



DEVELOPING A SOCIO-DEVELOPMENT INDEX INSTRUMENT FOR THE ORANG ASLI IN MALAYSIA

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Abstract

The Orang Asli, recognised as the earliest inhabitants of Peninsular Malaysia, continue to face persistent challenges in achieving socio-economic advancement in national development. Despite the implementation of various government policies and initiatives, the lack of an assessment tool has limited efforts to capture their multidimensional development. This study was therefore to address this gap by identifying and validating the most relevant indicators for constructing a socio-development index tailored to the Orang Asli community. This method was used to obtain consensus among experts on the primary needs for each item in the development of the Orang Asli socio-development index instrument. As a result, this study consulted 14 experts from various fields related to the Orang Asli. This study employed the Fuzzy Delphi Method (FDM) to obtain expert input and consensus on the proposed socio-development index indicators. The results indicate that thirty-two indicators were accepted for inclusion in the index, encompassing nine domains: Level of Educational Achievement, Complete Infrastructure, Economic Empowerment, Environmental Sustainability, Leadership Empowerment, Land Recognition, Level of Health Care, Policy and Legislation, and Cultural Heritage Empowerment. The findings contribute to the establishment of an index that captures the dimensions of Orang Asli socio-development. The validated indicators offer policymakers, practitioners, and stakeholders a reliable tool to monitor progress, identify development gaps, and design more effective, inclusive, and sustainable interventions tailored to the unique needs of the Orang Asli community.

Keywords: Socio-development, Indicators, Fuzzy Delphi Method, Orang Asli

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INTRODUCTION

Malaysia is recognized as a multi-ethnic country with many races, cultures, and backgrounds. The Orang Asli, the indigenous people of Peninsular Malaysia, are one of the multi-ethnic minority groups residing in Malaysia. The term "Orang Asli" refers to the indigenous population of Peninsular Malaysia. The word "Asli" comes from an Arabic word meaning "*asali*" (Ab Rahman et al., 2022) which means 'original', 'nation', or 'aristocrat' (Carey, 1976). According to Benjamin (2016) the name "Orang Asli" initially appeared around 1960 to replace the phrase "Malaysian aborigines," which had previously been used. Approximately 150,000 Orang Asli from the three essential tribes of Semang (Negrito), Senoi, and Proto-Malays live in peninsular Malaysia. At the same time, most Orang Asli remain in rural forests while retaining their traditional rituals and cultures. Circumstances before and following independence show that changes in Orang Asli's life coincide with changes in economics, social life, politics, and culture.

This study has identified a lack of measurement for assessing the socio-development of the Orang Asli community holistically. Despite facing various challenges, the absence of a measurement tool complicates efforts to achieve socio- development for the Orang Asli community. The Orang Asli socio-development should be focused generally and holistically on areas such as infrastructure, education, or economy, as experienced by mainstream society. On the other hand, attention should also be given to other domains, such as the preservation of their culture and language, land ownership, exploitation of natural resources, political and autonomy issues, pollution, health, and prejudice (Ab Rahman et al., 2022).

In the context of the Orang Asli development, the absence of relevant multidimensional measurement of well-being for the Orang Asli causes difficulties in ensuring the Orang Asli achieve successful development. The social development of the Orang Asli community is not only limited to infrastructure development and economic improvement but also includes health facilities, preservation of culture identity, social cohesion and environmental sustainability. All of this shows the need for an encompassing measurement instrument to enable the assessment of Orang Asli social development. Accordingly, through the social development index instrument developed can provide a comprehensive tool for accessing the well-being of the Orang Asli community in the future. The main objective of this study is to develop the Orang Asli socio-development index instrument in Malaysia based on expert consensus. Development is an ongoing process of changes that significantly impacts ethnicity, nations, economics, societies, and politics. One of the most effective research mechanisms for this purpose is the creation of an index instrument capable of providing a comprehensive assessment. Thus, to fill the knowledge gap in the socio-development of the Orang Asli, this study focuses on the index instrument as a priority solution to assist the government, especially the Orang

Asli Development Department, in successfully improving outcomes for stakeholders.

