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Environmental governance of a mass tourism destination: An analytic hierarchy process assessment of sustainable tourism policy implementation in Badung Regency, Bali, Indonesia

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ABSTRACT

Badung Regency carries the heaviest tourism load in Indonesia, and with it some of the most serious environmental pressures at the destination scale. These include coastal solid waste, the conversion of agricultural land, and an exceedance of environmental carrying capacity that has not yet been measured. The problems have continued even after Regulation No. 9 of 2021 on Sustainable Tourism Destinations came into force, which suggests that the difficulty lies in how the policy is delivered rather than in the rules themselves. In this study we assessed how the regulation is implemented across its four sustainability pillars and measured the relative importance of the factors that govern delivery. A descriptive qualitative design was combined with the Analytic Hierarchy Process. The qualitative work used in-depth interviews with nine key informants, non-participant observation at Kuta and Seminyak beaches, and documentary analysis, while the Analytic Hierarchy Process broke the four Edwards III determinants into thirteen sub-criteria that were compared on the Saaty ninepoint scale and tested for consistency. Implementation was strongest in the socio-cultural and economic pillars and weakest in the environmental and governance pillars. The Analytic Hierarchy Process ranked communication first (0.399), followed by resources (0.266), bureaucratic structure (0.204), and disposition (0.131), with all consistency ratios below 0.10. Clarity and consistency of the policy message were the highest-ranked sub-criteria, while budget availability was among the lowest. These results show that the participating stakeholders perceived message quality, technical competence, and role clarity, rather than a shortage of funds, as the most important implementation factors among those assessed. They express expert judgement about relative priority, not measured effects on environmental outcomes.

Tourism is one of the most effective tools for local economic development, but it is also one of the least regulated sources of environmental pressure in developing economies. When the number of visitors grows faster than the capacity of institutions to manage them, a destination tends to face solid waste accumulation, declining coastal water quality, land-use conversion, and infrastructure saturation. This condition is now widely described as overtourism (Risfandini 2024). The environmental cost is rarely paid by the tourism sector itself. Instead, it is passed on to coastal ecosystems, municipal waste systems, and the residents who depend on both. Evidence from Indonesian island destinations shows that the ecological damage caused by unregulated visitor growth, especially coral reef degradation and marine litter, can outweigh the economic benefit that drove the growth in the first place (Lukman et al. 2022).

Indonesia's post-pandemic recovery has made this problem sharper. Foreign arrivals fell to roughly four million in 2020 and dropped further in 2021 because of mobility restrictions, then recovered to more than fourteen million by 2024 (BPS 2025). This recovery has been concentrated geographically rather than spread evenly (Fig. 1). Between 2020 and 2024, Ngurah Rai International Airport in Bali received a cumulative 14.77 million foreign arrivals, compared with 5.97 million through Soekarno- Hatta and fewer than 0.65 million through each of the other main gateways. A single island therefore absorbed more than twice the arrivals of the national capital region and roughly nine times those of all other monitored gateways combined (BPS 2025).

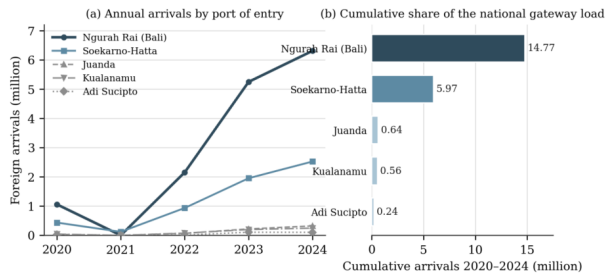


Fig. 1: Foreign tourist arrivals to Indonesia by principal port of entry, 2020 to 2024: (a) annual trajectory of postpandemic recovery; (b) cumulative arrivals over the period. Source: compiled from BPS (2025).

The same concentration appears at the sub-provincial scale. Within Bali, Badung Regency recorded 6,745,502 domestic visitor trips in 2024, about 1.5 times the volume of the next-ranked jurisdiction and more than three times the median for the province's nine regencies and cities (Fig. 2). Badung has held this position continuously since 2020. As a result, it absorbs a national-scale environmental load within an area of only about 418 km².

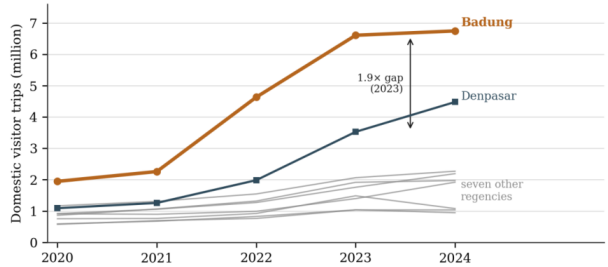


Fig. 2: Domestic visitor trips by regency and city of destination in Bali Province, 2020 to 2024. Source: compiled from BPS (2025).

The environmental consequences are well documented. Land-cover analysis of Badung shows a steady conversion of paddy fields and open land into commercial and accommodation use, with a loss of infiltration capacity and agrarian livelihood security (Indrawan et al. 2022). Waste-flow as- sessment indicates that plastics make up about 68% of the solid waste generated in the regency, much of it from tourism establishments and markets and carried to the sea through the river network (Ratnawati et al. 2022). Beach-sediment surveys on the Indonesian coast show that this pressure is directly attributable rather than diffuse. At Kondang Merak, a popular beach destination in Malang Regency, the backshore zone shaped by visitor activity carries a litter composition that can be dis- tinguished from the foreshore zone supplied by waves and currents, so the tourism-derived fraction can be separated from the marine-transported fraction (Yona et al. 2024). Traffic saturation in the Kuta-Seminyak corridor has become both an emissions problem and a liveability complaint (Ariana et al. 2025), and the regency's dependence on a single sector was exposed by the collapse in em- ployment during the pandemic (Heny et al. 2024). Stakeholder studies also report that ecotourism development in Badung remains economically weighted, so that ecological and cultural safeguards are placed below visitor-volume targets, and that cooperation between government, business, and community actors is limited by weak mutual trust (Hamka et al. 2022).

