

BALINESE PUBLIC PERCEPTION TOWARDS CLIMATE CHANGE ADAPTATION (CASE STUDY: GOVERNOR'S REGULATION NO. 48 OF 2019 ON THE USE OF BATTERY-BASED ELECTRIC MOTOR VEHICLES)

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Abstract:

The Bali Provincial Government has welcomed the Indonesian government's commitment to contribute to reducing greenhouse gas emissions. This study was conducted to determine the perception of the Balinese people towards the climate change adaptation policy that the Bali Provincial Government has made. The study was conducted qualitatively using content analysis. Interviews were conducted with respondents in the Sanur Tourism Area until the saturation point was reached. The results obtained were that most of the climate change perception stimuli were obtained through the sense of taste. There are three groups of perceptions, namely negative, positive, and neutral, towards the policy of Governor Regulation No. 48 of 2019. In addition, some people feel the benefits and disadvantages personally and in the community. Based on the results of this study, the tendency of the formation of respondents' perceptions is based on the work environment and daily activities. However, this policy is considered impossible for most people who do not have a choice of transportation modes. This study can provide information to local governments.

Keywords: Climate Change, Consumer Behavior, Citizen Perception

INTRODUCTION

Long-term use of fossil fuels can affect air quality and climate change. One of the most fundamental limitations of the planet is stable global temperatures, which are threatened by CO₂ emissions and other climate gases from human production and consumption activities (John Thøgersen, 2021). Many movements and even policies have been implemented to raise awareness of air quality and climate change issues. Indonesia has committed to addressing climate change since the Conference of the Parties (COP) 15 in 2009 with the Intended NDC pledge to reduce greenhouse gas (GHG) emissions by 26% (with its efforts) and by 41% (if receiving international assistance) by 2020. Indonesia's commitment was strengthened through the first Nationally Recognized Contribution (NDC) document in November 2016 by setting an unconditional target of 29% and a conditional target of up to 41% compared to the business as usual (BAU) scenario in 2030.

The updated NDC reflects progress beyond the existing NDC, in particular through:

- Increase ambition on adaptation;
- Increase clarity on mitigation by adopting the Paris Agreement rulebook (Katowice Package);
- Align national contexts with existing conditions;
- Establish milestones in line with national development in 2020-2024;
- Provide an indicative pathway towards Indonesia Vision 2045 and the Long-Term Strategy for Low Carbon and Climate Resilient Development 2050 (LTS-LCCR 2050); and
- Translate the Paris Agreement Rulebook (Katowice Package) into the Indonesian context.



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In the Katowice climate package, there are written guidelines for communicating adaptation. The following are the objectives of communicating climate change adaptation:

- a. Increase the visibility and profile of adaptation and its balance with mitigation;
- b. Strengthen adaptation action and support for developing countries;
- c. Provide input to the global inventory;
- d. Enhance learning and understanding of adaptation needs and actions;

Adaptation refers to adjustments in ecological, social or economic systems in response to actual or expected climate stimuli and their effects. It refers to changes in processes, practices and structures to moderate potential damages or to take advantage of opportunities associated with climate change. , countries and communities need to develop adaptation solutions and implement actions to respond to current and future climate change impacts (Dewi et al., 2024).

According to Thøgersen (2021), suggested actions to reduce the carbon footprint of consumption vary widely in their effectiveness. Consumers can also choose more environmentally friendly options when purchasing products, such as the most energy-efficient appliances or electric vehicles. However, assessing the carbon footprint of different behavioral choices is too complicated for most consumers. An individual's carbon footprint increases with income, especially in the transportation category, where high-carbon behavioral categories, such as air travel and car use, have high-income elasticity.

Adaptation actions can take many forms, depending on the unique context of a community, business, organization, country, or region. There is no 'one-size-fits-all solution' – adaptation can range from building flood defenses, setting up cyclone warning systems, and switching to drought-resistant crops to redesigning communication systems, business operations, and government policies. Many countries and communities have taken steps to build resilient societies and economies (Julaeha, 2023). However, greater action and ambition will be needed to manage risk cost-effectively, both now and in the future.

