Terms of Reference (TOR) for Consultancy Services for Preparation of Land Use Plans including zoning with land parcel information of Rajpur Rural Municipality

Background:

Land is one of the immovable sustainable major resources, increasing population creates pressure to balance the carrying capacity of the land resource therefore, and its proper use is necessary for food production, residential and other uses as well as for any development activities occurs on land to increase the access to the land for socio-economic development. Land is a unique resource limited in supply but endless in the variety of its uses. It is a basis of socio-economic development of every country. For sustainable development of society, this resource should be wisely managed. Many countries around the world are nowadays paying their utmost attention to various land management issues for sustainable socio-economic development and environmental management. One of the most effective and widely used land management instruments is to develop land use strategy from the long-term perspective which will provide basis for controlling land use changes through the adoption of land use zoning and regulations.

Land use planning refers to the process by which a society, through its institutions, decides where, within its territory, different socio-economic activities such as agriculture, housing, industry, recreation, and commerce should take place. This includes protecting well-defined areas from development due to environmental, cultural, historical, or similar reasons, and establishing provisions that control the nature of development activities. These controls determine features such as plot areas, their land consumption or surface ratio, their intensity or floor-area ratio, their density or units of that activity (or people) per hectare, the technical standards of the infrastructure and buildings that will serve them, and related parking allowances. All of these provisions should be included in the jurisdiction's land use or zoning code. This code becomes the legal guide for landowners, developers, citizens, and authorities.

Rapid increase of population and urbanization experiencing land management issues reached to critical stage at both Federal, Provincial and local level in Nepal. The highly fertile agricultural land is going to urbanize unevenly around the fast-growing urbanizing areas and market centers likewise along the transport corridors from east to west and south to north. In many places, agricultural lands have been left unused and abandoned. The available land is also not being used on its optimum level. Crop production is not in accordance with the suitability and capability of the land in many areas. Encroachment of public and forest land especially in the Terai areas have resulted in haphazard and uncontrolled growth of squatter settlements contributing to the declining level of the ecological balance. Similarly, widely scattered unplanned and haphazard subdivision of fertile agriculture land as building plots in areas adjacent to major and minor road network

in most terrain districts is taking place everywhere also indicate that there is no control mechanism or instrument to regulate such activities. In many places, especially in the hilly and mountainous land, uncontrolled and rampant human activities have contributed to the accelerated pace of natural disasters such as landslides and flooding. Consequently, Nepal is subjected to serious threat of facing problems related to food security and hunger in future. Similarly, unplanned settlement and unhealthy habitat, lack of basic infrastructure and services, natural disaster, and environmental degradation are other serious challenges already faced by the country. If these issues and problems are not addressed in time, it may invite a major disaster for the country from the perspective of food security and hunger, health risks due to environmental degradation and other unforeseen natural calamities.

Nepal being a developing nation, massive urban land has been encroached as slums and real estate market has been well flourished since last 2 decades specifically in large municipalities and fringe areas. Almost all economic activities in these areas depend on lands and so is the pivotal for economic development. There has been existed unsystematic and unhealthy real estate business in the absence of effective land use planning and zoning. The utility services are also very poor in the developmental areas due to lack of updated planning and monitoring. All these facts have resulted serious problems on settlement pattern and has deteriorated the urban-rural environment. The state being the guardian, it needs to pay serious attention to face, overcome and tackle the ever-growing problem.

Land use is one of the priority sectors of Government of Nepal (GoN) which can be visualized from the different official documents. Most of these documents have mentioned on short term policies and in some cases, it succeeded with partial implementation of the policy as well. To address the land use sector, the eighth fifth year plan first time has identified a long-term program. The ninth fifth year plan has focused for sustainable development of land and natural resources for preservation and extension of ecological sectors (Ninth Plan, 1998). This plan has identified the need of the formulation of land use plan based on the land form, climate, soil etc. as well as in agricultural production, environment preservation and other facilities, sectoral development and increase the public awareness on importance and role of land use plan. In the same way, the tenth fifth year plan focused to the formulation and activation of land use policy to discourage the use of arable land to other non-agricultural purposes and creation of national geographic information database related with land resource maps. However, it is necessary to devise a proper land based planned land use map to correlate in the actual ground. In this context, the superimposed of cadastral maps on the land use zoning maps are necessary for implementing the land use policy. Intimate relationship of human civilization with land has been the content of world history. Land has always played very crucial and important role in the social, economic, cultural and political life of people and the nations. It is the land which has preserved the proof of human achievement and failure. But never in the history of mankind has land been such a crucial issue as today. The land issue has developed in the

context of explosive urbanization that has taken place as a result of mankind's great achievement in the fields of science and technology (Chhetri, 1986). It has become now clear that land has become a scarce resource that must be wisely and carefully allocated if the environment of man is to be improved.

