

Professional Practice:

Integrated assessment (IA) with Indigenous community participation: an emerging market case study

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Organisation: B.E.A.CC.H. (Biodiversity •Environment •Agroecology •Climate Change •Habitats) is the environment cluster of the CSO Platform for Reform, a coalition of about 60 civil society organizations focusing on institutional reforms for a better Malaysia. B.E.A.CC.H. advocates for a human rights-based, sustainable and an ecologically sound environment in Malaysia.

ABSTRACT

In 2022, Malaysia was ranked as one of the fastest emerging economies in the world with a trade to GDP ratio averaging over 130% since 2010. As floodings pose the most frequent, severe climate change threat and the costliest natural disaster globally, Malaysia is no exception with its flood-related calamities escalating by 134% over the past two decades. The study was undertaken along Baram riverine in Borneo rainforest, in the state of Sarawak, East Malaysia. **Significance of study:** The study delineates the significance of Integrated assessment with community participation. **Method:** The mixed methods research adopted Participatory Rural Appraisal (PRA) approach and adhered to Free and Prior Informed Consent (FPIC) practice. The study insights highlight: (1) In relation to sensitive eco-systems, Indigenous people-led impact assessment provides grounded observations for social and environmental impact assessment (SEIA) reporting; (2) the need for robust state policy consideration for mandatory SEIA reporting in virgin rainforest areas; and (3) proposition for the adoption of cumulative effects impact, particularly, in areas with multi-infrastructure projects. As intensifying climate-induced challenges damage the physical environment of emerging and developing regions, it could inevitably lead to unsustainable development and consequently reduce its attractiveness for green funding and investments in the long run.

Keywords: Integrated assessment; indigenous people; participatory rural appraisal; FPIC; emerging market; public participation

INTRODUCTION

It is undeniable that flooding is the most frequent, severe climate change threat and the costliest natural disaster that affects human lives and the environment globally. An estimated 1.81 billion people are already facing flood risks (World Bank 2022a), accounting to almost 25% of the world population (see Figure 1). Among those affected, 89% live in low and middle-income countries. In addition, 780 million flood-exposed people live on less than \$5.50 a day while 170 million affected live in extreme poverty of less than \$1.90 a day (World Bank 2022a).

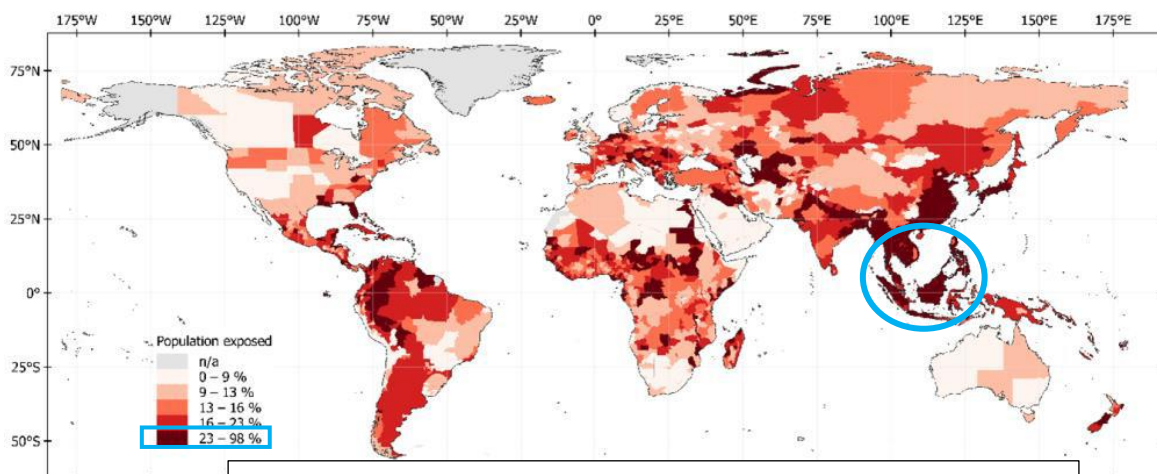


Figure 1: Flood Exposure & share of people living in high-risk flood zones in 188 countries
(Image credit & source: World Bank 2022; Rentschler et al. 2022)

