidation and alternative schemes to compensate the farmers who are affected by the changes in the categories of their existing land parcels. The responsibility of addressing land use issues has been shouldered upon the Village Level Land Use Implementation Committee (VLLUIC). This Committee has to respond to the circular issued by the Ministry of Federal affairs and Local Development (MoFALD) to local bodies to implement land use plan and community compliance that has been generated through series of Ward level interaction programs. Hence, it is imperative that the VLLUIC develops a mechanism to integrate the land use planning process and its implementation with the VDC level planning framework and ensures that land use plan becomes an integral part in periodic and annual VDC plans. The group of project experts (including land use planning, agriculture, forestry, soil, irrigation, natural resource management, socio-economics experts among others) carried out the review of relevant national sectoral policies, district plans, and master plan of district and VDC projects. The normative directives issued by the government in sectoral issues were also reviewed. A draft of VDC level land use plan was formed on the basis of the primary data and secondary information. The VDC land use plan was formulated by the involvement of professional thematic experts in consultation with district and VDC level stakeholders in all concerned government stakeholders and communities concerned with land use planning. The VDC land use plan, among others, annexed detailed maps in the scale of 1:10000 which included present land use map, soil map, land capability map, land suitability map, land use zoning map and cadastral superimposition to identify land parcels falling in certain zoning category. The map also highlighted VDC infrastructures like roads, water resource utilization projects, land cover/land use, land use zoning etc.

2.1 Land use pattern

The thematic data such as soil data required for the analysis of suitability of soil or stability of the land for agriculture or residential purpose were gathered in course of site visit.

Soil profile description was performed on the basis of FAO and USDA soil profile description guidelines. Based on the horizons developed in the profile, each horizon characteristics were recorded on the standard soil profile description sheet developed by the National land use program. Soil sample data have been collected on the basis of the polygons developed in the laboratory and pits located on the polygons with GPS location.

Based on the spatial analysis of soil, climate, and topographic parameters, to differentiate the land in arability class and deficiency type and sub-type unit by using GIS tool. A multi-criteria evaluation rule was developed to classify land units based on soil parameter, fertility, erosion susceptibility, terrain constraints and surface drainage (wetness). The present soil suitability analysis adopted the basic principles of land evaluation. FAO framework for land evaluation is based on evaluating land conditions according to the specific requirements of the defined types of land use. The structure of soil suitability assessment includes Order, Classes, Sub-classes. Orders (S, N) reflect the kind of suitability. Classes (S-1 to 3 under S and N-1 to 2 under N) reflect the degrees of suitability within Orders. Land Suitability Subclasses (S2m, S2e, S3me under S and N1m, N1me under N) reflect kinds of limitation. The level 1 categories of the land use are such as Agricultural area, Residential area, Commercial area, Industrial area, Forest area, Public services and other lands are classified as recommended according to the specification of National Land Use Project (NLUP).

Table 1: General land use pattern of three VDCs.

S.N.	Land Cover	Latikoili, 2012		Amraut, 2013		Jhorahat, 2013	
		Area (ha)	Percent	Area (ha)	Percent		
1	Agriculture	16.28	24.43	8.70	80.97	8.49	86.46
2	Forest	45.34	68.02	0.54	5.01	0	0
3	Industrial	0.04	0.06	0	0.00	0.12	1.22
4	Commercial	0.29	0.43	0	0	0.04	0.41
5	Public Services	3.37	5.06	0.42	3.91	0.58	5.91
6	Residential	1.33	2.00	0.93	8.64	0.59	6.00
7	Others			0.16	1.47	0	0
	Total	66.65	66.65	10.75	100	9.82	100

