ENVIRONMENTAL ASSESSMENT

Adopting European CORINE Land Cover concept

CLC shows the land cover change in ecosystems such as forest, lakes, agricultural activities and vegetation, and the impact of human activities (such as urbanisation, industrialisation, food production, transport etc.) on land. The database also serves a wide range of application sectors.

DR. MD. MIZANUR RAHMAN

CORINE Land Cover (CLC) is a database of geographic land cover encompassing most of the European countries. It is based on interpretation of satellite images. Images acquired by earth observation satellites are used to derive land cover information. It provides comparable digital maps of land use pattern. This is useful for nature conservation and environmental analysis. The component of the CLC aims to gather information relating to environment on certain priority topics like human disturbances, land use pattern, naturalness, etc. CLC covers all activities related to satellite image acquisition, orthorectification and production of local, national and continental mosaic, and temporal variation of images. CLC provides an inventory of the earth surface features for managing the environment.

The EU established CLC in 1985 to create pan-European databases on land cover, biotopes (habitats) and soil maps. An updated CLC database was launched in January 2000. CLC describes 44 classes of land cover organised hierarchically in three levels. The first level (5 classes) defines the land pattern (artificial areas, agricultural land, forests and semi-natural areas, wetlands, water surfaces). The second level (15 classes) corresponds to the physical and physiognomic entities in detail (urban zones, forests, lakes, etc); finally level 3 is composed of acutely defined 44 classes (residential areas, airport, commercial areas, etc.). The writer is describing different levels and classses of land cover considering the practical scenarios of Bangladesh (Table). He has also developed a methodology to implement the CLC concept in Bangladesh (Figure).

Environmental protection has become a major challenge and concern for the whole world. The updated information on land cover has become important for environmental assessment. The growing interest in such information indicates the importance of CLC. Rapid landscape changes are occurring in Bangladesh. CLC is essential not only in research, but also in environmental management. Harmonised and standardised spatial reference data are considered obligatory in support to the environmental management. It is also essential for development, territorial impact assessment, regional planning, nature conservation, environmental protection, integrated coastal management and strategic environmental assessment.

Land-use/land-cover change is the most important factor in causing biodiversity loss. Temporal significant increase or decrease in forest cover can be measured through CLC. It provides important information, which is useful for conservation planning. The writer suggests that an increasing conservation effort should be made to protect the forests and semi-natural areas. Moreover, future conservation efforts should consider the broad socio-political and ecological processes that are most likely to occur across the coastal areas. The network of protected areas should be functionally integrated in a conservation strategy.

CLC shows the land cover change in ecosystems such as forest, lakes, agricultural activities and vegetation, and the impact of human activities (such as urbanisation, industrialisation, food production, transport etc.) on land. The database also serves a wide range of application sectors. Environmental applications focus in their majority on nature conservation, biodiversity related issues, water and soil management, air pollution and climate change. CLC is a planner's tool and provides land cover information that actually helps policy makers to visualise the area of interest. It can be used as an analytical tool supplying statistics about land use or the development of land use and management in a specific area.

The main objective of CLC is to develop a core set of indicators to provide policy relevant information on terrestrial environment, to review and evaluate the effectiveness of existing policies, and to provide the basis for a better integration between environmental and sectoral policies. It can support the development of environmental indicators for nature conservation. For example it is possible to show where an endangered habitat is under intense pressure from factors such as transport, urban expansion or agriculture.

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Figure: Flow diagram of proposed CLC model for Bangladesh