Land use planning should be a decision – making process that "facilitates the allocation of land to the uses that provide the greatest sustainable benefits". It is based on the socio-economic conditions and expected developments of the population in and around a natural land unit. These are matched through a multiple goal analysis and assessment of the intrinsic value of the various environmental and natural resources of the land units. In the simplest planning situation, that of new land settlement land units can be allocated to specific uses. Settlers are then brought in, and at least initially, required to practice those uses (GTZ, 1995). Decisions on land allocation or land use recommendation for completing uses begin with a set of policy guidelines, for example – a minimum acceptable production of staple foods and fuel wood, the preferred location within range of existing services and a limited amount of development capital. Sometimes, it is helped to set out the options in a goals achievement matrix and rank them according to chosen criteria. For the increasingly complex tasks of selecting sites for development projects, allocating land among several land uses, development policies on land use as well as allocating resources, hundreds of individual land units and many alternative land uses may have to be considered.

The decision-maker must take into account a variety of practical considerations, including-

a. The expressed preference of the local people
b. The interest of minority group
c. Mitigation of national policies
d. Some constraints such as land tenure, availability of source of data as inputs
e. The maintenance of environmental standards
f. Practicability for its potential implementing agencies
g. Costs and the availability of funding.

Rationale:

Local level is responsible for land use planning and its implementation. So, land use zoning is carried out on particular areas of land – what shall be done, where and when, and who will be responsible. It requires detail basic information about the land, the people and services at local level. However, Nepal has only regional level data base on land use, land system and land capability which were produced by Land Resource Mapping Project (LRMP, 1986). Realizing this fact, the Ministry of Land Reform and Management of Government of Nepal established the National Land Use Project (NLUP) in 2057/058 fiscal year to generate the necessary data bases on the land resources of the country.

The study is based on following conceptual framework:

a. Classification of the land into (1) Agricultural zone, (2) Residential zone, (3) Commercial zone, (4) Industrial area, (5) Mining and Minerals zone, (6) Cultural and Archaeological zone, (7) River and Lake – Reservoir zones, (8) Forest zones, (9) Public Use and Open space zone, (10) Building materials (Stone, sands, aggregate) Excavation zone and (11) Others zones as specified as per necessity as mentioned in the National Land Use Policy 2072 of the Government of Nepal.
b. Identifying and demarcating areas for potential residential, commercial, industrial and public use to support sustainable urban development
c. Identifying and classifying agricultural land into comparatively advantageous sub areas on the basis of quality of land, suitability and capability of land to increase the productivity

Preservation and conservation of natural resources including forests, shrubs, rivers and rivulets and swampy lands for environmental protection.

Objectives of the Assignment:

The main objective of the study is:

- ✓ To prepare land use maps, Soil maps, Land Capability maps, Land use Zoning maps, Cadastral Layer Superimpose on Land Use zone maps, Rural Municipal Profile, GIS database and Reports of Rajpur Rural Municipality.

The specific objectives of this study are:

a. To update land use map of Rural Municipality on the basis of existing land use by using available data sources in GIS.
b. To prepare appropriate GIS database of existing land use.
c. To prepare land use zoning map clearly showing different zones and sub-zones in accordance with the Government of Nepal Land Use Policy - 2072, Land Use Act - 2076, Land Use Regulations - 2079.
d. To prepare detailed report containing conceptual basis and methodology, criteria of land use zoning, distribution of different land use zones and data models of GIS database.

Scope of Work:

The scope of this project work is as follows:

a. Collect all the basic and foundational information from Rajpur Rural Municipality, National Land Use Project (NLUP), Federal and Provincial Government.
b. Collect/Download the geometric rectification of satellite image.
c. Perform necessary rectification of the given satellite image
d. Perform field work to collected relevant land use information.

e. Populate the given database with the extracted features.
f. Maintain the database as per the specification supplied.
g. Prepare present land use maps as per different specified hierarchical levels for the Rajpur Rural Municipality.
h. Discuss the accuracy, reliability and consistencies of data.
i. Prepare reports describing methodology, existing land use pattern and model of GIS data base.
j. Perform DGPS (Differential Global Positioning System) surveying to collect acceptable number of GCP (Ground Control Point) required for the geometric rectification of satellite image.