Source: Satellite Image, 2012, 2013 and NLUP, 2013

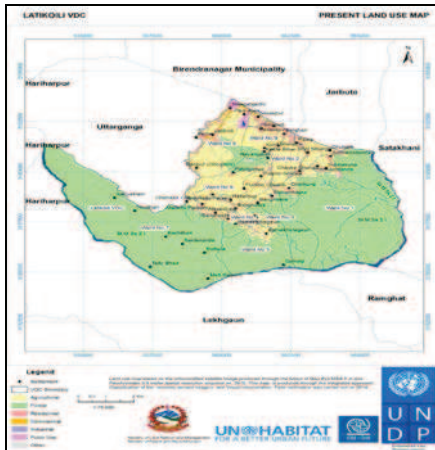


Figure 3: Land use map of Latikoili, VDC

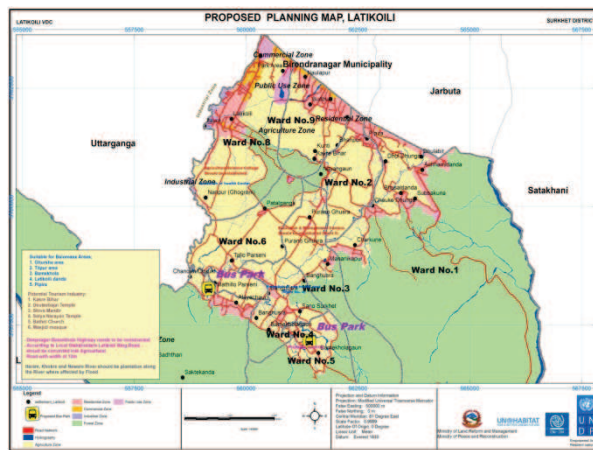


Figure 4: Land Use Zoning map

2.2 Formation of VDC Level Land Implementation Committee (VLLIUC)

A group which is representative of all important stakeholder groups should carry out the land-use planning process. The group members were formulated according to the guidelines of land use policy 2012. However, in some cases it may be necessary to also include non-local stakeholders who have an interest in the land and the land -use planning process. Land use policy 2012 indicates how the process is carried out and who should be involved, e.g. it formulates that the process is led by the elected VDC (represented by a government official, the Village Secretary, in the absence of the elected body during the project) and represented in the Committee are several other government officials and nominated members. VDC Land Use Plan Implementation Committee (VLLUPIC) as per the provisions made in Land Use Policy 2012 in each of pilot VDCs undertook participation in the land use planning.

Formation of the Village Development Committee and Municipality level V/MLLUIC is provisioned in the Land Use Policy as 2012 following:

Chair	Chief, VDC or Municipality
Member	Chairperson, concerned Ward
Member	Agricultural Technician at district agriculture development office responsible for concerned VDC/Municipality
Member	Forest Technician at district forest office responsible for concerned VDC/Municipality
Member	Person at District Land Reform Office responsible for concerned VDC/Municipality
Member	Person at District Land Survey Office responsible for concerned VDC/Municipality
Member	Nominees (2: at least one woman)) of VDC/Municipality from local NGOs and intellectuals
Member Secretary	Secretary/Chief of Planning Section at Municipality

This Committee is mainly responsible for:

- Implementing land use programs/activities at local (VDC /Municipality) levels
- Getting needed technical support from District Land Survey Office for preparing land use maps, formulating land use plan and other implementing activities

- Mobilizing all concerned agencies to provide needed resources to the District Land Survey Office

Although this framework has been made in the national land use policy 2012, necessary legislative provisions to support its effective functioning are still awaited for exercising full statutory authority for implementing the plans prepared.