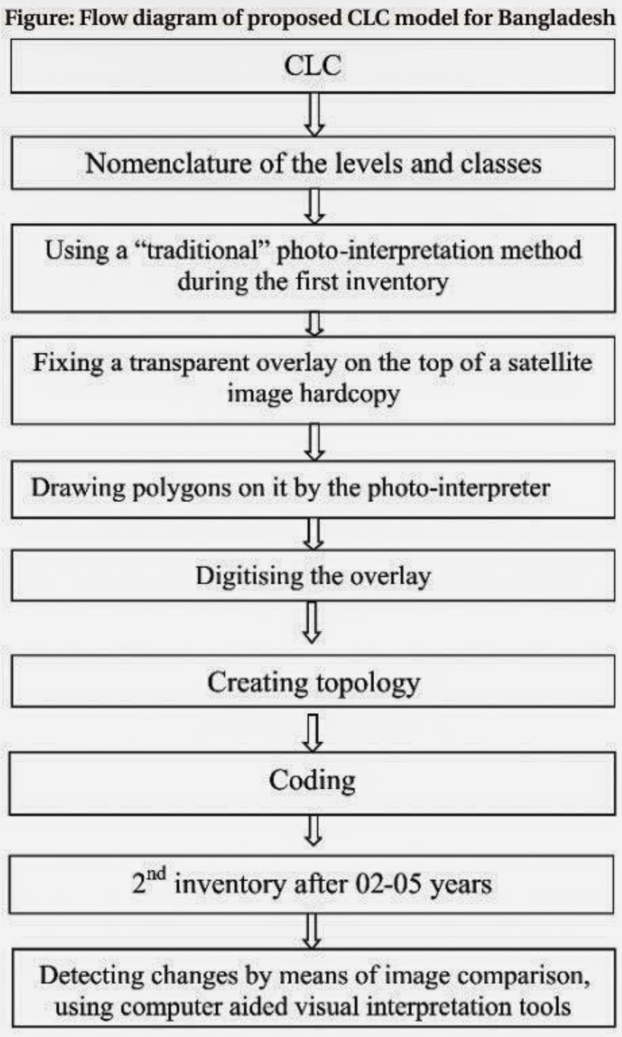


Table: Nomenclature of different levels of proposed CLC for Bangladesh

Level 1	Level 2	Level 3
Artificial areas	Urban residential areas	Residential areas of city
		Residential areas of town/ upazilla headquarter/bazar
	Industrial, commercial and transport units	Road/ Rail line
		Sea Ports/ river ports/ land ports
		Airports
		Industrial/ Commercial units
	Mine, dump and construction sites	Mineral extraction sites
		Dump sites
		Construction sites
	Artificial, non-agricultural vegetated areas	Botanical gardens/ Parks
		Stadiums/ recreational sites
Agricultural areas	Arable land	Irrigated land
		Non-irrigated land
		Field crops
	Permanent horticultural crops	Fruit orchards
		Vegetable gardens
		Flower gardens
	Pastures	Pastures
	Heterogeneous agricultural areas	Fallow land
		Multiple crops
		Agroforestry areas
		Jhum cultivation
Forests and semi-natural areas	Forests	Natural or semi-natural forests
		Plantation forests
		Degraded forests
	Shrub/Herbaceous vegetation	Grass land
		Meadow
		Deforested areas
		Remnants of natural forests
	Open spaces with little or no vegetation	Beaches, dunes
		Denuded areas
		Sparsely vegetated areas
		Road side areas
		River banks
Wetlands	Inland wetlands	Inland marshes
		Char land
	Coastal wetlands	Salt marshes
		New islands
		Inter-tidal flats
Water bodies	Fresh waters	River
		Channel, canal, lake, haor
	Marine waters	Coastal lagoons
		Sea
		Estuaries

Turag riverbank landuse and encroachment

For the greater interest of the city's ecology and economy, the issue of letting river back to its normal life has emerged now as a burning question before the nation. Accomplishing this hard task, controlling further encroachment and eviction of the existing encroachment appear more than imperative.

MUHAMMAD SELIM HOSSAIN

SIMPLY put land-use is human modification of natural environment into built environment such as, field, pasture, and settlements. But different developments along any river flowing beside a mega city like Dhaka essentially moots investigation of the riverbank land use. The riverfront land use of the Turag River, particularly from Buriganga Third Bridge to Tongi Bridge, has been roughly studied by the writer to know whether there has been any relationship between riverbank use and riverbank encroachment.

Land-use of almost all major categories except the administrative one has been found in the study area. The study area covers a total of 100 acres of which 26.23% is occupied by agricultural use, 19.45% by commercial use, 4.997% by educational, cultural, and recreational use, 16.23% by industrial use and 22.70% by residential use. The area of land under other uses is 10.39%.

Commercial use: Here commercial land use mainly refers to building materials (sand, bricks, and stones) depot and sale center and coal depot and sale center. Due to downpour and overland flow for longer hours, a portion, sometimes a significant portion of the building materials including sand, brick and stone chips piled along the riverbanks get into the river and cause riverbank, even river channel filling. Besides, at the time of loading to and unloading from cargo vessels, a considerable portion of these materials fall on the slope of the riverbank and intentionally or unintentionally left there. These slide and fall of building materials ultimately cause river-bank and river-channel encroachment. Later, the ownership of the encroached lands informally goes to the grabbers. Such filling of river bank by building materials is frequently found near the Gabtali BIWTA Landing Station and the Gabtali Bridge.

Industrial use: The main industrial land uses along the banks of the Turag are brickfields, stone and brick crushing centers. These land uses lead to river encroachment in different ways. Many brickfields throw their rejected bricks and brick bats on the slope of the river bank that ultimately leads to bank filling. Sometimes, the brickfield owners intentionally fill river bank to extend their working space so that it becomes easy for the buyers to load the bricks in the cargo ships. Sometimes, ill-motived brickfield owners even occupy the char developed in the middle of the river channel and establish brickfields there. Just such an occurrence took place near Bashila. Brick and stone crushing mills are most often placed just on the river bank. Their brick and stone particles roll down the river bank and cause bank filling. One can usually find this occurring if one makes a travel from Gabtali Bridge to Adabar by boat.

Residential use: Residential land use is also responsible for encroachment on the river. Those who have riverside settlements want to maximize the extent of settlement by encroaching on the river bank bit by bit over time. A section of the local influentials build slum type thatched houses, sometimes tin-shed buildings encroaching upon river bank and rent out to the low income people like the garment workers and rickshaw pullers. Housing projects are also habituated in encroachment. Many housing projects have developed along the Turag River. Many of them increase their project area by filling river bank or river feeding canals, it is alleged.