This means 4 out of 10 people susceptible to flood risk live in poverty. Due to their socio-economic conditions, these communities, in particular indigenous peoples, are less resilient to the exacerbating impacts of climate change. Inextricably, aggravating existing vulnerabilities and inequalities (IPCC 2022) and further undermining state development initiatives intended for poverty reduction and sustainable development (Djalante 2019). In 2022, Malaysia was ranked as one of the fastest emerging economies (Milken Institute 2022) and one of the most open economies in the world with a trade to GDP ratio averaging over 130% since 2010 (World Bank 2022b). Concomitantly, flood-related calamities in Malaysia have escalated by 134% over the past two decades. The study expounds on the adoption of integrated impact assessment approach as imperative with heightening climate change risks and managing multi-development projects in emerging and developing regions.

BACKGROUND OF STUDY

Borneo is the third largest island and home to the oldest tropical rainforest in the world, over 130 million years old. The study was undertaken in East Malaysia, Borneo and focuses on Baram River, the second longest river in the state of Sarawak, East

Malaysia (Figure 2). As part of the state's socio-economic growth plans for rural development, the Baram Growth Area was demarcated as part of its RM1.5 billion highland development projects covering an area of 18,463 square km. In 2022, the Highland Development Agency (HDA) announced investments in 50 infrastructure projects which include three completed road projects, 17 projects under construction, nine projects under detailed design stage and a total of 21 projects, including 19 water supply projects for tender (Ringgit 2022). The five-year (2022 to 2026) development plan is intended to expedite the economic growth potentials of Upper Baram and highland region. The main communities residing in the remote highlands of Upper Baram and Lower Baram River are the *Orang Ulu* (Upriver People) indigenous communities, who collectively represent the Kayan, Kenyah, Kelabit, Kiput, Penan, Punan and Saban communities; with a population of about 180,000.



Figure 2: Baram District

Motivation of study: The motivation of this study is rooted in two realities: First, over the past two decades, flood-related calamities in Malaysia have escalated by 134%. Despite the predictions and flooding patterns, parallel land clearance for multi-development projects continues to be undertaken. Consequently, with heightened eco-system vulnerabilities, flooding impacts are expected to worsen. To date, there is limited research insights on integrated impact assessment on projects around Baram riverine. Second, as a collaborative response to an invocation on the escalating flooding phenomenon and severe rapid riverbank erosion by affected indigenous communities to B.E.A.CC.H, an environmental cluster of civil society organizations platform focused on climate governance and institutional reform. Thus, further asserting the shifting role of civil societies and NGOs (Pandey 2015) in the provision of expertise, information, and negotiation for implementation of climate change mitigation plan and policies for sustainable development.

Purpose of Study: The objectives of this pilot study are two-fold: One, insights gathered will facilitate onward full study in upper, mid and lower Baram riverine. Second, serves as a case study for reference for riverine conservation and for onward (i) design of an integrated impact assessment framework for adoption into socio-economic and infrastructure development projects around riverine; and (ii) advocacy and development of appropriate flood mitigation and adaptation strategies for communities inhabiting in affected project areas.

Significance of study

The study delineates (1) the significance of integrated assessment (IA) in a real-world context in face of intensifying impact from climate change challenges; (2) explores aspects of IA in a multi-disciplinary manner instead of a more discipline-specific impact assessment; and (3) draw a comprehensive understanding of flood risks with community participation, ultimately facilitating adaptation and mitigation strategies for communities and vulnerable ecology conservation for policy consideration.

