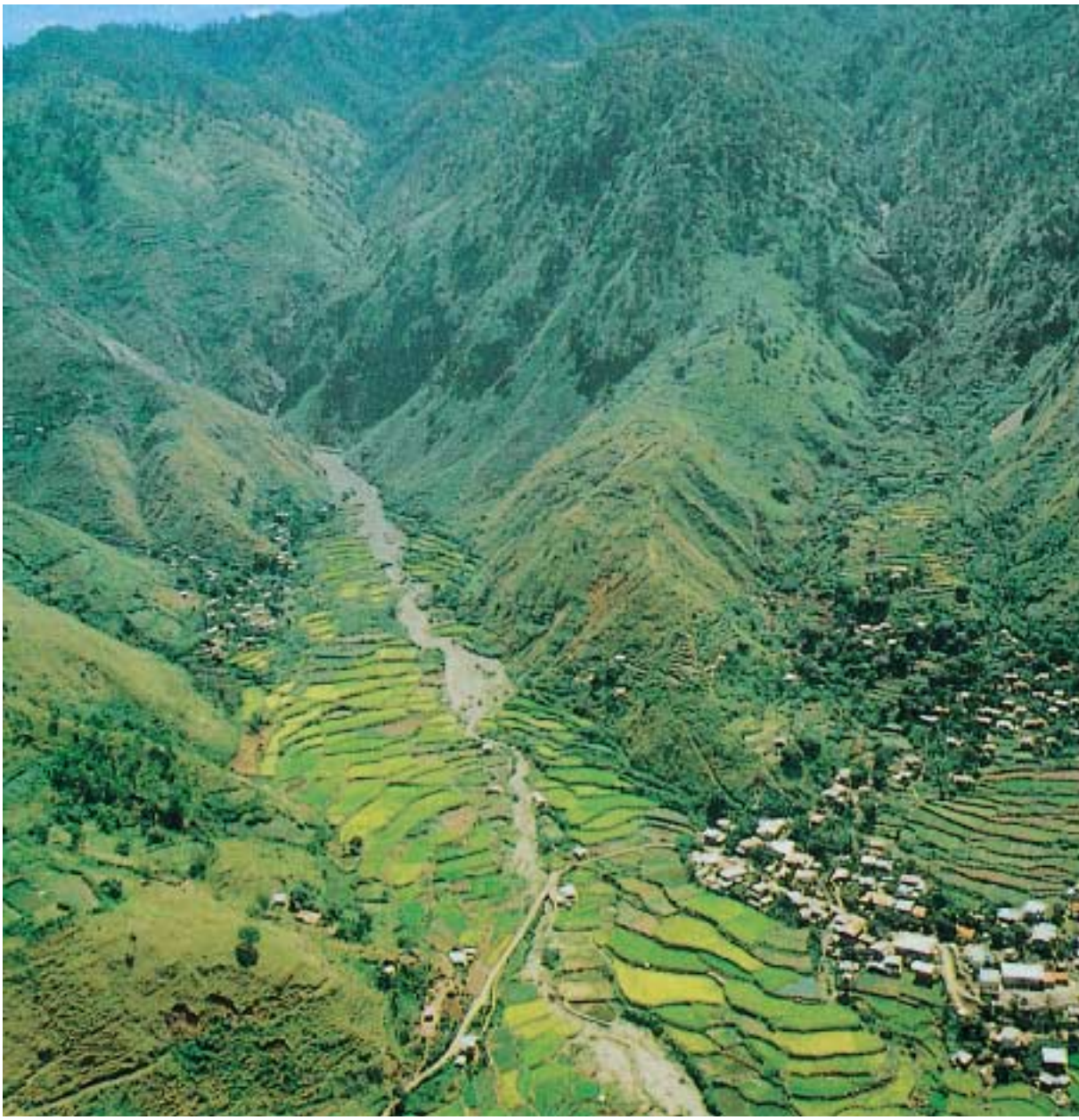
LAHMEYER INTERNATIONAL



Sustainable River Basin Development

Sustainable River Basin Development

Through over a quarter of a century's involvement in the water, land, energy and environmental sectors, Lahmeyer International has acquired the broad expertise which enables the company to provide the full range of services required to assist in the planning, implementation and management of Sustainable River Basin Development.

Lahmeyer International provides multidisciplinary teams from its in-house staff who meet all the requirements for the successful implementation of River Basin Studies worldwide.

Our permanent staff includes water resource engineers, agronomists, irrigation and drainage engineers, civil engineers, hydrologists, hydropower engineers, surface and groundwater modeling experts, environmental engineers, land use experts and pedologists, specialists in information systems and satellite imagery, rural and urban planners, economists, agro-economists, sociologists, institutional and management experts and professional trainers.