LITERATURE REVIEW

Socio-development

Socio-development is a multidimensional concept that is particularly relevant to the Orang Asli, as it addresses the social, economic, cultural, and environmental challenges faced by marginalized communities. It encompasses aspects of human life such as education, economic opportunities, health, and infrastructure, aiming to improve the well-being and quality of life of individuals and communities. Social development, a core component of socio-development, focuses on strengthening social structures, relationships, and institutions while promoting equality, social justice, and inclusive participation. Unlike development defined in economic terms, socio-development integrates social, cultural, political, and environmental dimensions to enhance human well-being, equity, and sustainability (Livingston et al., 2022; Zulkipli et al., 2021). Rooted in the Latin-derived concept of “socio-” as relating to social interactions, socio-development represents an inclusive process where communities enhance their capabilities while maintaining cultural identity and social equity (Bamigbelu & Adeyeye; Tiwari & Nguyen, 2024). For the Orang Asli, socio-development entails programs and policies that address poverty, inequality, and marginalization, while promoting participation, safeguarding rights, and supporting sustainable cultural and economic advancement (Ab Rahman et al., 2022; Zulkipli et al., 2021). Overall, socio-development provides a holistic framework that prioritizes both human and community empowerment alongside material progress, integrating tangible outcomes such as education and infrastructure with intangible elements like cultural preservation, political autonomy, environmental protection, and health equity.

Index Instrument

Index instruments serve as valuable tools or systems that enable the organization and categorization of data used for organizing and categorizing data related to various subjects or procedures. This is in line with Biswas et al. (2022) who argued that utilizing index enables policymakers to gain deeper insights into areas of progress and their outcomes. This empowers them to make decisions with efficiency. Indexes can provide guidance for policies aimed at identifying and solving problems and monitoring indicators of progress. That makes policies more proactive and strategic in targeting problems. This transition to stewardship means we can think more fully about and organize problem-solving, leading us to develop better and lasting solutions. Furthermore, using indexes also allows policy makers to better understand where progress has been made and what the results are. They can then make wiser decisions about how to allocate resources

more efficiently. In addition, Bandura (2008) emphasized that there are more than 400 official indices according to economic, political, social, environmental measures (Greco et al., 2019). For instance, the indexes such as Human Development Index, the Quality-of-Life Indicator, the Technology Achievement Index, the Competitiveness Index, the Environmental Performance, Index of Economic and Social Well-Being (Mazziotta & Pareto, 2018). However, research on Orang Asli socio-development index instrument is limited. Thus, this study provides a comprehensive overview of the development index instrument for Orang Asli socio- development, serving as a benchmark for monitoring and evaluating the impact of development programs and policies on the community.

RESEARCH METHODOLOGY

The Fuzzy Delphi Method (FDM) is a widely used approach for achieving expert consensus in decision-making and problem-solving. In this study, FDM was applied to develop a socio-development index instrument for the Orang Asli community. Using this method, 14 experts with expertise in the Orang Asli community participated in the study. The Delphi method is employed to obtain consensus among a group of experts for problem-solving (Jamil et al., 2024). Kaufman and Gupta (1991) pioneered the Fuzzy Delphi Method, which integrates fuzzy set theory with the traditional Delphi technique to enhance the accuracy and reliability of expert evaluations.

The FDM is a decision-making analytical approach that integrates fuzzy theory into the traditional method. Expert participation in this session aims to facilitate the development of index instruments for this study. This method also involves a multiple questionnaire survey to gather expert opinions on the issues under investigation. The selection of indicators and sub- indicators serving as a benchmark for Orang Asli development in Malaysia constitutes the initial step in the study. Besides saving time and money, employing FDM ensures an accurate representation of expert's judgement (Alqahtani & Noman, 2024). The approach for this study involved expert panel participation, particularly during FDM sessions. Expert participation in this session is designed to facilitate the development of instruments for this study. The step of this phase is in the next section.