2.3 Preparation of Land Use Zoning Maps and Adjudication of Land Use Zoning Maps

Land use Zoning maps are used to mark out areas designated for specific types of land use, so that people developing land know which kinds of uses are allowed by land use regulations in a particular area. The creation of zoning maps is part of the overall process of community planning, in which communities decide how they want to develop their land and vicinity in the future. Zoning decisions could include assigning land for uses like setting aside green space, isolating industrial areas, agricultural and residential areas and so forth. Another type of land use map is a map which shows utilization. Utilization maps are often used in zoning decisions to determine whether or not zoning changes need to be made. Land Utilization maps show how land is being used, and may also indicate historic utilization information, and provide information about how long land has been developed. In this context, this study is being carried out for the purpose of preparing land use zoning maps and implementation of land use policy for getting optimum benefits from land in the national and local level. In this project, the land use zoning of Jhorahat, Latikoili and Amraud VDCs were proposed for the coming 5 years (2015 to 2020).

The research highlights the need to improve the participatory nature of LUP and advocates that the elaboration of land-use plans should be directly derived from the local stakeholders' views. The land management activities should also be adaptive and allow for different ethnic groups to voice their needs with an equal representation of women and men in the different stages of decision-making. Prior to the zoning process, villagers' rights to exploit the resources to their own benefit and to modify their landscape through land-use planning have to be clarified for the entire village community.

The scope of this project is limited to

- Studying the existing relevant maps, documents, and database of the project area
- Preparing land use zoning maps of the selected VDCs at 1:10000 scale outlining different zones and sub zones as per the National Land Use Policy 2012
- Discuss with local people about the settlement history, remarkable land use changes in past, need of the scientific land use plan and local aspirations and their opinion regarding the proper management of the land resources.
- Designing appropriate GIS database logically on land use zoning for the selected VDCs

- Discussing accuracy, reliability and consistency of data

In that respect, the land use planning formulation in the area outlining cultivated or settlement areas etc was widely discussed. The land use zoning maps have been validated after wide discussion with local people and other stakeholders.

Planned land use zoning map was superimposed with the cadastral map and verified in the presence of representatives of District Level Land Use Implementation Committee, VDC Level Land Use Implementation Committee, other governing bodies like Land Revenue Office and Survey Office, and other relevant stakeholders. Present land use map was also considered as reference data/ map for land use zoning verification purpose. If any conflict comes in land use zoning data/ map, these conflicts were minimized with reference to the present land use map and other land resources data such soil data such as soil physical and chemical properties as well as land capability data/ maps. Verified land use zoning data/ map were carried out by the overlay of cadastral layers in land use zoning data for superimposition purpose and each land parcel was assigned proper land use zone by process of spatial analysis and attribute tagging in cadastral layer as land use zoning class.

2.4 Earthquake disaster management Approach

Recently the devastating earthquake hit on the 25th of April, 2015 at 11.56 am, local time with the magnitude 7.6 (as recorded by Nepal's National Seismological Centre (NSC)) followed by more than 400 aftershocks of more than magnitude 4, the largest among subsequent them with the magnitude of 6.8 on 12th May, 2015 at 12:50 pm local time, with the epicenter in Barpak VDC of Gorkha district and Sunkhani VDC of Dolakha district respectively. This was the most powerful earthquake in Nepal in 80 years since 1934. The earthquake has created an unprecedented situation by significant human loss, physical damage and crisis, affecting the country's most populous areas along with economic and administrative centers and numerous villages in the districts. The earthquake and consequent aftershocks have resulted in more than 8,969 deaths. More than 800,000 houses (private and government) and several infrastructures of cultural and historical importance are partially and completely smashed (drrportal.gov.np). It is estimated that the lives of eight million people, almost one-third of the population of Nepal, have been impacted by these earthquakes. Thirty-one of the country's 75 districts have been affected, out of which 14 were declared 'crisis-hit' for the purpose of prioritizing rescue and relief operations; another 17 neighboring districts are partially affected (PDNA Report, 2015). The total estimated damage is US\$5174 million and loss US\$1890 million (total US\$ 7065 million) out of which around half is related to housing, land and human settlement sector. Several housing and settlements were reported for review to ensure the disaster resilience of the entire community keeping in mind aspects of location-based vulnerability. The data for clustering of dwellings to safe locations in all the affected districts need to be carefully verified. Such clustering cases require a very careful and detailed analysis of landslide risks and socio-economic impacts in close consultation with the communities.