LITERATURE REVIEW

Sustainable development & significance of Integrated impact assessment

Sustainable Development requires the adoption of multi-disciplinary approaches to impact assessment of socio-economic development plans. This has led to the rising interest and inquiry in the integration of various methods of evaluation into impact assessment. Integrated Assessment (IA) can be broadly defined as (1) the process for guiding anthropogenic activities towards sustainable development; and (2) comprehensively examines potential implications viz. intended or unintended; with the application of qualitative and quantitative tools to generate valuable insights into observed impacts as well as the interrelationships among socio-economic conditions and ecological vulnerabilities (IPCC 2022). IA is widely recommended for emerging and developing regions. Concomitantly, scenario tools and methods also provide helpful guiding analyses for enhancing future adaptation, risk reduction options as well as policy planning (Berkhout et al 2014). These include (i) *multi-disciplinary analyses* which aim to assimilate the findings from experience, knowledge and technical assessment to consolidate social, economic and environmental impact in a single study and synthesize information that cannot be deduced holistically from a single disciplinary analysis (Baines et al. 2006; Lee 2006); (ii) *wider context examination* that takes into account other concurrent projects in the area of impact assessment study; (iii) emphasis on *public and grassroots stakeholder participation* in a meaningful and participatory manner (Scrase and Sheate 2002); and (iv) adoption of *complementary appraisal methods* to reconcile insights and establish consistency of impact assumptions (Orenstein et al. 2010)

MATERIALS AND METHOD

As the study involved Indigenous Peoples (IP), the research design was guided by Participatory Rural Appraisal (PRA) approaches and strictly adhered to ethical consideration and Free and Prior Informed Consent (FPIC) practice. The overarching intention is to extrapolate insights from personal and collective accounts, as well as recollections on (i) flooding impact on lives and livelihood;

ii) historical data on flooding events and (iii) circumstances contributing to the surge in flood disasters. PRA approach aims to actively involve communities to identify problems relevant to them; empower through open discussion and identify options for tackling issues. The study deployed a mixed methods approach (Figure 3) for data collection and analyses.

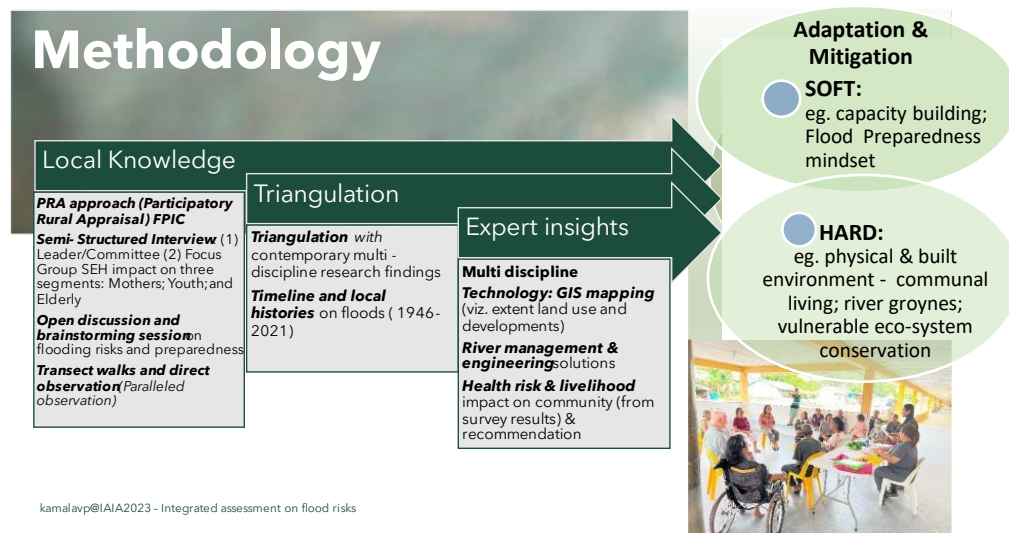


Figure 3: Integrated Assessment design Framework (Author 2023)

*Social, Economic & Health (SEH) on social profile, culture & education, livelihood, and health impact

Research Instrument

To ensure rigor of PRA research instrument, semi-structured interview questions were developed and peer-reviewed by experts from B.E.A.CC.H: (1) involved in international SDG-related projects; and (2) from various disciplines viz. agroecology, biodiversity conservation and natural resources planning, stakeholder collaboration, and IP engagement. The finalized version submitted to an independent expert on relevancy and appropriateness in terms of overall comprehension and recommended duration for administration on IP community. The improved version was presented for final peer review. Once approved, the instrument was translated and vetted by experts familiar with the language used by IP in the study.