1) Step 1- Selection of experts

There are fourteen ($n = 14$) experts selected to develop the index instrument using the purposive sampling method because it is the most acceptable strategy using the fuzzy Delphi method. In this phase, the selection of quality experts is important because it will affect the quality of the result (Ross et al., 2024). In accordance with Adler and Ziglio (1996), around 10 to 15 experts are an optimal number in the Delphi study if the uniformity is high and suggested that a total of 10-50 experts would be sufficient. The rationalization of the experts' selection is

based on the criteria of knowledge or interest, including experience of the issue of the study. Accordingly, experts in this study were selected based on several criteria, namely extensive knowledge related to the Orang Asli community, a minimum of 5 to 10 years of relevant professional experience, willingness to participate and remain committed throughout the study period, possession of at least a bachelor's degree with a doctorate preferred for academic participants, and effective communication skills (M. R. T. L. Abdullah et al., 2021; Zulkefli et al., 2025).

2) Step 2- Determine the linguistic scale

The next step is to establish a linguistic scale for the variable being considered. The linguistic scale is same as the Likert scale with an additional of fuzzy numbers given to the scale of responses based on triangular fuzzy number as shown in Figure 1 below. The triangular fuzzy number consists of three values: m_1 , m_2 and m_3 . The m_1 represents the lowest possible value, m_2 represents a middle possible value, and m_3 represents the highest possible value. For example, an evaluation score of 6 (highly agree) given by an expert will be converted into a 0.7 fuzzy score or 70% agreed minimum value, 0.9 or 90% agreed most reasonable value, and 1.0 or 100% agreed maximum value. These linguistic scales are used to convert the linguistic variables into fuzzy numbers. In this study, a 7-point linguistic scale was applied. This is because the higher and more scales were used, the more accurate and reliable the data (Dawood et al., 2021; Khalli et al., 2022). The result of the expert with the fuzzy number scale for each questionnaire was then inserted in Microsoft Excel.

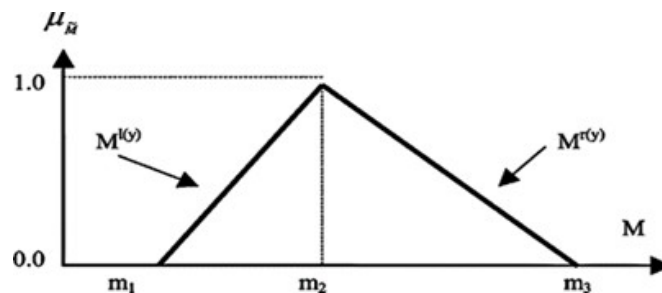


Figure 1: Triangular Fuzzy Number

3) Step 3- Determine threshold value 'd'

FDM method involves determining the threshold value 'd' where it is an important part in assessing the degree of agreement among the experts. The difference between the experts' evaluation data and the average value for each item is calculated to identify the threshold value 'd.' By using the threshold value 'd,' the consensus level among the experts will be determined. So that, the

threshold value ‘d’ for each item measured must be less than or equal to 0.2 (Cheng & Lin, 2002).

$$d(\tilde{m}, \tilde{n}) = \sqrt{\frac{1}{3} [(m_1 - n_1)^2 + (m_2 - n_2)^2 + (m_3 - n_3)^2]}$$

Figure 2: Threshold Value Construct

4) Step 4- Calculate the defuzzification value

Once the group consensus is achieved, the overall aggregate fuzzy evaluation is determined by adding all the fuzzy numbers for each item. The process of providing information about the level of importance of a variable is called defuzzification (Yaghoobi et al., 2024). The defuzzification process is the last step of the FDM. The calculation and determination of fuzzy value using the formula

$$A_{max} = \frac{1}{3} (m_1 + m_2 + m_3)$$

The 0.5 value of α -cut serves as the foundation for the fuzzy score (A). The measured item is discarded in accordance with the expert group's consensus if the score value (A) is less than 0.5. The value is allowed if it is equal to or greater than 0.5. Most crucial element will be the one with the highest defuzzification value (Kamaruddin et al., 2024).

