Land Governance in an Interconnected World

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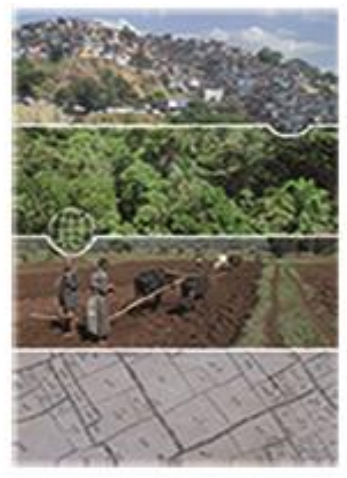

SUSTAINABLE LAND MANAGEMENT: SHIELDING THE AGRICULTURE LAND WITH FLOOD MANAGEMENT AND WETLANDS

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INTRODUCTION

This paper explores the issues of shielding the agriculture lands that are affected by floods frequency and wetlands habitat while needed for sustainable land management with infrastructure planning and environmental extenuation. In this case, optimality of sustainable land management is, therefore, concomitant with flood action strategy merging the erstwhile lenient of agro-ecological entities, social-ecological boundaries, and local environmental profile.

In the public policy agenda, land use-based zoning remains to be precise on agriculture land use concerning sustainable land management that signifies the abilities in local land resources for further use without any degradation and indeed in the attitude of Sustainable Development Goals (SDGs). Endeavours of Local Government Institutions (LGIs) are considered to be the persistent role in municipal affairs, especially in land use regulations patently by appraising the sectoral policy, the regional treaties, and the governments' statutes and public regulations associated with land use.

We can differentiate the countries globally where agriculture lands, including public assets and rural settlements, are often affected by the climate and inundation of land from floods, downpours or cyclones. High population pressure reinforces the geophysical and socioeconomic determinants that increasingly alters the natural environment without having substantive measures in wetlands and flood management with optimal surface drainage and resource interventions.

Nonetheless, the common impediments in local land management practice appear many from the policy context to the institutional settings and consequently to the sensitive implementation of planning policy that we can stimulate to the five distinct but interrelated determinants of land use for the sustainable agriculture lands.

MATERIALS | METHODS

Appraisals of data are mainly threefold: geophysical aspects, socio-economic perspectives and institutional and policy context. Review of geophysical aspects scrutinises GIS database, satellite imagery and spatial analyses while the socioeconomic data includes analyses of the trends and circumferences of occupational households that are habitually dependent upon livelihood opportunity and income sources. The analysis of sectoral policy and the designated institutional roles are inevitable at the current state. Shielding the agriculture land with flood management and wetlands habitat is obvious in a framework what we can term as APDOM in the manner of sustainable land management sketched in a simplified network model **(Figure 1)**.

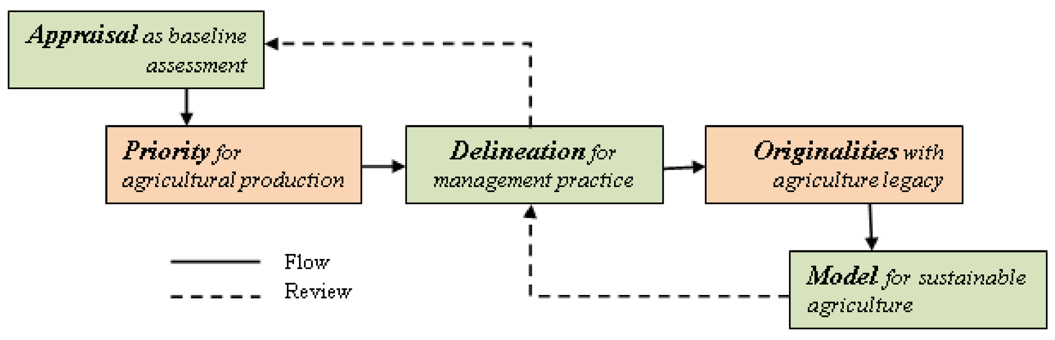

Figure 1: Simplified network model of shielding the agriculture land with flood management and wetlands in the sustainable land management practice

The principal parameters for appraising land use zoning are agro-ecological zone, soils physiography, land topography, administrative jurisdictions, and revenue boundaries. Physical infrastructure and comprehensive land-use coverage such as settlements, agriculture, and water bodies are crucial.