Indonesia's policy response is Regulation of the Minister of Tourism and Creative Economy No. 9 of 2021 on Guidelines for Sustainable Tourism Destinations. It replaced the earlier 2016 instrument and, for the first time, set a single integrated standard covering four pillars at once: sustainable des- tination governance, economic sustainability, socio-cultural sustainability, and environmental sus- tainability (Fadli et al. 2022). The environmental pillar is explicit. It requires efficient management of water, energy, and waste, protection of biodiversity, control of pollution, and spatial planning that takes the environment into account. The regulation also aligns destination management in Indonesia with Sustainable Development Goals 8, 11, 12, 13, 14, and 15.

The fact that environmental degradation in Badung has continued five years after the regulation came into force therefore points to an implementation problem rather than a regulatory one. Other Indone- sian evidence supports this reading. Studies of sustainable tourism policy at the national level identify communication between actors, resource allocation, and community involvement as the main deter- minants of success, rather than the content of the rules themselves (Damiasih 2023). Systematic review evidence points to cross-sectoral coordination and human resource capacity as the recurring bottlenecks, with budget limits and stakeholder conflict as secondary constraints (Cahyono et al. 2025). The same pattern appears in Indonesian environmental management outside tourism. In a study of polyethylene terephthalate bottle waste, Amirudin et al. (2023) found that the main barrier to performance was the absence of a clear allocation of roles, obligations, targets, and activities among stakeholders. They proposed a public-private partnership framework that fixes each actor's role before performance is

expected. This approach can be transferred directly to destination-scale environmental governance, where the set of actors is similarly fragmented across tourism, environ- ment, spatial planning, and customary institutions.

What has not been established is the relative weight of these determinants. Implementation research in the Indonesian tourism sector is dominated by descriptive case studies that identify constraints without ranking them. This leaves local governments, which operate under real fiscal and adminis- trative limits, without any basis for deciding which reforms to tackle first. Multi-criteria decision anal- ysis addresses exactly this gap. The Analytic Hierarchy Process breaks a complex judgement into a hierarchy of criteria and sub-criteria, converts expert judgement into ratio-scale weights through pair- wise comparison, and then tests those weights for consistency (Saaty & Vargas 2012). It is well suited to environmental policy problems of this kind, where the criteria are qualitative and the evi- dence is necessarily expert judgement, but the resulting priorities still need to be reproducible and open to inspection.

This study therefore combines a qualitative implementation assessment with the Analytic Hierarchy Process, using the four determinants proposed by Edwards III (1980), namely communication, re- sources, disposition, and bureaucratic structure, as the criteria layer. The objectives are threefold: to assess how Regulation No. 9 of 2021 is implemented across its four pillars in Badung Regency; to determine the relative priority of the implementation determinants and their sub-criteria; and to draw implications for environmental governance in comparable mass tourism destinations.

2. MATERIALS AND METHODS 2.1. Study Area

Badung Regency lies in southern Bali, Indonesia, and covers about 418.52 km² across six districts.

It contains Ngurah Rai International Airport and the main coastal tourism zones of Kuta, Legian, Seminyak, Canggu, Jimbaran, Nusa Dua, and Uluwatu, together with an upland interior that still holds agricultural and customary land uses. The regency's coastline receives both direct tourism-derived waste and riverborne waste from upstream catchments (Ratnawati et al. 2022). We concentrated

densities in the regency with visible pressure on solid waste handling, public space, and traffic ca- pacity, and therefore provide the most demanding test of the environmental pillar of the regulation.

2.2. Research Design

We adopted a descriptive qualitative design as the main strategy, because implementation is an interpretive process whose meaning is carried by the accounts of the actors who perform it. Purely narrative implementation research has a known limitation: it identifies constraints but does not weight them. To overcome this, we integrated the qualitative component with the Analytic Hierarchy Pro- cess. The two strands are interdependent rather than parallel. The qualitative data establish what is happening and why, and they serve three specific functions in relation to the Analytic Hierarchy Pro- cess. They supply the operational sub-criteria that fill the hierarchy (Section 2.4); they provide the expert judgement from which the pairwise comparisons are drawn; and they give the interpretive context in which the resulting weights are read, so that a numerical priority is explained by the field evidence rather than presented on its own. The Analytic Hierarchy Process, in turn, converts the constraints identified in the qualitative work from an unranked list into an ordered, consistency-tested priority structure. The full sequence from problem definition to the derivation of governance implica- tions is set out in Fig. 3 in the Appendix. Data collection and analysis were carried out between 2025 and January 2026.

2.3. Data Collection

We used three techniques. In-depth interviews were conducted with nine key informants, selected purposively and then extended by snowball sampling from an initial set of officials in the Badung Tourism Office. We judged informants suitable against three explicit criteria: direct involvement in the formulation, delivery, or oversight of sustainable tourism policy in Badung; at least five years of rele- vant professional or scholarly engagement with the destination; and the ability to compare implemen- tation determinants against one another, which is the specific skill the Analytic Hierarchy Process requires. The informants were two officials of the Badung Tourism Office, two destination managers responsible for Kuta and Seminyak beaches, two representatives of local communities involved in tourism, and three tourism academics from Udayana University. All nine informants took part in the in-depth interviews and completed the full set of Analytic Hierarchy Process pairwise comparisons, so the qualitative evidence and the priority weights come from the same expert panel. The panel was deliberately weighted toward actors with a cross-cutting view of destination governance. It did not include dedicated representatives of the environmental agency, the spatial-planning authority, waste- management operators, or the tourism business associations, and we discuss the implications of this boundary for the environmental findings in Section 4.6. Interviews were held face to face or by tele- phone, lasted 45 to 90 minutes, and were recorded and transcribed in full. Passive participant obser- vation was carried out at the two coastal sites, focusing on waste handling, public-space and beach conditions, traffic loading at peak hours, and the visible application of sustainability requirements by tourism enterprises. Documentary analysis covered Regulation No. 9 of 2021, the Badung Regional Tourism Development Master Plan 2017 to 2025, annual performance reports of the Badung Tourism Office, and internal operating documents of destination managers.