In order to achieve the above-mentioned objective, the study team shall carryout the following activities:

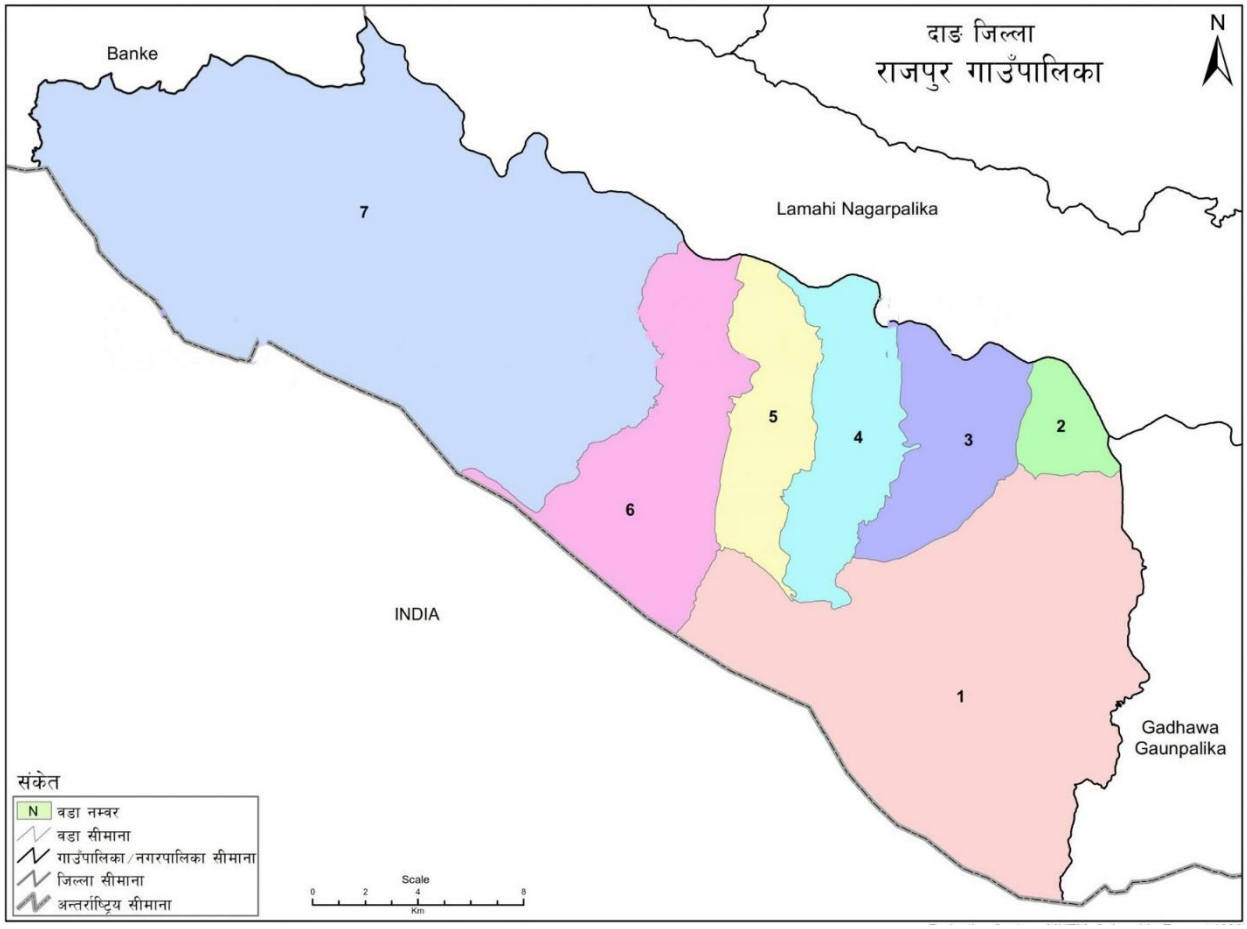
- Study of the existing relevant maps, documents, and database of the project area,
- Preparation of existing land use map of Rajpur rural Municipality in appropriate scale,
- Preparation of land use zoning maps of the Rajpur Rural Municipality at appropriate scale based on existing land use and field survey with clear demarcation of different zones and sub-zones as per the Government of Nepal Land Use Policy - 2072, Land Use Act - 2076, Land Use Regulations – 2079,
- Designing appropriate GIS database logically on land use zoning for the Rajpur Rural Municipality.
- Assuring accuracy, reliability and consistency of data
- Preparation of detailed reports, describing methodology, criteria and distribution of different land use zones and sub-zones with GIS data models and databases.
- Prepare Geological Maps of the Rajpur Rural Municipality at 1:10,000 scales. Identify different geological formation based on the field visit and taking the reference of existing geological maps.
- Prepare Land System Maps for the Rajpur Rural Municipality at 1: 10,000 scales. Sub divides the land system maps into different land units as per the specification supplied.
- Prepare maps of sample pits location covering each land unit/land type of the Rajpur Rural Municipality with coordinate points to be identified in the field.
- Carry out extensive field survey for field verification of land system maps and to collect soil samples from the pits and fill up of the soil profile description form.
- Analyze the physio-chemical characteristics of soils including nutrients based on the field survey as well as Laboratory test of the soil samples.
- Populate the given database with the analyzed, collected and lab supplied soil-nutritional and other parameters.
- Prepare reports describing methodology, distribution of different soil types and discuss the soil distribution of the area under study.
- Prepare Maps of N, P, K, Boron, Zinc, OM, Texture, and pH to attach in the soil reports of the Rajpur Rural Municipality.
- Prepare Land capability maps for the Rajpur Rural Municipality at scales by analyzing relevant data, maps, field samples and information of soil laboratory test

