Knowledge-based monitoring and evaluation system of the ecosystem integrity of forest intervened by gas pipelines

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The pressures of land use have caused the degradation of most of the dry forest ecosystems worldwide. The Chiquitano dry forest in eastern Bolivia is still an ecosystem close to natural conditions. In December 2000 an underground pipeline that crosses the forest was built, in order to export gas to Brazil. The overlap of the pipeline's construction and operation with the socio-economic activities of long-time established villages, as well as the enhanced penetration into the forest by the pipeline's right of way (corridor); will generate, in the long term, an indirect impact on forest degradation and deforestation. Thus, the pipeline construction represents a threat to the ecosystem's connectivity. Responding to supervision needs, the development of a monitoring system is suggested towards the regular assessing of the land use pressures on the vegetation cover, within a 15 km buffer zone on both sides of the corridor.

The GIS-supported M & E system assesses the forest integrity using land cover information improved with primary land use data. It consists of two independent knowledge-based models developed by means of knowledge engineering techniques. Knowledge-base models are built up under the Ecosystem Management Decision Support System (EMDS) (Reynolds, K. M. (2001)[1]). To represent information EMDS uses NetWeaver Logic Engine whose reasoning is supported on object-oriented networks and fuzzy-logic. Spatial representation of results is supported by means of ArcInfo version 8.3.

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1 Reynolds, K. M. (2001). Fuzzy logic knowledge bases in integrated landscape assessment: examples and possibilities. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 24 p.