2.4. Analytical Framework and Hierarchy Construction

We specified the criteria layer of the hierarchy from the implementation framework of Edwards III (1980), which holds that policy delivery is governed by communication, resources, disposition, and bureaucratic structure. We chose this framework for two reasons. First, Regulation No. 9 of 2021 is a hierarchical instrument passed down from central to local government, so a top-down analytical lens is appropriate. Second, its four variables match the constraints reported independently for Badung, namely weak collaboration between actors, limited technical capacity, an economically weighted policy orientation, and fragmented

institutional arrangements (Hamka et al. 2022, Cahyono et al. 2025). Each criterion was then broken into operational sub-criteria drawn from the theoretical framework, the content of the regulation, and the preliminary field findings, giving thirteen sub-criteria in total (Table 1). The resulting three-level hierarchy places the goal at level one, the four determi- nants at level two, and the thirteen sub-criteria at level three (Fig. 4).

2.5. Analytic Hierarchy Process Procedure

Pairwise comparisons were obtained from the key informants using Saaty's nine-point scale, on which 1 means equal importance and 9 means that one element is extremely more important than another, with reciprocal values entered in the transposed cells (Saaty & Vargas 2012). Comparisons were made first among the four criteria with respect to the goal, and then among the sub-criteria with respect to each parent criterion. The individual judgements were combined into a single group matrix using the geometric mean, which is the aggregation rule consistent with the ratio-scale properties of the method.

Each aggregated matrix was normalised by dividing every entry by its column total, and the priority vector was obtained as the row-wise arithmetic mean of the normalised matrix. For a matrix that is exactly consistent, this arithmetic-mean vector equals the principal right eigenvector. For the near- consistent matrices obtained here, it is a close and commonly used approximation, and we confirmed that the two agree to three decimal places for every matrix in this study. Consistency was tested through the maximum eigenvalue λmax, the consistency index in Eq. (1), and the consistency ratio in Eq. (2), where n is the matrix order and RI is the random index (0.58 for n = 3 and 0.90 for n = 4).

Consistency was checked at two levels. Each respondent's own comparison matrices were checked before aggregation and had to satisfy $CR \leq 0.10$. Where an individual matrix exceeded this threshold at first, the respondent was asked to reconsider the specific judgements involved, and only matrices that met the threshold were carried into the geometric-mean aggregation. In this way the group weights are not an average over internally inconsistent judgements. The aggregated matrices were then tested again at the group level and again satisfied $CR \leq 0.10$. Global weights were obtained by multiplying each sub-criterion's local weight by the weight of its parent criterion. All computations were carried out in Microsoft Excel. The aggregated pairwise-comparison matrices and a worked example of the priority-vector and consistency calculation are given in Appendix B, and the full set of individual matrices is available from the corresponding author on request.

$$CI = (\lambda max - n) / (n - 1) \quad \ldots(1) \qquad CR = CI / RI \quad \ldots(2)$$

2.6. Qualitative Analysis and Validity

Interview transcripts, field notes, and documents were analysed using the interactive model of Miles et al. (2014), moving through data collection, data condensation, data display, and conclusion draw- ing with verification. We established credibility in two ways. Source triangulation compared accounts across government, managerial, community, and academic informants, and technique triangulation tested interview claims against direct observation and official documents. We treated convergence across the three sources on the main implementation findings as the criterion of adequacy.

We assess the four pillars below as an interpretive judgement based on the convergence of interview, observation, and documentary evidence. We did not apply any formal scoring procedure or quanti- tative implementation index. The words "strongest" and "weakest" therefore refer to the relative weight of enabling over constraining conditions in the qualitative evidence (Table 2). These are find- ings about how the policy is implemented, drawn from informants and field observation. They are different from measured environmental outcomes such as water quality, waste generation, or land- cover change, which we did not quantify in this study and which, where cited, come from previously published work.

3. RESULTS 3.1. Implementation of the Four Sustainability Pillars

Destination governance. Badung has adopted a collaborative governance model in which custom- ary villages, tourism enterprises, and community groups take part alongside the regency administra- tion, and formal instruments such as the Regional Tourism Development Master Plan and regental regulations on tourism villages are in place. Monitoring mechanisms exist, but they are not well inte- grated. Coordination between the Tourism Office, the Environment and Sanitation Office, and the spatial planning authority remains sectoral, so programmes run in parallel rather than in sequence.

Beach cleaning is carried out routinely with community participation, but upstream waste handling does not always keep pace, and the predictable result is that riverborne material returns to the coastal zone that has just been cleaned. Tourism Office informants and destination managers described this repeated re-accumulation independently of one another, and direct observation at both study beaches confirmed it. The transparency of monitoring results to non-governmental actors also re- mains limited, a point on which community and academic informants agreed.

Economic sustainability. Tourism contributes a large share of Badung's own-source revenue, and the regency has used this fiscal room to fund micro-enterprise development, tourism village pro-grammes, and workforce training in places such as Pangsan, Sangeh, and Belok. Household in- comes and local employment have risen, but the benefits are not evenly distributed. Returns are concentrated in large accommodation and food-service operators that have better access to markets and to regulatory processes, while micro-enterprises depend on government help for similar oppor- tunities, and village-level economic institutions remain weak. Training has tended to be short and without sustained mentoring, producing the situation Edwards III (1980) calls resource inadequacy, where implementers are willing but under-equipped. Community informants described the support they received as one-off events rather than continuing accompaniment, which is consistent with the Tourism Office's own programme documents.

Socio-cultural sustainability. This is the strongest pillar. The Tri Hita Karana principle, which orders the relationships among

people, nature, and the divine, works as a normative foundation for destina- tion management, and customary villages hold real authority over the scheduling of tourism activity, the use of sacred space, and the way cultural performance is presented to visitors. Cultural identity

control over tourism conduct. This arrangement is best described as cultural governance (Sastrawan 2020). We identified two risks. Ritual practices are increasingly packaged for visitor consumption in ways that erode their sacred meaning (Greenwood 1989), and the transmission of cultural value to younger generations is not yet systematically organised. Academic and community informants both stressed the authority of the customary villages over tourism conduct, while noting that participation is stronger in carrying out decisions than in making them (Tosun 2000).