A country-level data review comprises the review of land acreage coverage by catchment basin, hydrological region, national policies, agriculture potentials, and pilot study locations validating the flood scenarios. Transformation and visualisation of landscape with the defined physiographic units and the corresponding soil textures associations of the floodplain lands, hills and terraces remain as first efforts to determine the characteristics and suitability of the agriculture land, wetlands habitat and surface water drainage system.

ACKNOWLEDGEMENTS

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RESULTS

Shielding the agriculture lands with flood management and wetlands is illustrative in this subject-matters as:

- Convolution and Pragmatism in Water Resources Management: *(a) Surface water level monitoring and hydrological context; and (b) Groundwater flow and hydraulic driving force.*
- Inundation Land Type and Flood Risk Dynamics: *Tools and Procedures:*
- Relative factors in agriculture, floods and wetlands occupancy; and
- Sustainable land management practice and model.

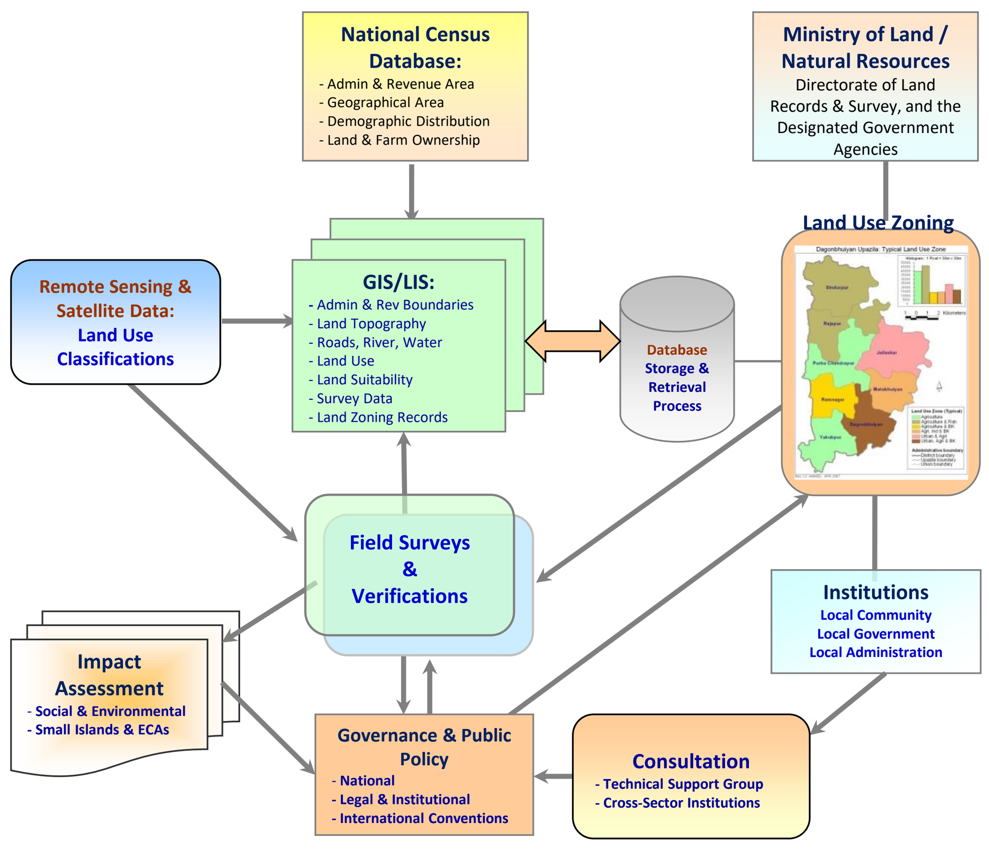

Figure 2. Digital Geospatial Data Management Framework: Integrated Land Zoning Information System