Population and Sampling

For this pilot study, longhouses in Lower Baram were selected based on the severity of flooding viz. structural loss and damages, with possible displacement due to severe riverbank erosion and safety risks (Figure 4). Hence, (1) Long Banyok; (2) Long Ikang; and (3) Kuala Tutoh and an additional longhouse (4) Longan Sibung participated voluntarily during this study. In addition, Purposive sampling was adopted primarily to gain a better understanding of common experiences and perceptions on flooding; with focus group discussion with three segments of community, namely, mothers, elderly and youth, to develop insights on flooding encounters and level of preparedness. The prime selection criteria for participation in the study is: individuals have stayed at the longhouse since birth or at least 20 years. FPIC was administered for every session.

FINDINGS & DISCUSSION

The section briefly highlights result findings from *local knowledge* and extends the deliberation by way of *triangulation with current multi-discipline literature* insights and *expert inputs* as a frame of reference to establish corroborative and meaningful insights on (1) vulnerabilities and level of flood preparedness; (2) contributing factors; and (3) proposition for policy considerations.

(1) Vulnerability of IP communities & lack of flood preparedness

Based on the socio-economic background, the average earnings of the communities under study are between RM200 to RM600, approximately US\$46 to US\$136 per month, which indicates they fall below the poverty line in terms of global standards. This means with continued damage from floods to farms and built environment, loss of livestock, disruption to essential services such as water, education and healthcare, their ability for any rapid and effective recovery would be undermined. To comprehend the perceived severity, ongoing and future risks, an examination of the historical flood timeline in Baram, Sarawak from 1946 to 2021 by the Department of Irrigation and Drainage Sarawak delineate that the worst floods in Baram began in the late 1980s. Since 2008, flooding incidences have increased steadily with compounded frequency and extremity annually. Apart from that, insights from the open discussion and brainstorming sessions affirm absence and lack of flood preparedness attitude among longhouse(s) residents. Despite the obvious lack of flood readiness attitude, the session was welcomed by the participants and village head/committee representatives as it was their first time discussing openly together on flood issues and participants expressed a heightened sense of informed awareness on flood realities and actions needed at the community level as well as engagement with relevant state agencies on disaster management and mitigation.

(2) Contributing factors to incessant floodings

Based on local community knowledge, the incessant floodings in Baram are mainly attributed to anthropogenic activities. Table 1 delineates the contributory factors juxtaposed with findings from contemporary literature, GIS mapping and expert inputs to establish corroborative evidence and insights:

| Flood Contributing Factors: | Corroborative findings & insights from current discipline-related studies in the fields of biology; sustainability science; ecology; hydrology, innovative technology and engineering |
|---|---|
| Community observation and perception in Baram | |
| Poor drainage system in adjacent monoculture plantation area viz. oil palm | Flooding risks are exacerbated from large-scale expansion of monoculture plantations due to lengthened periods of inundation reported in these areas (Sumarga et al 2016). Properly designed drainage system is imperative. |
| Heavy rainfall upriver 'Hulu/ulu sungai' | Statistics on Sarawak flooding records from 1946 to 2021 by Department of Irrigation and Drainage Sarawak affirm 50% of floodings are attributed to heavy rainfall upstream 'Kawasan hulu/ulu sungai'. |
| Overlogging and deforestation in Upper Baram/Highland | <ul style="list-style-type: none"> Academy of Sciences Malaysia noted '<i>...the uncontrolled development in Selangor and the mass logging in Sarawak were the reasons these states are experiencing frequent floods</i>' (Rajaendram 2022). Studies on deforestation in highland areas affirmed: (1) interruption to important services of the forest ecosystems linked to hydrological cycle, which depend on the landscape's capacity to regulate the quantity of freshwater flows and mitigate damages from flooding and erosion (Razali et al. 2018); and (2) connection to exacerbated landslides and soil erosion (Wells et al. 2016). GIS Mapping conducted in this study affirmed extensive land clearance occurring along and around upper Baram Riverine. |
| Over 40 years of quarry sand & gravel mining | Numerous studies on sand and gravel mining around riverine affirm (1) threat to riverbank erosion and soil stability, (2) riverbed degradation, (3) river buffer zone encroachment, (4) siltation, (5) altering natural flow of the river and (5) deterioration of river water quality (Teo et al. 2017; Devi and Rongmei 2017) |
| Severe siltation and sedimentation in Baram River | <ul style="list-style-type: none"> Annamala et al. (2021); Razali et al. (2018) - large-scale land clearance and conversion accelerate sedimentation in riverbeds and reservoirs eventually resulting in floods especially during monsoon periods. Nainar et al. (2017) - substantial disturbances on soil surface can accelerate erosion rates by 10 to 100-fold and inadvertently, contribute to higher suspended sediment concentrations compared with natural, undisturbed catchments. |
| Severe climate change impact – with sudden heavy downpours | Despite heavy rainfall, historical time series of hydrological and meteorological data (Nasser and Nurainin 2018) affirmed overall rainfall trend in Baram has decreased over a 10-year period (2005 to 2014) due to change in climate regime. In fact, rainfall prediction analyses for the next 30 years (2015 to 2044) forecast a decrease with direct impact on water resources in Baram in terms of its quantity and quality. To surmise, the study asserted to mitigate climate change impact, healthy ecosystems are critical. |
| Construction of ineffective river bundings in two villages were washed away in short time | Based on GIS Mapping and local knowledge inputs, river management consultants from B.E.A.CC.H proposed the use of river Groynes** that are far more economical and sturdier than existing bunding design strategy. |