RESULT AND DISCUSSION

Based on the result show that, 32 of the 33 proposed indicators were accepted for inclusion in the Socio-Development Index Instrument based on threshold value (≤ 0.20), expert consensus ($\geq 75\%$), and defuzzification value (≥ 0.50) (Cheng & Lin, 2002; Kamaruddin et al., 2024; Yeh et al., 2024), with only ‘indebtedness’ rejected due to a high threshold value ($d = 0.261$) and low expert consensus (31%). In the Level of Educational Achievement domain, all five indicators were accepted, while Complete Infrastructure had four accepted indicators. The Economic Empowerment domain included four accepted indicators, excluding ‘indebtedness,’ and both Environmental Sustainability and Leadership Empowerment had two and three accepted indicators, respectively. Land Recognition had three accepted indicators, Level of Health Care two, Policy and Legislation four, and Empowerment of Cultural Heritage five indicators. Expert consensus ranged from 75 to 88 percent, with defuzzification values between 0.814 and 0.960, showing strong agreement on the multidimensional aspects of Orang Asli development, including education, infrastructure, economic

empowerment, environmental sustainability, leadership, land rights, healthcare, legal and policy measures, and cultural preservation.

Table 1: List of indicators and sub-indicators

No	Indicators and Sub-Indicators	Threshold value	Expert consensus	Defuzzification value	Status
		(d) ≤ 0.2	(%) $> 75\%$	(a) = 0.5	
1	Level of Educational Achievement	0.085			Accepted
1.1	Completion of Schooling	0.066	81	0.940	Accepted
1.2	Educators among the Orang Asli	0.208	75	0.814	Accepted
1.3	Level of Literacy	0.051	88	0.945	Accepted
1.4	Skills Training	0.062	88	0.938	Accepted
1.5	Admission to Public and Private Higher Education Institutions (IPTA/IPTS)	0.037	88	0.952	Accepted
2	Complete Infrastructure	0.082			Accepted
2.1	Social Amenities	0.092	81%	0.919	Accepted
2.2	Public Facilities	0.087	81%	0.926	Accepted
2.3	Residential facilities	0.075	88%	0.924	Accepted
2.4	Digital Communication Facilities	0.075	88%	0.924	Accepted
3	Economic Empowerment	0.179			Accepted
3.1	Orang Asli Entrepreneurial Performance	0.168	75%	0.824	Accepted
3.2	Equity Savings	0.184	75%	0.845	Accepted
3.3	Employment	0.142	75%	0.886	Accepted
3.4	Household Income	0.142	75%	0.900	Accepted
3.5	Household Indebtedness	0.261	31%	0.786	Rejected
4	Environmental Sustainability	0.117			Accepted
4.1	Orang Asli Participation in Forest Conservation and Restoration	0.092	81%	0.919	Accepted
4.2	Level of pollution	0.143	75%	0.893	Accepted
5	Leadership Empowerment	0.083			Accepted
5.1	Orang Asli Involvement in NGO	0.107	75%	0.886	Accepted
5.2	Institution of Batin and Committee Leadership	0.037	88%	0.952	Accepted
5.3	Orang Asli Participation in Politics	0.107	75%	0.886	Accepted