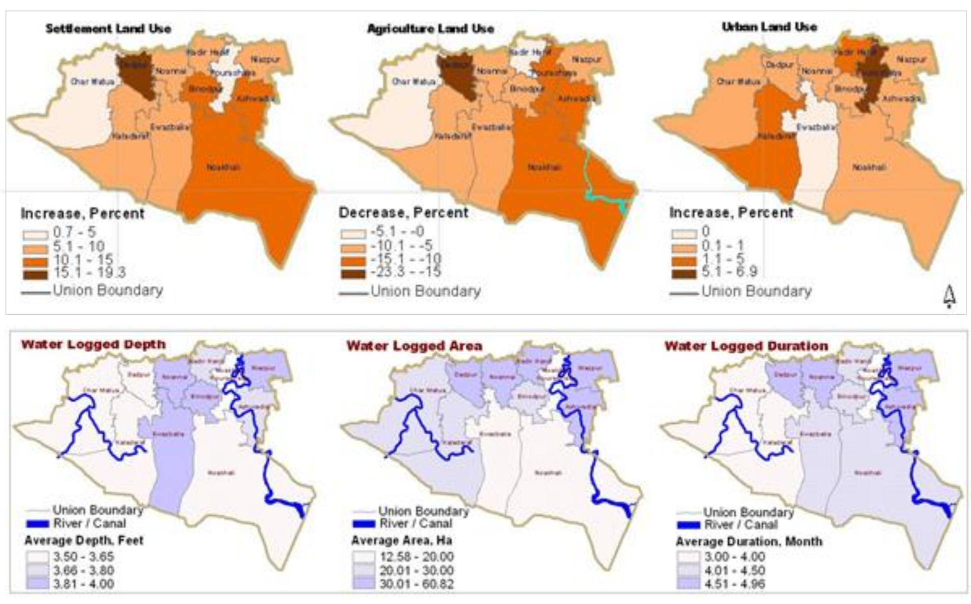

Figure 3. Analysis of major land use change, and water logging and surface drainage congestions in the floodplain lands: Change in settlement, agriculture and urban land use (top); and Inundation Depth-Area-Duration (bottom).

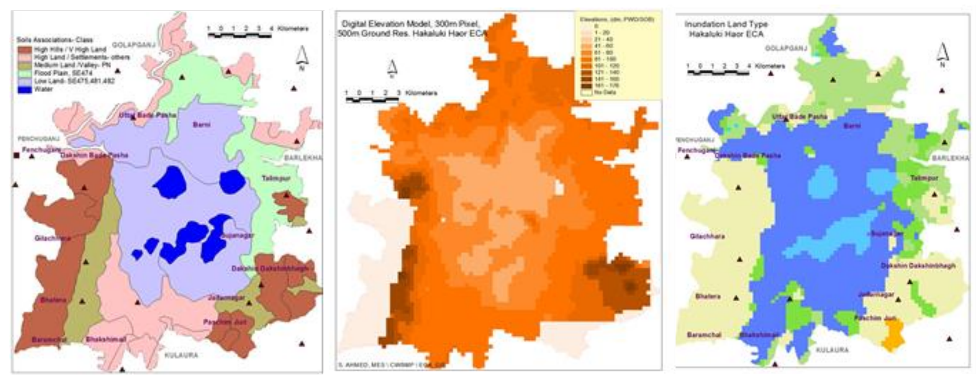

Figure 4. Three key components of land use appraisal for baseline assessment based on the Digital Geospatial Data (from left to right): 1. Physiographic Units: Soils Association; 2. Digital Elevation Model: Land Surface; and 3. Inundation Land Type: Flood Depths.

Figure 5. Ground observations in the wetlands habitat: Seasonal flood in monsoon (left), and Agriculture lands management in dry season (right).