3.2. Priority Structure of Implementation Determinants

All aggregated comparison matrices met the consistency requirement, with consistency ratios below the 0.10 threshold at both the criteria and the sub-criteria level, so the derived weights are accepta- ble. A group-level consistency ratio can hide disagreement among respondents, so we also exam- ined how stable the criteria ranking was across the informant groups. The ordering of communication first and disposition last was common to the government, management, community, and academic sub-panels, while the middle positions of resources and bureaucratic structure were less clearly sep- arated. The headline ordering is therefore robust, but the exact interior weights should be read as indicative rather than exact. We report the weights below to five decimal places to reproduce the computation, not to claim that level of precision in the underlying judgements. The criteria weights are given in Table 3 and shown in Fig. 5. The distribution is far from the uniform 0.250 that would result if the four determinants were equally important: communication is 59% above that reference, while disposition is 48% below it.

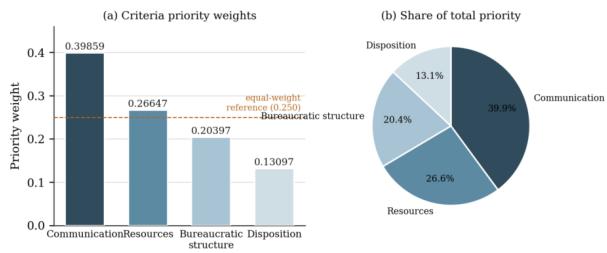


Fig. 5: Priority weights of the four implementation criteria: (a) weights against the equalweight reference; (b) proportional share of total priority.

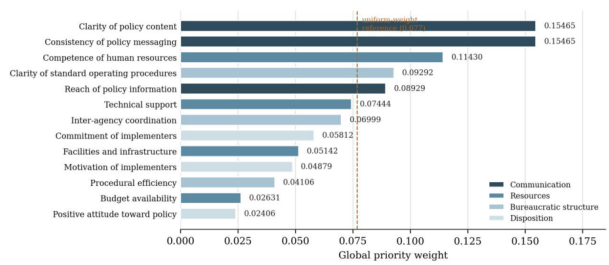


Fig. 6: Global priority weights of the thirteen sub-criteria, ranked, coloured by parent criterion. The dashed line marks the weight each sub-criterion would carry under a uniform distribution.

Table 4: Local and global priority weights of the thirteen sub-criteria.

Criterion (weight) Sub-criterion Local Global Rank Clarity of policy content 0.38800 0.15465 1

Communication carries the highest weight of the four criteria at 0.39859, half again as much as re-

Edwards III (1980) treats communication as the first factor, whose failure spreads into every later stage. Its size here, however, reflects the particular structure of the Badung policy field, where a mixed set of actors, including regional agencies, hotel and restaurant operators, destination manag- ers, customary villages, and residents, must share a single meaning of sustainability.

The internal structure of the criterion is more informative than the aggregate. Clarity of policy content and consistency of policy messaging carry identical global weights of 0.15465 and rank jointly first among all thirteen sub-criteria, while reach ranks only fifth at 0.08929. Informants gave more weight to the quality of the message than to how widely it is spread. The qualitative material explains why.

Field-level implementers often read sustainability as cleanliness and conservation alone, rather than the balanced management the regulation requires, and operators read it through the lens of visitor numbers. When the message is understood differently along the chain, the policy drifts from its stated intent, which is exactly the distortion Edwards III (1980) predicts, and clear objectives are a precon- dition for consistent action in cross-sectoral policy of this kind (Hjern & Porter 1981). Widening dis-semination before the message is stable raises rather than lowers the risk of miscommunication (Pressman & Wildavsky 1973), and signals that keep shifting erode compliance (Mazmanian & Sa-batier 1983). The main reform is therefore not another round of socialisation events, but a single, technically clear, and stable statement of what sustainability requires of each type of actor. This is the qualitative counterpart of the numerical result. Because clarity and consistency of the message are the two highest-weighted sub-criteria, and because the interviews trace implementation drift to different understandings of sustainability along the delivery chain, the single technical guideline pro- posed in Section 4.5 follows as the specific instrument the ranking points to.

4.2. Resources: Competence Rather Than Finance

Resources rank second at 0.26647, but the make-up of the criterion goes against the usual expec- tation. Competence of human resources dominates at a global weight of 0.11430, third overall, while budget availability is last within the criterion and twelfth of thirteen at 0.02631 (Fig. 6). The low weight on budget reflects Badung's particular fiscal position, since its tourism-derived own-source revenue is among the highest of any Indonesian regency. This result needs to be read carefully. The inform- ants perceived budget as relatively less important than competence, which is not the same as show- ing that budget is not a constraint at all. What the evidence supports is that, in a regency with Badung's fiscal standing, the constraint that is felt more

sharply moves from the amount of money to the capacity to turn money into environmental outcomes (Pressman & Wildavsky 1973, Wu et al. 2015). Implementing the environmental pillar needs officials and managers who can carry out carry- ing-capacity analysis, zoning, waste-stream management, and destination sustainability standards, and these skills are unevenly spread across the regency's institutions. Without them, the policy stays normative rather than operational (Hall 2019). What the informants' priorities suggest, for well-re- sourced destinations, is that sustained investment in technical capacity and mentoring is likely to matter at least as much as extra environmental budget lines. This is a statement about perceived relative priority among the factors assessed, not a claim that funding does not matter.