analysis.

- Prepare reports describing methodology, existing land capability types and model of GlS & data base.
- Prepare land use zoning maps of the Rajpur Rural municipality at 1:10,000 scale portraying different zones and sub-zones as per Land Use Policy - 2072, Land Use Act - 2076, Land Use Regulations – 2079.
- Prepare reports describing methodology, distribution of different land use zone/sub zones and model of GIS data base.
- Collect and prepare seamless cadastral maps of the Rajpur Rural municipality at standard scales.
- Collect land use zoning maps and present land use maps of the Rajpur Rural municipality at 1: 10,000 scales.
- Perform linear transformation of vector cadastral layer if necessary (only for free-sheet based cadastral maps) at the same time not distorting the scale of the original data.
- Prepare cadastral layer superimpose maps on present land use and land use zoning of the Rajpur Rural municipality at 1: 10,000 scale.
- Classify the cadastral parcels of the Rajpur Rural municipality according to present land use and land use zoning.
- Design appropriate GIS database logically on cadastral parcels with zoning characteristics and current land use of the Rajpur Rural municipality.
- Prepare reports describing methodology, distribution of cadastral layers as per land use zones/present land use and model of GIS data base.
- Collect necessary and available data/information from secondary sources.
- Carry out extensive field work to collect necessary data on physical aspect, soils and other land characteristics, agriculture and food production, infrastructures, social and economic condition, heritage, culture, tourism etc.
- Study the existing relevant maps, documents and database of the project area.
- Prepare Rajpur Rural municipal profiles describing physical, economic, social, historical, and environmental aspects, and land resource, agriculture, forest, livestock characteristics together with infrastructures and services for the land use zoning.

Study Area:

Rajpur Rural Municipality



Methodology:

a) The consultant should review all the relevant maps of the project area including LRMP maps, Topographical map sheets and documents prepared by the Survey Department of Nepal as well as relevant products prepared by other agencies.
b) The Rural Municipality present land use maps should be prepared from rectified enhanced high resolution satellite images originally purchased by consultant or provided by the NLUP office.
c) Ortho-rectification of satellite images should be performed in standard software generating Digital Elevation Model (DEM) and using Ground Control Points (GCP) collected through Differential Global Positioning System (DGPS). Location of GCPs should represent the range of elevation and the Root Mean Square Error (RMSE) should not exceed the Value of Two Pixel size of the satellite image.
d) The level one (1) category of the land use should be such as Agricultural, Residential, Commercial, Industrial, Forest, Public Use etc. (as per NLUP, Rajpur Rural Municipality specification and data model). The fundamental classes should be as per Land Use Policy - 2072, Land Use Act - 2076, Land Use Regulations – 2079. However, sub levels should be populated as per requirement of the data model and

ground truth.

e) The smallest mapping unit for delineation of land use categories should be of 0.25 hectare, which would be 1/4th of a square centimeter in map scale.
f) The interpretation and feature extraction in terms of different land use units should be validated through enough ground truths collected from extensive fieldwork as well as through accuracy assessment matrix. The accuracy of each class as well as overall accuracy should not be less than ninety percent (90 %).
g) The map layout and legends should be as according to the standard of map/ data model.
h) The Present land use map must contain Hazard Risk Information as a separate layer.
i) The report on the land use should cover details of the methodology adopted in preparation of the present land use maps of the Rajpur Rural municipality. It should cover tables, maps and charts showing the categories of the land use and their properties. It should be in the standard format.
j) The Rural Municipality output maps must be based on Modified Universal Transverse Mercator Projection system and at 1: 10,000 scales. The database, images and maps should be provided as per the Data model.

