EAST KALIMANTAN PROGRAMME

The interrelationships between climate variability, biogeochemical and morphodynamical processes, ecosystem dynamics and human influences in the coastal zone of East Kalimantan

Programme Document 2005

1. Introduction: Key issues in coastal zones

Research on coastal zones is of great scientific interest, because of the large variety of biotic and a-biotic processes, the richness of the biological systems, social and economic aspects and the interrelation between these. Over the last decades, the understanding of tropical coastal systems has increased considerably, but remained rather fragmentary. Most research in the past decades concerned mono-disciplinary studies of specific aspects.

Indonesia, like most tropical countries, is in many respects a very vulnerable part of the world. Indonesian seas are the richest in biodiversity and play an important role in the global cycles of carbon dioxide and oxygen through calcium carbonate producing organisms in the oceans and along the coasts. Indonesian coastal areas host urgent societal problems including poverty, overpopulation, territorial conflicts, weak economy, deforestation, overfishing and pollution. These societal problems often result in uncontrolled and unsustainable economic development in the coastal zone to support the increasing needs of the fast growing population and are a significant threat to Indonesia's coastal ecosystems. Examples are deforestation and damming of rivers upstream which change the discharge of water and sediment to the coastal systems; land use change in the coastal zone such as the massive replacement of mangrove forests by fish- or shrimp ponds; changes and partial destruction of ecosystems (mangrove forests, seagrass beds, coral reefs) and biodiversity; and depletion of fish stocks. At the same time, considerable parts of the local economy often depend on the presence of healthy coastal ecosystems.

The interrelations between many aspects of the natural and social systems in coastal zones are still insufficiently understood and urgently need further investigation to support sustainable development.

2. East Kalimantan: perspectives for research co-operation

The most complex and socio-economic significant systems in coastlines are deltaic and estuarine areas, in particular well-developed deltas of large rivers. These areas hold a great potential for societal and economic development and therefore attract many. The largest rivers in Indonesia are found in Kalimantan, Sumatra and Irian Jaya. The Indonesian Institute of Sciences LIPI, being aware of the drawback of a soaring social and economic development in the coastal zone, together with its partners in the Indonesian Consortium on Coastal and Marine Research (ICoMAR)[1], have amongst others identified East Kalimantan, in particular the Mahakam Delta, as a priority area for marine and coastal research in Indonesia.

In 2002, NWO-ALW, NWO-WOTRO and KNAW launched an Indonesian - Netherlands Programme for coastal zones research in East Kalimantan: EKP. The programme has been divided in a Pilot Phase (EKP-Pilot) of one year and a Main Phase of five years.

The EKP-Pilot was developed in collaboration with ICoMAR. Following a call for proposals in the Netherlands in 2002, 17 pilot projects were approved by the Netherlands EKP Committee to make

[1] Participants in ICoMAR are: LIPI (Indonesian Institute of Sciences), Bakosurtanal (planning) , LAPAN (remote sensing), DESDM (geology), Institut Teknologi Bandung, Universitas Mulawarman (Samarinda)

preliminary investigations to identify options for future full research projects together with Indonesian counterparts. Reconnaissance fieldwork of the pilot projects, executed in 2003 together with Indonesian counterparts, was aimed at collecting samples of marine flora and fauna, sediments and water, at analysing environmental, ecological and geological characteristics, at exposing social conflicts and important management issues, and at establishing contacts with counterparts and stakeholders. ICoMAR at Indonesian side also supported 17 projects, some of them in co-operation with Netherlands EKP-researchers, in the fields of: oceanography and estuarine dynamics; coastal dynamics, delta development, and the environmental changes; implication to groundwater aquifers and ecological integrity (mangrove, seagrass, corals); marine biodiversity and coastal resources productivity; remote sensing and GIS technology in tropical coastal areas; and human impacts and Integrated Coastal Zone Management (ICZM). EKP-Pilot was concluded in May 2004 and the results were reported during the Indonesian – Netherlands EKP symposium in Jakarta, 24 and 25 May 2004, which was followed by a workshop for the EKP main phase 2005 – 2010. The first call for proposals in the framework of the main phase of EKP was issued September 2004. This call has resulted in approval of an Indonesia-Netherlands Research Cluster focussed on the Berau area, which will address physical, biological and socio-economic aspects.

The focus of this second Call for Proposals is primarily on the coastal areas of the Mahakam delta and relevant upstream areas and the adjacent part of the shelf. Research Clusters submitted in the framework of this call should aim at addressing scientific problems that are of importance for abiotic, biotic and socio-economic issues in the coastal area of East Kalimantan (e.g. resource use, land use change, social conflicts, water pollution, climate change; the impact of these issues on the coastal (eco)system and anthropogenic and natural processes; multihazard risk mapping and assessment). (Mathematical) modelling of processes, changes and risks is recommended, e.g. resulting in models for the benefit of sustainable development and spatial planning. Because sustainable development can only be defined with reference to specific spatial and temporal scales, comparative and complementary research outreaching to other areas may be included as well (some aspects, e.g. socio-economic drivers of resource use, may even have an outreach far beyond the focus areas of East Kalimantan).