No	Indicators and Sub-Indicators	Threshold value (d) ≤ 0.2	Expert consensus (%) $> 75\%$	Defuzzification value (a) = 0.5	Status
6	Land Recognition	0.150			Accepted
6.1	Gazettement of Orang Asli Land	0.102	81%	0.926	Accepted
6.2	Land Ownership	0.182	75%	0.893	Accepted
6.3	Rights of Access to Land	0.167	75%	0.900	Accepted
7	Level of Health Care	0.028			Accepted
7.1	Levels of Health	0.037	88%	0.952	Accepted
7.2	Accessibility of Health Services	0.020	88%	0.960	Accepted
8	Policy and Legislation	0.049			Accepted
8.1	National Commitment to International Instrument	0.078	81%	0.933	Accepted
8.2	National Commitment to Constitutional and Legal Provisions	0.020	88%	0.960	Accepted
8.3	Gender Equality and Empowerment	0.078	81%	0.933	Accepted
8.4	Implementation of Free, Prior and Informed Consent (FPIC) and Self-Determination	0.020	88%	0.960	Accepted
	Culture Heritage Empowerment	0.06			Accepted
	Status Enhancement of Orang Asli Language	0.078	81%	0.933	Accepted
	Participation in Cultural Events	0.020	88%	0.960	Accepted
	Customary Law and Beliefs	0.078	81%	0.933	Accepted
	Indigenous Knowledge	0.033	88%	0.960	Accepted
	Recognition of Contributions to Nation-Building	0.091	81%	0.933	Accepted
	Overall	0.095	80%		

This study successfully determined nine indicators and 32 sub-indicators to be included in the Orang Asli socio-development index instrument. Level of Educational Achievement is a critical dimension in the socio-development of the Orang Asli community, strongly influencing human development (Deli & Yasin, 2016; Salim et al., 2020). The Malaysian government has implemented initiatives to improve access, facilities, and economic support across ethnic, geographical, and religious boundaries (Choy et al., 2010; Razak, 2022). The study highlights their relevance in capturing educational attainment. Literacy levels and admission to public (IPTA) and

private higher education institutions (IPTS) were ranked highest, showing their central role in enabling Orang Asli youth to access socio-economic mobility and integrate into the national education system. Beyond basic literacy, education serves to break cycles of poverty, enhance opportunities, and align with the 2030 Sustainable Development Goals for inclusive and equitable education (Guleng et al., 2023). Ensuring progress in literacy, schooling completion, skills training, and higher education access therefore remains foundational to improving the livelihoods of Orang Asli communities.

Complete Infrastructure is a fundamental component of Orang Asli social life, supporting community functioning, well-being, and daily activities (Enneking et al., 2025; Myntti, 2024). It encompasses physical facilities, public services, and information and communication technology (ICT) networks (Zakaria et al., 2024). Infrastructure deficits, such as limited access to clean water, electricity, and internet connectivity, are particularly significant for rural communities (Ab Rahman et al., 2022). Including these indicators in the SDI underscores that Orang Asli cannot fully participate in development without equitable access to basic services. The strong expert consensus reflects a shared understanding that addressing infrastructure gaps is a prerequisite for achieving equitable socio-development outcomes.

Economic Empowerment is a determinant of long-term socio-development for the Orang Asli, encompassing access to resources, income generation, livelihood sustainability, and the preservation of cultural and ecological knowledge (M. F. Abdullah et al., 2021; Dong et al., 2022). In this domain, four indicators, entrepreneurship performance, equity savings, employment, and household income, were accepted, highlighting the importance of economic participation and asset ownership for securing livelihoods (Derani et al., 2020). Nevertheless, the indebtedness indicator was rejected, consistent with indigenous practices emphasizing financial self-reliance and freedom from debt as a key criterion for well-being (Abdul Razak et al., 2025). These findings underscore that economic empowerment for the Orang Asli should prioritize sustainable income, employment, and asset-building rather than financial burdens, ensuring the SDI reflects pathways to autonomy, resilience, and inclusive socio-economic development (Ford et al., 2020).