Table 1: Flood contributing factors juxtaposed with existing multi discipline research and expert insights Note:

**Mitigation Proposal for riverbank erosion using River Groynes approach for severely affected villages in this study with cost breakdown was submitted to the Sarawak Chief Minister's office, Malaysian Prime Minister's Office and the Natural Resources, Environment and Climate Change Minister's office in April-May 2023.

Policy consideration for Cumulative effects assessment

The study findings illuminate two pertinent aspects for policy consideration: First, as climate-influenced risks and future vulnerabilities get more complex and systemic (UNDRR 2019), the state needs to consider cumulative effects impact assessment on socio-ecology (IPCC 2022) when implementing multiple development projects viz. sequenced or paralleled implementation; from past, present, and future development projects in demarcated growth areas. Second, the existing non-mandatory EIA reporting when clearing virgin forests under 500 hectares along with non-requirement for public participation is evidently outdated; and should be implemented in line with national standards. Furthermore, Sarawak Biodiversity Blueprint which emphasizes on sustainable development should include Baram as a case for reference for riverine conservation and design a framework for support, remedial and mitigation action for riverine communities and ecology conservation for the state's flood management plan as climate change risks worsens.

CONCLUSION

Borneo's rainforest is two times as old as the Amazon rainforest and is ranked among the most vulnerable biodiversity hotspots in the world. The severity of anthropogenic impact in an emerging market like Malaysia, should not be underestimated as sporadic losses due to climate change can lead to perennial losses and impoverishment that could precipitate social tipping points among communities living along riverine. The integrated assessment study highlights three significant insights: To begin with,

the participation and incorporation of local knowledge and perspective facilitates better understanding of longitudinal changes in the physical environment and contributory factors. In relation to sensitive eco-systems like rainforest regions, as native forest dwellers, Indigenous people-led impact assessment provides grounded observations and enriching assessment insights for EIA reporting and recommendation. Furthermore, project proponents and the state can determine more efficacious mitigation and adaptation strategies viz. both hard and soft for affected or to-be affected communities as well as determine sensitive eco-systems for conservation. Secondly, a cumulative effects impact approach should be adopted and enforced in developing and emerging regions with multiple development projects. This is particularly critical as any oversight on the escalating climate-induced risks and vulnerabilities, could lead to unsustainable development and reduce its attractiveness for green funding and foreign investments as worsening climate conditions severely damage its physical environment. Thirdly, the findings assert the absence of robust state policy consideration for mandatory social and environmental impact assessment reporting in view of escalating climate change challenges, could ultimately reverse rural poverty alleviation initiatives by the state with irretrievable impact viz. on livelihood and food security due to frequent floodings and rapid riverbank erosion. Consequently, loss of land increases land encroachment threats as communities are forced to move.

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