4.3. Bureaucratic Structure and Role Allocation

Bureaucratic structure ranks third at 0.20397, but its leading sub-criterion, clarity of standard operat- ing procedures, is fourth of the thirteen sub-criteria overall at 0.09292, ahead of every element of the two lower-weighted criteria. Implementers gave roughly twice as much weight to procedural certainty as to administrative speed. Where tourism regulation meets environmental protection, spatial plan- ning, and customary law, unclear procedure creates conflict over jurisdiction, and clear procedure is a precondition for consistent and coordinated delivery (Hill & Hupe 2002). Coordination also carries substantial weight, because sustainable tourism in Badung needs alignment among regional agen- cies, customary villages, operators, and residents, and collaborative arrangements fail without strong coordinating mechanisms (Ansell & Gash 2008, Emerson et al. 2012). This agrees with Amirudin et al. (2023), who found that the decisive constraint in Indonesian waste governance was the absence of a framework setting out the role, obligation, target, and activity of each stakeholder. The strongest institutional asset in Badung, the enforcement capacity of the customary villages, currently sits out- side any formal allocation of environmental responsibility. Setting it out in a written procedural frame- work would turn an informal source of compliance into a durable governance tool.

4.4. Disposition as an Intervening Condition

Disposition ranks fourth at 0.13097, with commitment (0.05812) more than twice the weight of posi- tive attitude (0.02406). Where institutional arrangements and fiscal capacity are relatively mature, disposition works as a latent variable that strengthens or weakens the structural determinants rather than as a visible constraint on its own (Van Meter & Van Horn 1975). The internal ordering shows that implementers draw a sharp line between endorsing sustainability and being bound by it. Under constant commercial pressure, individual approval has to be turned into consistent collective action before it affects outcomes (Matland 1995). Local leadership is decisive here, because customary leaders interpret policy against conditions on the ground and effectively set its local content (Lipsky 1980). Motivation is shaped by what is measured, yet sustainability indicators are not built into the performance evaluation of officials (Ryan 2012).

4.5. Implications for Environmental Governance

Taken together, the qualitative and multi-criteria results point to a consistent reading. The evidence suggests that Badung's environmental deficit is linked less to an absence of regulation, a shortage of funds, or unwilling implementers, than to the delivery mechanism itself: a policy message that is unclear and inconsistently passed on, uneven technical competence, and an incomplete allocation of procedural responsibility across a fragmented set of actors. Because the priority weights express stakeholder perception rather than measured causal effect, we offer this as the most coherent ac- count of the convergent qualitative and multi-criteria evidence, not as a demonstrated causal chain.

The ranked weights translate into a suggested reform sequence, set out in Fig. 7 in the Appendix and ordered by the priority the participating stakeholders gave to the determinants. The sequence is a decision aid based on perceived priorities, not a prediction of environmental outcomes.

Four practical implications follow. First, the regency should issue a single technical guideline that states, in terms that micro-enterprises and tourism village managers can use, what each type of actor must do, by when, and against what measurable indicator. Second, a comprehensive environmental carrying-capacity assessment should be completed and made the binding basis for development permits and for managing visitor numbers in the coastal zone. We mean carrying capacity in four linked senses: ecological capacity, the assimilative limit of the coastal and reef environment; physi- cal-infrastructure capacity, the limits of water supply, roads, and drainage; waste-management ca- pacity, the throughput of collection, treatment, and disposal systems; and visitor or social capacity, the density beyond which the experience of residents and visitors declines. Sediment-based litter surveys that separate visitor-derived from marine-transported material give a practical monitoring tool for the waste-management dimension, since they isolate the share of coastal pollution that des- tination management can actually control (Yona et al. 2024). Third, sustainability indicators should be built into the annual performance reports of every relevant regional agency. Fourth, the environ- mental responsibilities of customary villages, private operators, waste banks, and regional agencies should be set out in an explicit partnership framework that specifies the role, obligation, target, and activity of each actor (Amirudin et al. 2023). These measures can be transferred to other high-pres- sure coastal destinations where the same pattern of strong regulation and weak delivery appears (Fadli et al. 2022, Zakaria 2024).

4.6. Limitations

Several limitations qualify these findings. First, the Analytic Hierarchy Process weights come from the judgements of nine key informants, so they express expert perception of relative importance rather than measured environmental performance or causal effect. They show where the participat- ing stakeholders would direct implementation attention, not how much environmental improvement would follow. Second, although the panel spanned government, management, community, and aca- demic perspectives, it did not directly include the environmental agency, the spatial-planning author- ity, waste-management

operators, or the tourism business associations, all of which are closely tied to the environmental findings. Their absence may under-represent constraints that are specific to those functions, and claims about the implementation system as a whole should be read with this boundary in mind. Third, non-participant observation was concentrated at Kuta and Seminyak beaches, the most heavily used sites in the regency. We chose them as the most demanding test of the environmental pillar, but they are not statistically representative of every tourism area in Badung, so we generalise observations from them to the regency only where interview or documentary evi- dence supports it. Fourth, the study covers a single regency whose fiscal capacity is unusual for Indonesia, so the low weight on budget should not be generalised to jurisdictions with tighter fi- nances. Fifth, the design is cross-sectional and cannot capture change in the priority structure over time. Future work should combine this framework with quantitative environmental indicators, includ- ing coastal water quality, waste diversion rate, and land-cover change, so that the stakeholder-per- ceived priorities reported here can be validated against measured environmental outcomes.

5. CONCLUSIONS

The implementation of Regulation No. 9 of 2021 in Badung Regency has gone furthest in the socio- cultural and economic pillars, where customary village institutions and the Tri Hita Karana principle provide both legitimacy and effective social enforcement. It has gone least far in the environmental and governance pillars, where cross-sectoral coordination is still fragmented, enforcement is weak, the economic benefit is unevenly shared, and no comprehensive carrying-capacity assessment yet limits development in the coastal zone.

The Analytic Hierarchy Process ranked the determinants as communication (0.399), resources (0.266), bureaucratic structure (0.204), and disposition (0.131), with all consistency ratios below 0.10.

At the sub-criterion level, clarity of policy content and consistency of policy messaging ranked jointly first (0.155 each), followed by competence of human resources (0.114) and clarity of standard oper- ating procedures (0.093). Budget availability ranked twelfth and positive attitude toward policy thir- teenth, so the two lowest-ranked sub-criteria were budget and a disposition item, not budget alone.