Lahmeyer International's recent and ongoing experience of river basin studies and integrated river basin development projects includes:

- Genale-Dawa River Basin Integrated Resources Development Master Plan (Ethiopia, 2003–2007)
- Valle de Sula Priority Works for High Risk Zones (Honduras, 2001–2004)
- Moragahakanda Development Project (Sri Lanka, 2000–2002)

- Caspian Sea Environment Program (Central Asia and Caucasus, 1998–2000)
- Upper Volga River Basin Environmental Program (Russia, 1996–1997)
- The Kayanga and Koliba Rivers (Guinea-Bissao, Guinea and Senegal, 1993–1995)
- Tuy River Basin Rehabilitation (Venezuela, 1992–1998)
- Danube River Basin (Hungary, Slovakia, Romania and the Czech Republic, 1992–1994)
- Oder River Basin Improvement (Poland, Germany, 1991–1992)

Nation-wide inventories and planning studies have also been undertaken for the development of water and land resources in a range of countries, including: Armenia, Burundi, Ecuador, Guatemala, Laos, Malawi, Morocco, Nicaragua, Pakistan, Peru, Somalia, Zambia and Zimbabwe.

The Process of Sustainable River Basin Development

- human resources
- water resources
- land resources
- conservation areas
- agriculture
- forestry
- fishery
- transport
- energy
- communication
- industry
- institutions
- water rights
- legal framework

Problem Awareness

Demographic and utilisation trends lead to the awareness that, unless action is taken, a disparity will develop between quantity and quality of river basin resources, and the needs of the population and their environment.

Resources and Needs Inventory

Physical data are captured using field surveys and remote sensing techniques. Legal, social, institutional and management information is processed. Needs are identified and projected. A prime consideration from the start of any proposed intervention is the identification of the beneficiaries, and the determination of their needs and aspirations. Their participation and the building of consensus in conceiving, planning and implementing projects is a pre-condition for success.

Development Objectives

Development objectives may include better land and water use, adequate energy and food supply, improved health and education standards and protection of the environment.

Scan for Poten

Alternative or selected multi-
measures may

social:
– nutrition and health care
– community development
– vocational training
– gender recognition
– family planning
– culture preservation

land use:
– farming systems
– erosion control
– mining
– forestry
– recreation
– nature reserves
– industrial and residential zoning

physical:
– irrigation, drainage
– flood control
– water supply
– power facilities
– rail, river, road, air
– agro-processing
– industry
– waste managemen

Implementation

Coordinated implementation of projects and measures involves time and budget control, equitable cost recovery, monitoring of resources, demand management appropriate to supply reliability, suitable operation and allocation procedures, and the evaluation of future needs for further developments.

Action Plan Formulation

The pros and cons of the most attractive scenarios are presented and evaluated together with decision-makers. Coordinated resource use planning and management procedures are devised. Compromises often need to be made among competing interest groups before formulating and adopting the final action plan.

This step aims at the evaluation of possible scenarios for river basin development. Standard tools include GIS and digital terrain models; hydrological and hydraulic investigations; groundwater simulations; water and air quality modeling; integrated resource planning; conjunctive surface/groundwater use; system modeling; cost/benefit analysis; impact assessments and various visualisation techniques.

ntial Actions

disciplinary development
y include:

institutional/legal:
– river basin authorities
– local government
– water user groups
– non-governmental organizations
– private developers
– water rights
– international obligations
– public consultation

financial:
– financing
– funds allocation
– pricing
– cost recovery
– taxation

transport

t

Sustainable River Basin Development

Why Sustainable River Basin Development?

Increasing demographic pressure on land and water resources have placed river basins under stress worldwide. Inappropriate land use practices have led to land degradation and consequent loss of economically useful areas. Dam construction for hydropower generation and water supply has involved the inundation of large areas of forest and agricultural land, and in some cases to involuntary resettlement of populations.

Dikes and levees for flood protection have aggravated flooding problems downstream. Although irrigation development of agricultural areas has increased food production, it has sometimes also brought about increases in waterlogging and soil salinity, contamination of surface and ground waters with pesticides and fertilizer residuals, and the spread of waterborne diseases.

Furthermore, the demand for potable and industrial water in growing urban and industrial centres has led to water scarcities, high costs of new water supplies, and increasing threats to ground and surface water resources from inadequate municipal waste and effluent disposal facilities.

Prevention and mitigation of such problems requires cross-sectoral and long-term planning and management efforts to ensure Sustainable River Basin Development.

What is Sustainable River Basin Development?

Sustainable River Basin Development is the integrated, long-term planned development and management of a river basin's water and other resources, to ensure their continued availability and renewability.

This requires a process covering detailed assessment of available resources and existing infrastructure, analysis of present and projected demands, identification of constraints to development, determination of real costs and benefits of alternative actions, and evaluation of institutional capabilities and legal frameworks.

Objectives, policies and strategies are then formulated for short, medium and long term development of the basin's resources, with specific regard to local conditions and regional requirements. Prioritization of selected interventions results from analysis of planned actions for conformity with agreed selection criteria.

Successful implementation of the development plan requires appropriate legislative and regulatory frameworks, use of objective-oriented funding and cost recovery principles, effective monitoring and competent cross-sectoral management. International water issues may also play an important role.

Sustainable River Basin Development therefore spans a broad spectrum of disciplinary boundaries, covering agriculture, engineering, economics, the environment and a wide range of social, institutional and management sciences.

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