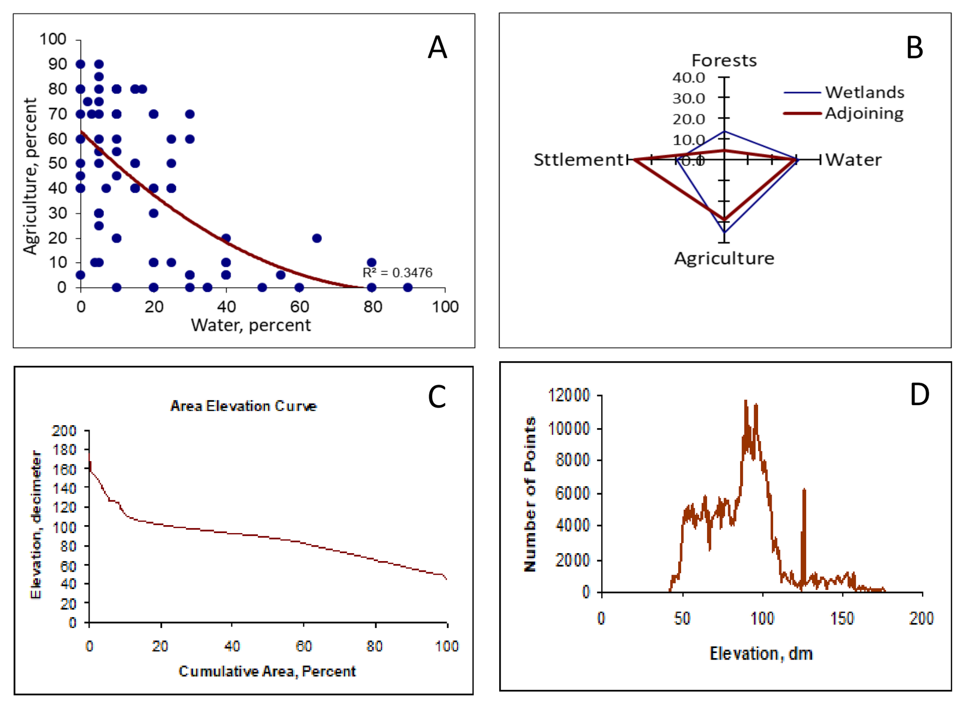

Figure 6. Analysis of wetlands habitat based on physical data: A. Wetlands agriculture and water persistence relationship; B. Proportion of agriculture lands, waterbodies, forests and settlements; C. Area Elevation Curve; and D. Land elevation histogram.

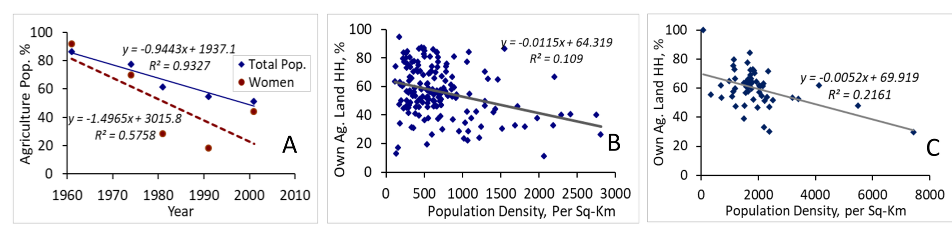

Figure 7. Typical trends in agriculture dependent occupants: A. Total population and Women population in a dominant floodplain and highly populated country at the national level; and B & C. Own agriculture land households (percent) and population density (per Square Kilometer) at the local levels.

CONCLUSIONS

Promising deliberations are crucial to apprehend the Sustainable Development Goals to meet the challenges for the sustainable agriculture lands and its management practices at the policy context and the institutional level. Factors associated to the potentiality and harshness or vulnerability of variant flood-frequency, local food-crops, ecologically critical areas, public health grumble, institutional paradox, and trans-boundaries and environmental externalities on the environment and climate change adaptation issues are predominant.

On the contrary, this paper draws to offer a synthesis of reviewing the physical environment of digital geospatial data such as land topography with physiography, agro-ecology, surface drainage and inundation land types of the designated areas signifying the permissible agriculture lands, rural settlements and wetland habitats—where at least the five underlying components described in the materials and methods section (Figure 1) would be the inevitable steps for a country or region and applicable to accelerate the protection of sustainable agriculture lands.

In conclusion, the obligatory option is a "land use policy model" for the "sustainable land management" shielding the agriculture land with the optimal processing of flood management and wetlands habitat information, including national and regional trends in agriculture lands and rural occupancies, that are inexorable to the investment-priorities in infrastructure planning to prevent the upset from the local disaster, hazard and vulnerability.

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Note: Complete references can bee seen in full paper.