Among the determinants assessed, the participating stakeholders identified the quality and stability of the policy message, the technical competence of the people who put it into practice, and the pre- cision with which procedural responsibility is shared among governmental, commercial, and custom- ary actors as the most important for implementing the environmental pillar in a destination with strong regulation and strong fiscal capacity. These are priorities perceived by an expert panel, not causal effects established against measured environmental indicators, and they need to be validated through the quantitative environmental monitoring described above. Read with that qualification, the evidence suggests that, for destinations of this kind, strengthening the delivery mechanism deserves at least as much attention as adding further rules or funds.

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7. REFERENCES

Amirudin, A., Inoue, C. and Grause, G., 2023. Rethinking waste management in Indonesia using public-private partnership framework: A case study of PET bottle waste management. Nature Environment and Pollution Technology, 22(1), pp. 29-38. https://doi.org/10.46488/NEPT.2023.v22i01.003 2.

Ansell, C. and Gash, A., 2008. Collaborative governance in theory and practice. Journal of Public Admin- istration Research and Theory, 18(4), pp. 543-571. https://doi.org/10.1093/jopart/mum032 3. Ariana, N., Sutama, I.K., Pujaastawa, I.B.G., Wiranatha, A.S., Yudiastina, I.G.B.A. and Panca, W.A.P.,

Journal of Applied Sciences in Travel and Hospitality, 8(1), pp. 1-23. https://doi.org/10.31940/jasth.v8i1.1- 23 4. Badan Pusat Statistik, 2025. Number of foreign tourist visits and domestic tourist trips by regency and city of destination, Bali Province, 2020 to 2024.

Badan Pusat Statistik: Jakarta, Indonesia. Available online: https://www.bps.go.id (accessed on 6 August 2026).

Cahyono, J.P., Haryanto, T., Kusumawardani, D. and Purwono, R., 2025. Evaluating the effectiveness of public policy sustainable tourism development in Indonesia: A comprehensive systematic literature re- view. KnE Social Sciences, 10(5), pp. 158-175. https://doi.org/10.18502/kss.v10i5.18111

Damiasih, D., 2023. Implementation of sustainable tourism policy in Indonesia. Journal of Governance, 8(4), pp. 1-14. https://doi.org/10.31506/jog.v8i4.22928

Edwards III, G.C., 1980. Implementing Public Policy. Congressional Quarterly Press: Washington DC, USA, pp. 1-216.

Emerson, K., Nabatchi, T. and Balogh, S., 2012. An integrative framework for collaborative governance.

Journal of Public Administration Research and Theory, 22(1), pp. 1-29. https://doi.org/10.1093/jop- art/mur011 9. Fadli, M., Susilo, E., Puspitawati, D., Ridjal, A.M., Maharani, D.P. and Liemanto, A., 2022. Sustainable tourism as a development strategy in Indonesia. Journal of Indonesian Tourism and Development Studies, 10(1), pp. 25-32. https://doi.org/10.21776/ub.jitode.2022.010.01.04

Greenwood, D.J., 1989. Culture by the pound: An anthropological perspective on tourism as cultural com- moditization. In: Smith, V.L. (ed.) Hosts and Guests: The Anthropology of Tourism, 2nd ed. University of Pennsylvania Press: Philadelphia, USA, pp. 171-185.

Gravitiani, E., Ratnadewati, A. and Widiastuti, N., 2025. The implementation of contingent valuation method for waste management at Telaga Ngebel, Ponorogo, Indonesia: A novel approach to ecotourism waste processing house. Nature Environment and Pollution Technology, 24(2), D1706. https://doi.org/10.46488/NEPT.2025.v24i02.D1706

Hall, C.M., 2019. Constructing sustainable tourism development: The 2030 agenda and the managerial ecology of sustainable tourism. Journal of Sustainable Tourism, 27(7), pp. 1044-1060. https://doi.org/10.1080/09669582.2018.1560456

Hamka, H., Koesponco, E., Anita, A., Cahyaningrum, S. and Yusuf, M., 2022. Stakeholder collaboration in developing sustainable ecotourism in Badung. KnE Social Sciences, 7(9), pp. 1-12. https://doi.org/10.18502/kss.v7i9.11020

Heny, M., Dewi, M. and Irwansyah, M.R., 2024. Survival strategy for tourism business actors during the COVID-19 pandemic in Badung Regency. Journal of Economics, Finance and Management Studies, 7(7), pp. 4167-4177. https://doi.org/10.47191/jefms/v7-i7-34

Hill, M. and Hupe, P., 2002. Implementing Public Policy: Governance in Theory and Practice, 1st ed. Sage: London, UK, pp. 1-232.

Hjern, B. and Porter, D.O., 1981. Implementation structures: A new unit of administrative analysis. Organ- ization Studies, 2(3), pp. 211-227. https://doi.org/10.1177/017084068100200301

Indrawan, I.N.P., Widiatmaka, W. and Trisasongko, B.H., 2022. Land use land cover change in Badung Regency, Bali. IOP Conference Series: Earth and Environmental Science, 950(1), 012096. https://doi.org/10.1088/1755-1315/950/1/012096

Lipsky, M., 1980. Street-Level Bureaucracy: Dilemmas of the Individual in Public Services, 1st ed. Russell Sage Foundation: New York, USA, pp. 1-244.

Lukman, K.M., Uchiyama, Y., Quevedo, J.M.D. and Kohsaka, R., 2022. Tourism impacts on small island ecosystems: Public perceptions from Karimunjawa Island, Indonesia. Journal of Coastal Conservation, 26, 14. https://doi.org/10.1007/s11852-022-00860-9

Matland, R.E., 1995. Synthesizing the implementation literature: The ambiguity-conflict model of policy implementation. Journal of Public Administration Research and Theory, 5(2), pp. 145-174. https://doi.org/10.1093/oxfordjournals.jpart.a037242

Mazmanian, D.A. and Sabatier, P.A., 1983. Implementation and Public Policy, 1st ed. Scott Foresman: Glenview, USA, pp. 1-314.