Regional Secretary of Bali Province, Dewa Indra, stated that in compiling the program, the Bali Provincial Government has been very pro-environment. He pointed to a number of programs, such as reducing carbon emissions, reducing greenhouse gas emissions, switching to electric vehicles, and protecting rivers and lakes. "This indicates how strong Bali's commitment is to the environment," he said. The Governor has issued very strategic policies as a form of climate change adaptation. Climate change is caused by increasing carbon emissions and increasing greenhouse gases. "The Governor's policies are related to the environment and clean energy in that context. Indeed, the name of the policy is a regional regulation on organic farming and a gubernatorial regulation on new and renewable energy. However, the regulation of the Bali Provincial Government wants to contribute strongly to climate change adaptation in reducing the effects of greenhouse gases," he said.

With this strong commitment, the Governor of Bali issued Governor Regulation No. 48 of 2019 concerning the use of battery-based electric motor vehicles. Article 16 regulates the restriction of the use of fossil-fueled motor vehicles by implementing traffic restrictions. Based on the statement of the Governor of Bali (Mr. Koster), the Provincial Government plans to create an electric vehicle zone, namely in Nusa Penida, Ubud, Sanur, and Kuta, which have so far been the most popular tourist destinations in Bali. The traffic restrictions, as referred to, are carried out in the following ways:

- a. prohibition of the use of fossil fuel-powered motor vehicles entering the area with the exception of residents living in the area, emergency vehicles and certain other permitted vehicles;



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- b. prohibition of parking on the roadside;
- c. provision of parking pockets (park and ride); and
- d. provision of non-motorized vehicles and/or Battery-Based KBL for services within the area.

Public perceptions of government policies often develop by relying on a number of sources of information. These sources include their own experiences, word of mouth, the media, and officially published government materials such as performance appraisals (James & Moseley, 2014). According to Van de Walle and Bouckaert (2007), "Although perceptions of government performance do not necessarily correspond to actual performance, perceptions are important because they guide public action" (p. 1135). This study examines Balinese public perceptions of the need for and actions to adapt to climate change in Bali using a content analysis approach. So, the 2 research objectives can be grouped as follows,

- Identifying the mechanism of the Balinese people's perception of climate change using Sensory Information
- Analyzing the Balinese people's perception of the need for and actions to adapt to climate change in Bali using Conventional Content Analysis

Balinese people's perceptions of this regulation vary widely. This regulation helps reduce air pollution and supports environmental conservation efforts. However, this regulation adds to the burden, especially for those who do not yet have the ability and access to own and operate electric vehicles. This perception is also influenced by the theory of social intervention regarding their knowledge and understanding of the benefits and challenges of using battery-based electric vehicles (Pohjolainen et al., 2021).

According to Sukartini and Achmad (2013), the understanding and knowledge of the Balinese people about climate change and ways to adapt to these changes are very important. Communities that are very concerned about the environment and local traditions, such as in Bali, in the theory of tendency, the theory supports government policies that focus on the use of battery-based electric vehicles. They see these electric vehicles as a more environmentally friendly alternative to traditional gasoline vehicles (Raditya, 2023). The increasing use of electric motor vehicles not only provides practical benefits such as the perception of cheaper fuel or energy savings. In addition, it also brings social benefits, namely increasing public awareness of energy consumption.

Moral foundations theory argues that moral values influence both personal and collective action in the public sphere. These include harm and care, fairness and reciprocity, in-group identity and loyalty, authority and respect, and purity and sanctity. Moral foundations theory provides a conceptual organization for measuring and describing differences in moral concerns across individuals, social groups, and cultures. In relation to environmental issues, moral foundations theory has been applied to environmental and climate change research. Moral arguments are used to persuade or legitimize action on climate change and suggest that they are more compelling. Adger et al. (2017) argue that most arguments about climate change are based on the idea of 'protection from harm,' either to the environment or to vulnerable communities. This form of harm-based and concern-based moral reasoning is more aligned with liberal political orientations than with conservative positions.