Educational, cultural and recreational use: During the land use survey, mosque, park, cremation ground, moktob, private university and Iztema maidan have also been found as the land uses along the Turag river bank. Mosque, cremation ground and moktob are public institutions. On the plea of community interests, significant parts or sometimes whole of these institutions have been developed occupying river bank or even river channel.

Agricultural use: Agricultural land use is apparently not as responsible for river encroachment as other land uses. During the dry season, when water level recedes, in many parts of the river, the bank and even river bed rise and come under agricultural use. Often agricultural land use entices people to grasp the raised river bank and bed as the best ground for paddy threshing. The grabbers gradually elevate the ground through earth filling. One day, this land use becomes permanent and the river loses its area.

Other uses: Road, another land use of this category, is an influential factor of river encroachment. If a road is constructed along river, the value of river side land jumps many fold. Then the river side land owners, local influentials and land developers cast a greedy eye on the river bank and try their level best to grasp it. In case of Turag the frequency of encroachment is higher along the south-eastern bank than its north-western bank because the embankment along the south-eastern bank of the river has been turned into a high way and connected with many important roads of the capital city.

Controlling also through land use

There are some land uses which can indirectly control encroachment if practiced along the banks of the river. Some such land uses are elucidated below: Walkway and pucca road, institutions of law enforcing agencies, play ground with concrete boundary wall, recreation center on private initiative, afforestation.

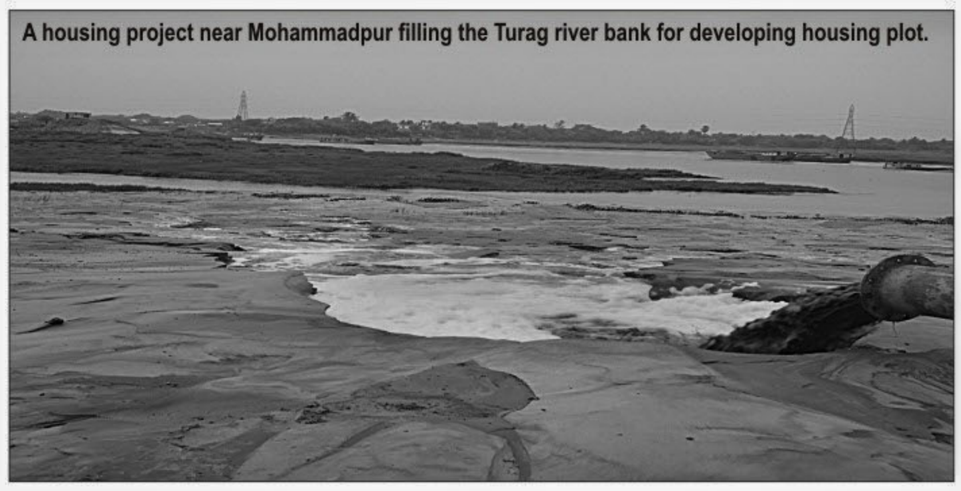
Walkway and pucca road can keep a tight rein on encroachment as these will work as distinctive boundary of the river and accordingly there will be no confusion over the area covered by the river. It will also facilitate all time movement of people along the riverbanks. That is, river will remain in people's keen observation. As a result, hardly anybody will dare to encroach upon.

Institutions of law enforcing agencies can help check river encroachment as it will cause presence of law enforcers on the nose of river that will at least make people hesitant to encroach upon the river. As a result, the frequency and intensity of illegal occupation of river by any one or by any institution will be reduced. Play ground with concrete boundary wall may be a good encroachment checking land use along the banks of the Turag.

In some parts of the river banks with which communication system of other parts of the city is satisfactory can be leased to private entrepreneurs for development of recreation centers like eco-park, shooting spot, picnic spot, botanical garden, commercial flower garden and recreation boating ghats under the keen obserbation and supervision of the government authorized organizations. These land uses will indirectly protect river from encroachment and help keep the river neat and clean.

Afforestaton is an important land use to check river encroachment problem as it is difficult for any one to occupy river bank cutting the trees without coming to notice.

A housing project near Mohammadpur filling the Turag river bank for developing housing plot.



Intentional filling of Turag river bank by brickfield.

Concluding remarks

Succinctly speaking, for the greater interest of the city's ecology and economy, the issue of letting river back to its normal life has emerged now as a burning question before the nation. Accomplishing this hard task, controlling further encroachment and eviction of the existing encroachment appear more than imperative. Riverbank land use is very important not only for controlling encroachment but also for all-round welfare and health of the river itself. However, the government and others concerned should seriously consider this landuse pattern on an urgent basis. The local people should be motivated in all possible ways to encroachment-controlling landuses along the river banks.

Muhammad Selim Hossain is a young researcher.