Miles, M.B., Huberman, A.M. and Saldana, J., 2014. Qualitative Data Analysis: A Methods Sourcebook, 3rd ed. Sage: Thousand Oaks, USA, pp. 1-381.

Pressman, J.L. and Wildavsky, A., 1973. Implementation: How Great Expectations in Washington are Dashed in Oakland, 1st ed. University of California Press: Berkeley, USA, pp. 1-182.

Ratnawati, N.M.D.P., Hendrawan, I.G. and Brasika, I.B.M., 2022. Potential of waste entering the sea from land activities in Badung Regency, Bali Province. Journal of Marine Research and Technology, 5(1), pp. 5-9. https://doi.org/10.24843/JMRT.2022.v05.i01.p02

Risfandini, A., 2024. Sustainable tourism implementation in Indonesia: Emphasizing green tourism, com- munity-based tourism, and local empowerment. Jurnal Kajian Bahasa dan Pariwisata, 11(1), pp. 58-67. https://doi.org/10.34013/barista.v11i01.1506

Ryan, R.M., 2012. Motivation and public policy: Time for a psychologically informed approach. Public Administration Review, 72(2), pp. 174-182. https://doi.org/10.1111/j.1540-6210.2011.02516.x 27. Saaty, T.L. and Vargas, L.G., 2012. Models, Methods, Concepts and Applications of the Analytic Hierar- chy Process, 2nd ed. Springer: New York, USA, pp. 1-346. https://doi.org/10.1007/978-1-4614-3597-6

Sastrawan, I.W., 2020. Cultural governance in tourism management in Bali. Jurnal Kajian Bali, 10(1), pp. 1-20. https://doi.org/10.24843/JKB.2020.v10.i01.p01

Scheyvens, R., 2011. Tourism and Poverty, 1st ed. Routledge: New York, USA, pp. 1-244.

Tosun, C., 2000. Limits to community participation in the tourism development process in developing countries. Tourism Management, 21(6), pp. 613-633. https://doi.org/10.1016/S0261-5177(00)00009-1

Van Meter, D.S. and Van Horn, C.E., 1975. The policy implementation process: A conceptual framework. Administration and Society, 6(4), pp. 445-488. https://doi.org/10.1177/009539977500600404

Wu, X., Ramesh, M. and Howlett, M., 2015. Policy capacity: A conceptual framework for understanding policy competences and capabilities. Policy and Society, 34(3-4), pp. 165-171. https://doi.org/10.1016/j.polsoc.2015.09.001

Yona, D., Arifianti, D.N., Sari, S.H.J., Lestariadi, R.A. and Amirudin, A., 2024. Classification, composition, and sources of marine litter on beach sediment of Kondang Merak Coast, Malang, Indonesia. IOP Con- ference Series: Earth and Environmental Science, 1328(1), 012015. https://doi.org/10.1088/1755- 1315/1328/1/012015

Zakaria, J., 2024. Sustainable tourism as an economic development model in evaluation and prospects of priority tourism destination development policy in Indonesia. Jurnal Manajemen Pelayanan Publik, 8(2), pp. 474-489. https://doi.org/10.24198/jmpp.v8i2.54183

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INSTITUTIONAL REVIEW BOARD STATEMENT Ethical review and approval were waived for this study because it involved interviews with public officials and professional stakeholders in their institutional capacity, collected no sensitive personal data, and posed no more than minimal risk to participants.

INFORMED CONSENT STATEMENT Informed consent was obtained from all key informants involved in the study.

CONFLICTS OF INTEREST The authors declare no conflicts of interest.

APPENDIX A

Fig. 3 sets out the full research design, showing how the qualitative implementation assessment and the Analytic Hierarchy Process fit together.

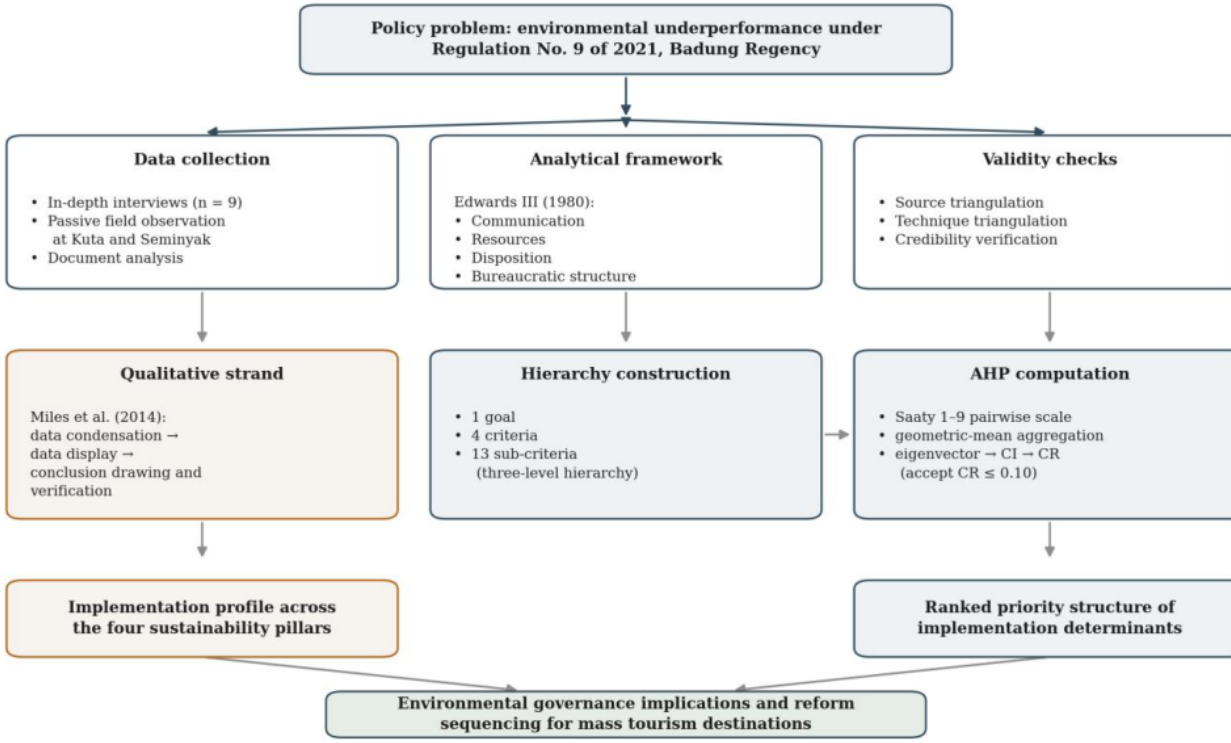


Fig. 3: Research design integrating the qualitative implementation assessment with the Analytic Hierarchy Process. Solid arrows denote the sequence of the design; the two strands converge on the governance implications.