During the land use zoning phase basis are established for an appraisal of potential hazard risks in the VDC level. To this end, the study reviews of recent experiences of

earthquakes which are significant now and which might be of particular relevance for the coming decades. From these, the study draws some lessons for disaster preparedness and mitigation policy, considered in a holistic way. Landscape visualization and learning tools have been developed to support land-use planning activities and help local people elaborate their own views based on a simple representation of the landscape.

In this context, land use planning is instrumental in addressing the challenges posed by natural hazards (ex: earthquake) on built environment. Through land use planning, vulnerability parameters can be modified to reduce risks. With its array of regulatory and non-regulatory techniques and mechanisms, participatory land use planning can become an effective tool for disaster risk reduction through the use of disaster risk information in land use planning.

2.5 VDC Level Land Use Plan Validation

Once the views and ideas from the entire community have been incorporated, the plan should be verified and approved by the VDC level land use plan implementation committee. They consisted of Members of VLLUIC including Village Secretary (as Chairperson); communication media; center and district level project team members; and representatives from MoLRM.

2.6 Decisions on implementation of VDC Land Use Plans

For implementing the land use zoning plan, conducive legal aspects such as law, rule and directives are essential; experience showed that the existing legal framework on land use planning were insufficient. Also for implementing the land use zoning plan, it needs to motivate public by awareness of this plan and provide them with some incentives for adhering to the proposed land use.

The central and district level project team management visited all three project VDCs to deliver the VDC land use plans and results of soil tests, land zoning/other maps, reports on land consolidation schemes and alternative incentive schemes for the farmers to be affected from new land parcels based on six categories of land etc. The team also facilitated to organize meetings with VDC level land use implementation committee. In the meeting all the reports and relevant documents pertaining to this VDC were handed over to this committee by the project management team during the meeting. It was decided that the decision of implementation of land use plan would be endorsed in the forthcoming VDC/ Municipality council meeting.

3. CONCLUSION AND RECOMMENDATION

A detailed participatory land use planning process has been tested for the first time in Nepal. This is the process of qualifying and quantifying the activities of land use planning.

Land-use management and planning practices that reduce disaster risks are part of larger risk scenarios, best considered in local community contexts. Land-use

management and planning practices that reduce disaster risks are part of larger risk scenarios, best considered in local community contexts. Regulatory approaches, which emphasize land-use planning to reduce future disasters and maintain the sustainable development of VDCs and municipalities and it is essential to use of Open source technology for the preparation of Land use plan in developing country like Nepal.

Nation has learned lesson from the earthquakes of April 25th and May 12th, 2015 and realized that such loss could have been avoided if there were proper land use planning in place. With a month or so the Ministry of Federal Affairs and Local Development (MoFALD) issued a circular to all local bodies (DDCs, Municipalities, VDCs) of the nation to initiate the process of land use planning and its implementation. Likewise, the Development Committee of present Constituent/Parliamentary Assembly in one of its meetings has also instructed the government to take up the implementation of land use planning with great urgency.

Land use planning and its implementation has been very much emphasized in Nepal. Nation has learned lesson from the earthquakes of April 25th and May 12th, 2015 and realized that such loss could have been avoided if there were proper land use planning in place. With a month or so the Ministry of Federal Affairs and Local Development (MoFALD) issued a circular to all local bodies (DDCs, Municipalities, VDCs) of the nation to initiate the process of land use planning and its implementation. Likewise, the Development Committee of present Constituent/Parliamentary Assembly in one of its meetings has also instructed the government to take up the implementation of land use planning with great urgency. For this purpose creating an environment for the ownership on the part of the stakeholders and also a strong legislative framework to enforce land use are as well essential. Participatory process as a mix of both top-down and bottom-up has been tested as an appropriate approach.

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