Brief Methodology for present/Existing Land Use Classification/Zoning

The consultant should review all the relevant maps of the project area including Land Resources Mapping Project – LRMP 1986 maps,

a. Topographical map sheets and documents prepared by the Survey Department of Nepal as well as relevant products prepared by other agencies.
b. The Rural Municipality present land use maps should be prepared from rectified enhanced high resolution satellite images.
c. The level 1 categories of the land use should be such as Agricultural, Residential, Commercial, Industrial, Forest, Public Use etc. (as per NLUP, Land Use Policy - 2072, Land Use Act - 2076, Land Use Regulations – 2079). The fundamental classes should be as per Land Use Act 2076. However, sub levels should be populated as per requirement of the data model and ground truth.
d. The smallest mapping unit for delineation of land use categories should be of 0.25 hectare.
e. The interpretation and feature extraction in terms of different land use units should be validated through enough ground truths collected from extensive field work as well as through accuracy assessment matrix. The accuracy of each class as well as overall accuracy should not be less than ninety percent (90 %).
f. The map layout and legends should be as according to the standard of map/data model.
g. The report on the land use should cover details of the methodology adopted in preparation of the present land use maps of the Rajpur Rural municipality. It should cover tables, maps and charts showing the categories of the land use and their properties. It should be in the standard format.

The Rajpur Rural Municipality output maps must be based on Modified Universal Transverse Mercator Projection system. The database, images and maps should be provided as per the Data model.

Brief Methodology for Land Use Classification/Zoning

After the preparation and updating of existing land use, the consultant should focus on land use zoning. The methodology for zoning is mentioned below:

a) The consultant should review all the relevant maps of the project area including present land use, cadastral layers, land form, arability, slope, drainage system.
b) A rule based Multi Criteria Evaluation (MCE) methodology should be developed for optimum use of land resources of the municipality under the following broad land use zones: Agricultural area, Residential area, Commercial area, Industrial area, Forest area, public use area etc. as mandated by Land Use Policy - 2072, Land Use Act - 2076, Land Use Regulations – 2079. Corresponding sub - divisions for each zone type must be as per the data model.
c) The proposal and final report must describe these issues relating how these issues may be addressed in the proposed study area.
d) The MCE criteria should be guided by the environmentally friendly perspective and as far as possible, proper care should be maintained to preserve forest areas, protection of food crop producing areas, conserving eco-system and biodiversity and providing unproductive areas for settlement.
e) The smallest mapping unit for delineation of land capability categories should be of 0.25 hectare, which would be 1/4th of a square centimeter in map scale.
f) The map layout, legends and report should be as per the standard.
g) The report on the land use zoning should cover details of the methodology adopted in preparation of the land use zoning maps of the Rajpur Rural municipality. It should cover tables, maps and charts showing every category of the land use zones.
h) The Rajpur Rural municipality out-put maps must be based on Modified Universal Transverse Mercator Projection system. The data base and maps should be provided as per the data model.

Brief Methodology for Preparation of Soil Maps

A brief procedure in general for soil mapping is given as follows:

The consultant should review all the relevant maps of the project area including Land Resources Mapping Project – LRMP maps, Topographical map sheets and documents prepared by the Survey Department of Nepal as well as relevant products prepared by other agencies. The final soil map layout and legends should be in according with the standard data model.

a) The Rural Municipality level soil maps should be prepared on the top of rectified and enhanced high resolution satellite images Through the interpretation and collecting the geo-morphological information from the satellite images, different land system, landform and land unit types should be developed for the Rajpur Rural Municipality and it should be validated in the field. A land system map at 1: 10,000 scales should be generated before the actual soil sample collection from the field These land/ system and units will act as the base units for conducting the soil survey and delineation of soil map units within the area.
b) The smallest mapping unit for delineation of land system/soil categories should be of 0.25 hectare which would be ¼ of a square centimeter in map scale.
c) Pit sample selection methodology should be developed in consultation with Rural Municipality or Provincial Government or GON covering enough samples within each land unit/land type. The locations of the sample pits should be identified through the overlay with satellite images before field work and the same locations should be identified through GPS receivers and used for sample collection during soil survey.
d) During soil survey, a standard soil profile description form will be provided that should be filled up and necessary samples per horizon should be collected for laboratory analysis as well. The laboratory analysis should provide the data base on primary nutrients N, P, K (nitrogen, phosphorous and potassium). Boron, Zinc, Organic matter, Texture and pH of the top horizon available in the sample pits.
e) As far as possible, the test of soil samples should be performed at Nepal government owned soil laboratories or government recognized soil test centers.
f) The database map layout and legends and final report should be as per the standard. The report on soil should cover details of the methodology adopted in preparation of the soil maps of the Rajpur Rural Municipality. It should cover tables, maps and charts showing the categories of the soils. The Rural Municipality level out-put maps must be based on Modified Universal Transverse Mercator Projection system and at 1:10,000 scales. The database, maps and images should be provided as per the data model.