Fig. 4 shows the three-level hierarchy on which the Analytic Hierarchy Process was built, with the derived criteria weights in parentheses.

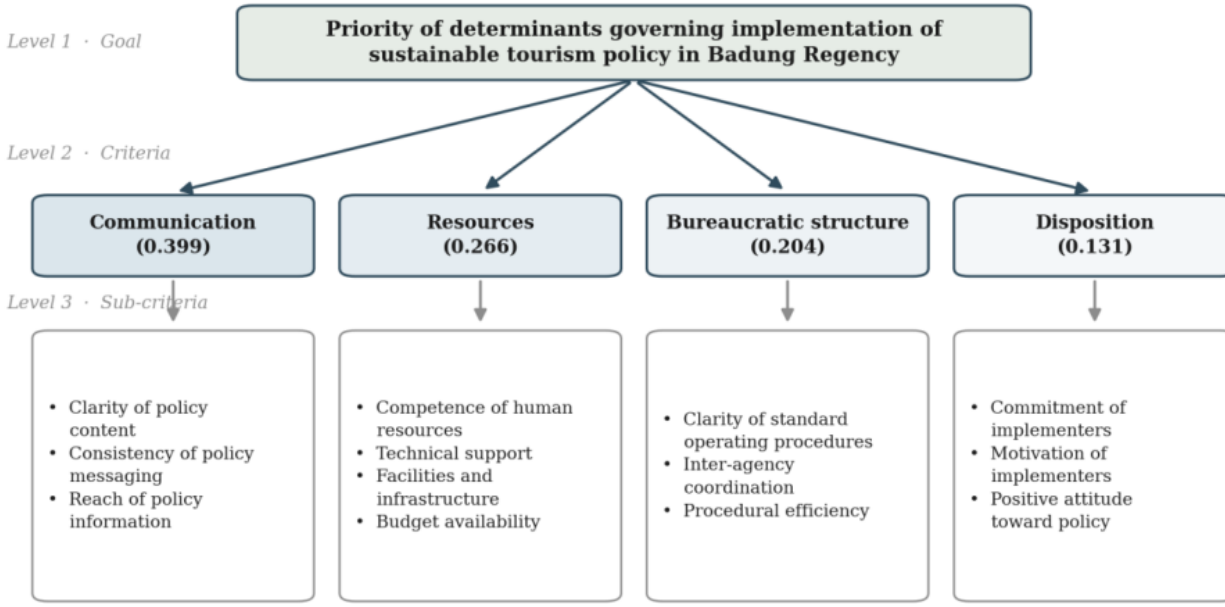


Fig. 4: Hierarchical structure of the Analytic Hierarchy Process model. Values in parentheses are the criteria priority weights derived in this study.

Fig. 7 presents the reform sequence implied by the global priority weights reported in Table 4.

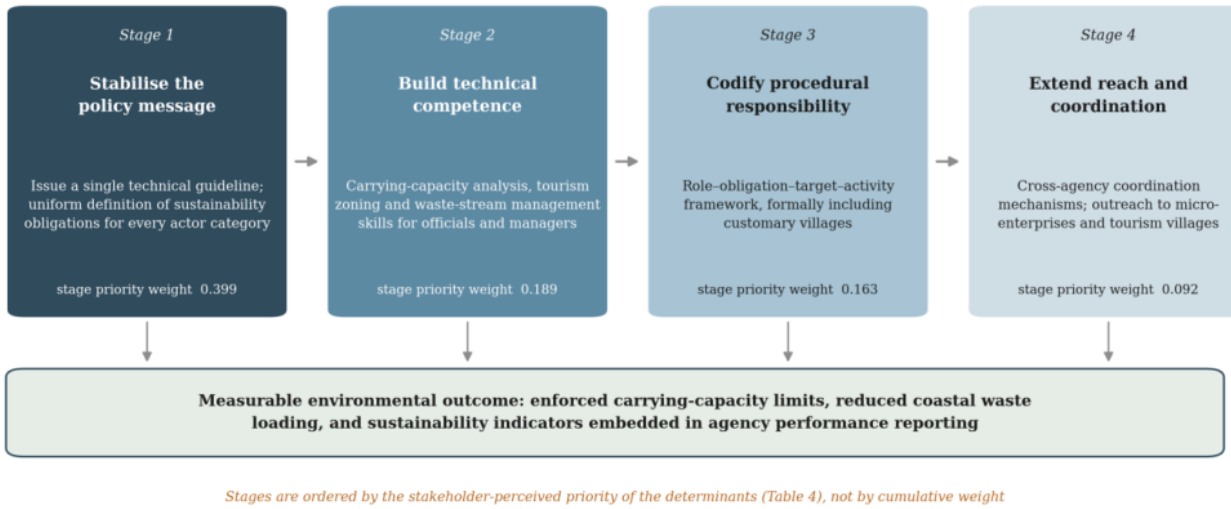


Fig. 7: Priority sequencing for strengthening environmental policy delivery in Badung Regency, derived from the global weights in Table 4. The value shown for each stage is the combined global priority weight of the sub-criteria addressed at that stage (Table 4); the four values are not cumulative running totals and do not sum to one.