Natural science aspects
The rivers in East Kalimatan have a large hinterland, reaching up to more than 400 km inland. Since the Tertiary, these rivers have developed large delta systems and they continue to do so today, varying from river-dominated strongly prograding deltas (Mahakam delta; 0°30’ S) to more tidally dominated estuarine systems like the Berau area (2° N). The deltas of the East Kalimantan rivers Mahakam and Berau differ strongly in morphology and environmental dynamics, determining the occurrence of different ecosystems and their variability (like coral reefs, seagrass beds, mangrove forests, etc.), which are to a large extend related to different tolerance limits and responses to abiotic factors such as sediment load (turbidity), nutrient availability, currents and tides.

Societal aspects
East Kalimantan is a relatively scarcely populated province, rich in natural resources. It has a wide variety of coastal systems under varying influences of human pressure. In parts of its coastal zone, large-scale oil and gas exploitation occurs, but other areas are still in a relative pristine state. However, the human pressure has increased strongly over the last ten years and will continue to increase in the future due to growth of the population, upland deforestation, intensification of land use and exploitation of natural resources, and expanding industrialisation. Over the last decade, most of the 1500 km² mangroves in the Mahakam delta have been converted into fish- and shrimp ponds. This is fostered by high profits on the international market. However, the exploitation of fishponds is not sustainable and results in ecological and morphological deterioration of the whole delta system.

For proper understanding of the dynamics of the East Kalimantan coastal systems and in search of alternative scenarios and options for sustainable use of natural resources and services, relevant to the local society and stakeholders, a focussed, multi-disciplinary approach is needed. The research programme should take into account the relationships between the different components of coastal systems, the socio-economic aspects which drive human activities and the role of governance.

Relevant interrelationships may concern e.g. sediment load and sedimentation in relation to land-use (deforestation, shrimp pond development), sea level rise and local coastal zone management; climate variability, environmental change, biogeochemical and morphodynamical processes in relation to socio-economic and ecological developments, both on temporal and spatial scales; ecosystem dynamics, economic development, nature conservation, (eco-)tourism in relation to land-use planning, coastal management, decentralization, indigenous social custom and legal reforms, etc. Results should have societal significance or should be relevant for sustainable development.

3. Collaboration, capacity building, communication and dissemination of knowledge

Involvement of stakeholders, including local and regional government authorities, should be an essential part of the programme and individual projects in order to foster the use of results for addressing society relevant issues (e.g. sustainable development). The programme offers grants for Indonesian PhD-students and post-docs. These fellowships should outreach to extensive involvement of university students, in particular for fieldwork. In addition, the Faculty of Earth Sciences and Mineral Technology of Bandung Institute of Technology (ITB) expressed its willingness to host a graduate school on coastal and marine science, to be launched in 2007. The graduate school should be open to participation of universities and students from all over Indonesia, including the Mulawarman University at Samarinda, East Kalimantan, which is an important member of ICoMAR. It may be interesting to explore funding possibilities for this initiative from the Netherlands organization for international cooperation in higher education (Nuffic) or from the Asia-Link Programme of the European Commission, which is to promote regional and multilateral networking between higher education institutions in EU Member States and eligible countries in Asia, amongst others Indonesia.

4. Options for extended international collaboration

EKP intends to fund joint research projects between Indonesian and Netherlands researchers. At the same time other EU member states (e.g. Germany and Italy) are engaged in scientific cooperation with Indonesia in the field of coastal zone research. German scientists of the Zentrum für Marine Tropenoecologie at Bremen University (www.zmt.uni-bremen.de) are working in marine ecology programmes and Italian scientists from the CNR institutes IRSA in water research and from ISE in ecosystem studies (http://www.cnr.it/istituti/Istituti_eng.html).
It may be interesting to explore whether linkages to other existing bilateral activities in this field could be established. Therefore, the EKP Committee welcomes research co-operation settled on mutual terms with other European partners adjoining EKP. If such linkages prove to be beneficial for the research projects and the programme as a whole (e.g. information sharing, network building) linking bilateral activities to multilateral programmes could be considered. This could be beneficial to the quality of the co-operation, especially in terms of expanding critical scientific mass, which is essential for obtaining additional third stream (international) funding.
Exploring possibilities at the multilateral level serves two specific objectives. The first objective is to promote the visibility of international funding opportunities (e.g. EU, World Bank, ADB) amongst Indonesian researchers and to facilitate their access to such opportunities, both directly and in partnership with Netherlands researchers. The second objective is to network and co-ordinate the bilateral efforts of European counterparts. If this collaboration can be established it will be considered to submit this for additional support from the EU-Framework Programme (FP 7). In this respect, a major international marine expedition (*Snellius-3*) is envisaged in Southeast Asian waters on the medium term (around 2010).