Brief Methodology for Preparation of Land Capability Maps

a) The consultant should review all the relevant maps of the project area including LRMP maps, Topographical map sheets and documents prepared by the Survey Department of Nepal as well as relevant products prepared by other agencies. As far as possible, the maps should be made compatible to the LRMP products so that both could be used as temporal data by the concerned users for research and other uses.
b) The Rural Municipality level land capability maps should be prepared with data sources such as high resolution satellite images, recent soil map prepared at 1: 10,000 scale, recent land system map prepared at 1: 10,000 scale, present land use map prepared at 1: 10,000 scale and management practices, soil survey data (both information gathered from the field as well as laboratory analysis) geomorphology/geology map, slope map, data on climate, soil erosion and moisture conditions.
c) The multi-criteria evaluation rule should be developed to classify land units based on soil parameters, fertility, erosion susceptibility, terrain constraints and surface drainage (wetness).

d) The smallest mapping unit for delineation of land capability categories should be of 0.25 hectare, which would be **1/4th of a square centimeter** in map scale.
e) The map layout and legends should be as specified in National Level specification for the Preparation of Rural Municipality Level Land Resource Maps, Database and Reports, 2069.
f) The report should cover details of the methodology adopted in preparation of the soil capability maps of the Rajpur Rural Municipality. It should cover tables, maps and charts showing the categories of the soils.
g) The Municipality level out-put maps must be based on Modified Universal Transverse Mercator Projection system and at 1: 10,000 scales. The data base and maps should be provided as per the data model.

Brief Methodology for Preparation of Land Use Zoning Maps

a) The consultant should review all the relevant maps of the project area including present land use, soil type and fertility, land capability, cadastral layers, land form, arability, slope, drainage system, topography, geology, settlements and population density, hazard risk as well as policy and planning documents of the government that are necessary for land use planning.
b) A rule based Multi Criteria Evaluation (MCE) methodology should be developed for optimum use of land resources of the Rural Municipality under the following broad land use zones: Agricultural area, Residential area, Commercial area, Industrial area, Forest area, public use area etc. as mandated by Land Use Policy - 2072, Land Use Act - 2076, Land Use Regulations – 2079. Corresponding subdivisions for each zone type must be as per the data model.
c) On the basis of maximum productivity and fertility, agricultural areas should be divided into sub areas of Cereal/food crop areas; Cash crops areas; Vegetable production areas, Fruit orchards, areas used for Animal husbandry and grassland/grazing lands, Fish farming area and Agro-forestry.
d) The consultant must have carried out Risk Study within the entire package area so as to identify ensure secure settlement, industrial area, commercial area or other relevant areas. Risk study should be related to the possible hazard issues in the study area concerned such as: fire hazard, flood hazard, land slide hazard or seismic hazard.
e) The land use zoning map must contain **Hazard Risk Information** as a separate layer.
f) The proposal and final report must describe these issues relating how these issues may be addressed in the proposed study area.
g) Such risk areas must be delineated as a separate classified layer in the map and accordingly must be populated in the database model.
h) The MCE (Multi Criteria Evaluation) criteria should be guided by the environmentally friendly perspective and as far as possible, proper care should be maintained to preserve forest areas, protection of food crop producing areas, conserving eco-system and biodiversity and providing unproductive areas for settlement.
i) The smallest mapping unit for delineation of land capability categories should be of 0.25 hectare, which would be 1/4th of a square centimeter in map scale.
j) The map layout, legends and report should be as per the standard.
k) The report on the land use zoning should cover details of the methodology adopted in preparation of the land use zoning maps of the Rajpur Rural municipality. It should

cover tables, maps and charts showing every category of the land use zones.

l) The Rural municipality out-put maps must be based on Modified Universal Transverse Mercator Projection system and at 1: 10,000 scales. The data base and maps should be provided as per the data model.