Environmental Sustainability is a vital dimension of Orang Asli socio-development, as the community maintains reciprocal relationships with forest ecosystems for food, water, medicine, shelter, and cultural practices (Baer, 2014; Diansyah et al., 2022). These findings underscore that Orang Asli socio-development is closely linked to environmental stewardship, ensuring that improvements in livelihoods, health, and social participation are aligned with sustainable forest management and natural resource protection (Han, 2021; Jamaludin et al., 2025). By including environmental sustainability in the SDI, experts emphasized that community progress must be integrated with ecological

management, reinforcing the balance between socio-economic development and environmental protection.

Leadership Empowerment is essential for Orang Asli communities to actively participate in decision-making, represent their interests, and guide their own development processes (Isa et al., 2025). The Tok Batin serves as a custodian of cultural values, a mediator in community decision-making, and a link between Orang Asli communities and government agencies for the delivery of aid, socio-economic development, and problem-solving, ensuring the well-being and progress of the community (Abdullah et al., 2023; Roslan et al., 2024). This study highlights that effective leadership ensures Orang Asli are active participants, not passive recipients, in shaping their socio-development and preserving their cultural heritage.

Land Recognition is central to Orang Asli identity, cultural continuity, and economic survival (Dong et al., 2022; Khairil et al., 2025; Sadeka et al., 2020). In this domain, all three indicators, gazetted land, land ownership, and land access rights, were accepted, highlighting the importance of legal recognition and management of land for Orang Asli communities. Customary land constitutes the core of Orang Asli settlements, enabling socio-economic stability, inheritance of traditions, and continuation of cultural practices (Taman & Kasim, 2021). Expert consensus emphasizes that legal recognition of land tenure is fundamental to preserving Orang Asli culture, heritage, and livelihoods, allowing communities to manage their land, pass it down across generations, and sustain both economic stability and cultural identity (Hassan et al., 2023; Kasim, 2021; Wahab et al., 2022).

Level of Health Care is a persistent dimension of inequality affecting the Orang Asli community, with disparities in physical health, environmental exposure, access to healthcare, and cultural understandings of illness and well-being (Rosman et al., 2020). The inclusion of these indicators emphasizes that improving both health outcomes and service accessibility is essential to reducing disparities, supporting vulnerable populations, and aligning Orang Asli socio-development with national healthcare goals, ensuring that no community is left behind.

Policy and Legislation are fundamental to Orang Asli socio-development, as legal frameworks shape access to resources, protect rights, and enable participation in decision-making (Davidson & Coburn, 2021; Hassan et al., 2023). These findings highlight that while international norms and inclusive principles are important, strong domestic legal commitment and the practical application of FPIC are critical for ensuring equity, justice, and long-term sustainability in Orang Asli socio-development.

Cultural Heritage Empowerment is a core dimension of Orang Asli socio-development, as culture shapes identity, values, social norms, and everyday practices that sustain community well-being (Gan, 2022). These indicators

capture lived cultural practices and knowledge systems that anchor Orang Asli resilience and social cohesion. The inclusion of this domain in the socio-development index underscores that development for the Orang Asli must go beyond material progress to safeguard language, customary law, and indigenous knowledge, ensuring that socio-development strengthens rather than erodes cultural identity and heritage.

CONCLUSION

The development of the Orang Asli socio-development index instrument provides a valuable guideline for ensuring that the Orang Asli community is not left behind in national development efforts. This study offers a structured way to assess the advancement of socio-development for the Orang Asli community. The findings demonstrate a strong consensus among experts regarding the objectives of the socio-development index instrument. This tool has the potential to be systematically employed over the long term to assess the effectiveness of socio-development initiatives and their impact on the Orang Asli community. Furthermore, the index instrument provides a foundational framework for strategic planning and evidence-based policymaking, particularly in supporting the Orang Asli Development Department (JAKOA) in achieving its vision and mission. By adopting a multidimensional and data-driven approach, this study contributes to the broader discourse on Orang Asli socio-development and social equity in Malaysia.

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