Brief Methodology for Cadastral Layer Superimpose

a) Obtain/prepare cadastral layer of the Rajpur Rural municipality.
b) Geo-reference cadastral layers of both Trigonometric Sheet Series and Island Map System with the help of ortho-rectified satellite images of the area.
c) Prepare Rural municipality level seamless cadastral database with proper care for overlapping and gaps between the data layers.
d) Link attribute of present land use with the cadastral parcel which shows the parcel level present land use within the Rural municipality.
e) Superimpose cadastral database with land use zoning maps.
f) Prepare tables and maps showing the properties of each cadastral parcel in relation to the present land use and land use zoning.
g) The map layout and legends should be as specified in updated National Level specification for the Preparation of Rural Municipality Level Land Resource Maps, Database and Reports provided by the NLUP.
h) The report should cover details of the methodology adopted to superimpose cadastral layers on the land use zoning of the Rajpur Rural municipality. It should cover tables, maps and charts showing the numbers of parcels and areas under the different categories of land use zoning and present land use.
i) The Rural Municipality output maps must be based on Modified Universal Transverse Mercator Projection system and at 1: 10,000 scales. The database and maps should be provided as per the data.

Brief Methodology for Preparing Profile

Profile has to be prepared by analyzing primary and secondary information' and maps necessary for formulating land use zones for the Rajpur Rural municipality. The following contents with the necessary data and information are mandatory for each profile. The reports should be in the standard.

a) The data to be included are as follows:

- Naming and origin of the Rural Municipality
- Location
- Settlement and administrative units
- Physiography
- Geology/Geomorphology
- Drainage/hydrology
- Terrain
- Climate
- Forest and Biodiversity
- Natural Hazard and Overall environment
- Land system, Soils, Land capability and other land Characters
- Present land use and land use zoning
- Cadastral data
- Agriculture and food production
- Vegetable farming/fruit Production

- Poultry Farming/fishing etc.
- Livestock
- Access to infrastructure and services
- Industry
- Social condition
- Population Characteristics
- Economic Condition
- Heritage and Culture
- Tourism
- Hazard and Risk

b) The profile has to be prepared keeping in view the environmentally friendly perspective for balanced environment and sustainable land development of the Rural municipality.
c) While preparing profile, the units in the map of geology, soil types, land capability, land use etc. should be analyzed and data about each area should be made available.
d) Chart, diagram and graphs have to be presented.
e) Digital or analogue data collected by other institutions should be utilized if necessary.

However, data sources must be mentioned along with the presented data.

Role and Responsibility of Different Stakeholders:

Role of Consultant

- ✓ Consultant shall be responsible to supply technical personnel and complete consulting work as stipulated in TOR and bid form and work under the team leader. Consultant's personnel shall directly participate in fieldwork and plan preparation, under the supervision and instructions of the team leader. The fieldwork among other things includes data gathering, ward and Rural municipal level meetings as per requirement.
- ✓ Consultant shall remain in Rural Municipality until plan preparation is complete and the plan is submitted to the Steering Committee and the Rural municipality.
- ✓ Consultant shall be responsible for making available of logistics including computers, printer, scanner, photocopier, and vehicle as stipulated in TOR and bid form for use in the field.
- ✓ Consultant shall be responsible for undertaking necessary training programs to Rural municipal as well as departmental technical personnel on GIS and other relevant computer skills that are required in connection to plan preparation and using plan information.
- ✓ Keep appropriately the records and minutes of the meetings/workshops.
- ✓ Gather data and carry out necessary analysis and inform the outcome of such analysis to the team leader and to the planning team during plan preparation.
- ✓ Undertake the task of preparing land use plan in complete as described in this TOR, under the supervision of the team leader.
- ✓ The consultant shall accomplish the work in close contact and guidance with the Rajpur Rural Municipality, Office of the Rural Municipal Executive.

Role of Rural Municipality

- ✓ Rural Municipality shall depute its senior official preferably from the technical section to coordinate internally and externally in the entire planning process till the completion of plan preparation. Rural Municipality shall also depute the full-time technical officer/ personnel to be associated with the planning team.
- ✓ Rural Municipality shall be responsible for forming Steering and (sub) Steering Committees, and organizing steering and (sub) steering committee meetings and other Rural municipal and ward level meetings/workshops as requested by the team leader.
- ✓ Rural Municipality shall provide office (Sava hall) for the planning team to work.
- ✓ Rural Municipality shall help the planning team to provide and gather data. It may also raise specific planning issues and provide suggestions separately to the planning team.
- ✓ Rural Municipality shall make the payment of contract amount to the consultant.

Expected Outcomes and Deliverables:

Following reports in quantities as mentioned below within Four (4) months should be submitted as follows:

Stages of Reports	**Time Period**	**Requirements of Report**	**Deliverables**
Inception Report with Detail action plan	Within One (1) month of Agreement Date	Criticize and comments on TOR, Thoroughly understanding of TOR. Crystallize the Detail Methodology. Study team interacts with expert and concerned stake holders.	1 set hard copies
Draft Report (Finalized, Validated & Approved land use Plans)	Within Three (3) month of Agreement Date	Detailed of Interim Report based on findings of the field and comments. Preparation of Land Use Zoning Maps. Preparation of Rajpur Rural Municipal Profile. Preparation of Superimpose of Cadastral Database. Presentation of study at Rajpur Rural Municipality.	1 set hard copies
Completed Final Report	At the end of Four	Detailed of Completion Final Report based on findings of the field and comments.	▪ 3 set Color hard copies,

	(4) months	Incorporate with relevant data, figures, drawings, questionnaires, interviews and other necessary information.	▪ 3 set of Pendrive with Soft copies, ▪ All Necessary Files as required by Engineer, ▪ Technology Transfer.

Team Composition and Qualification of the Firm and Experts:

In general, the consulting team shall compose of the following personnel:

S.N.	Description & Designation	No. of person	Duration in days		Qualification required
			Field Work	Office Work	
A	**Professional Staff**				
1	Urban Planner/ Team Leader	1.00	7.00	7.00	At least Master Degree in Urban Planning, City Planning, regional Planning, Land use planning, Infrastructure planning with 10 years working experience after Master degree in the fields of Periodic Plan/ Physical Development plan/ Land Pooling/ Regional Development Plan, Land Use Plan.
2	Environmental Expert/ Natural Resource manager	1.00	4.00	4.00	At least Master's degree in Environmental Engineering/ Science/ Natural Resources with 5 years' work experience in related field.
3	Socio-economies/ Social Scientist	1.00	4.00	4.00	At least Master's degree in Sociology/ Anthropology/ Economics/ Finance with 5 years' work experience in related field.
4	Geologist	1.00	4.00	4.00	At least Master's degree in Geological Engineering/ Science with 5 years' work experience in related field.

5	GIS Expert	1.00	7.00	6.00	At least Bachelor's degree in GIS and Remote Sensing with 5 years' work experience in related field.
6	Geomatics Engineer	1.00	7.00	4.00	At least Bachelor's degree in Geomatics Engineering with 5 years' work experience in related field.
7	Agriculturist/ Forester	1.00	4.00	4.00	At least Master's degree in Agricultural Engineering/ Science, Forestry or Integrated Water Shed Management with 5 years' work experience in related field.
8	Architect/ Planner	1.00	7.00	4.00	At least Bachelor's degree in Architecture/ Urban Planning with 5 years' work experience in related field.
9	Sub Engineer (Civil)	1.00	7.00	7.00	At least Proficiency certificate level or Diploma in Civil engineering with 5 years' work experience in related field.
10	Sub Engineer (Computer)	1.00	-	7.00	At least Proficiency certificate level or Diploma in Computer engineering with 5 years' work experience in related field.
B	**Supporting Staff**				
11	Enumerator	1.00	10.00	7.00	At least SEE Level.
12	Field Labours	1.00	10.00	-	Not Required
13	Field Assistant	1.00	10.00	-	Not Required
14	Office runner	1.00	-	20.00	Not Required

Equipments:-

S.N.	Name of Instrument	Number	Accuracy
1.	DGPS (Differential Global Positioning System) Survey Instrument.	1.00	As Confirmed by Survey Department of Nepal.

Work Schedule:

Work Schedules of the Study									
S.N.	Activities	Time in Months							
		Month 1		Month 2		Month 3		Month 4	
		15 days	30 days	45 days	60 days	75 days	90 days	105 days	120 days
1	Literature review, Field survey, observation and preliminary data collection.	■	■						
2	Primary and secondary data collection.		■	■					
3	Data processing and analysis.		■	■	■				
4	Land Use Plan preparation.			■	■	■			
5	Draft report presentation and feedback collection.						■		
6	Final report preparation & Submission.							■	■

Mode of Payment:

This is a lump sum contract for delivery of a defined set of outputs. Payments are made at percentages of the total contract value on the basis of the Consultant satisfactorily achieving the key milestones stated below and after the approval from the Client.

(1) After agreement of Contract = 0% of the total contract amount.
(2) After submission of inception report = 20% of the total contract amount.
(3) After submission of the draft report = 60 % of the total contract amount.
(4) After submission and approval of the final report = 20% of the total contract amount.