METHODS

Conventional content analysis is typically used with research designs that aim to describe a phenomenon, in this case, the emotional reactions of hospital patients. This type of design is usually



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appropriate when there is limited theory or research literature on a phenomenon. Researchers avoid using preconceived categories Kondracki et al. (2002), instead allowing the categories and category names to flow from the data. Researchers immerse themselves in the data to allow for new insights to emerge Kondracki et al. (2002), also described as inductive category development (Mayring, 2000). Many qualitative methods share this early approach to study design and analysis.

Content analysis, like all qualitative analysis, is a reflective process. Identifying and condensing units of meaning, coding, and categorizing are not one-off events. It is an ongoing process of coding and categorizing, returning to the raw data to reflect on the initial analysis. In other words, analysis is a flexible, reflective work process (Erlingsson & Brysiewicz, 2017).

If data are collected primarily through interviews, open-ended questions will be used. Probes also tend to be open-ended or specific to participant comments rather than pre-existing theories, such as "Can you tell me more about that?" Data analysis begins with reading the entire data repeatedly to achieve immersion and gain an overall sense Tesch (1990), much like one might read a novel. The data are then read word by word to derive codes (Miles & Huberman, 1994; Morgan, 1993; Morse & Field, 1995) by first highlighting the exact words from the text that appear to capture key thoughts or concepts. Next, the researcher approaches the text by making notes of first impressions, thoughts, and initial analysis. As this process continues, code labels emerge that reflect more than one main thought. These often come directly from the text and then become the initial coding scheme. Codes are then sorted into categories based on how the different codes relate to each other and are linked. These emergent categories are used to organize and group codes into meaningful clusters (Coffey & Atkinson, 1996; Patton, 2002). Ideally, the number of clusters is between 10 and 15 to keep the clusters large enough to sort a large number of codes (Morse & Field, 1995).

Environmentally Conscious Consumer Behavior (ECCB) is a tool used to evaluate the level of ecological awareness of consumers. This scale includes knowledge, emotions, intentions, and actual behavior towards environmental issues (Saleem et al., 2018). The following is an explanation of the elements of the ECCB scale (Ghali-Zinoubi, 2022):

1. Environmental Concern: This section covers the level of consumer concern about environmental issues. This concern can include worry about the condition of the environment and its impact on their future.
2. Perceived Consumer Effectiveness: This section covers the level of consumer perception about the extent to which they can help society through their behavior.
3. Willingness to Be Environmentally Friendly: This section covers the level of consumer desire to be more environmentally friendly. This desire can include the intention to use environmentally friendly products, pay more for environmentally friendly products, and stop buying products from companies that are damaging the environment.
4. Environmentally Conscious Consumer Behavior: This section covers the level of consumer actual behavior related to environmental issues. This behavior can include choosing products that contribute the least to pollution, purchasing products packaged in recyclable containers, and purchasing products that are low in pollutants.

RESULT AND DISCUSSION

Identification of the mechanism of the Balinese people's perception of climate change based on Sensory Information. Perception is obtained through stimuli that have been grouped into the senses of touch, taste, smell, sight, and hearing. The results of the analysis showed that



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respondents received climate change stimuli from the senses of taste, sight, and hearing. Feelings were obtained based on changes in air temperature, sight based on changes in weather, and hearing from news or stories of disaster experiences. It can be explained as follows,

Table 1. Stimulus from Respondents' Senses

Responses	Stimulus Category
Feeling the change in weather, hot but the wind is cold	Feeling
I have experienced pollution in other cities, but in Bali, the pollution is still good.	Feeling
Yes, especially in Bali where the weather often changes, sometimes hot, sometimes cold.	Feeling
Experiencing sudden changes in weather, especially lately	Feeling
Ever especially on the beach if it suddenly rains	Penglihatan
Nowadays, the weather is unpredictable, and there are more and more natural disasters.	Feeling and sight
Current weather anomalies are an indication of climate change. What should be rain is actually dry, and vice versa; what should be dry is actually rain.	Feeling
What used to be the rainy season from September to November now the rainy season is unpredictable.	Feeling
Worried and want to contribute	Feeling
Feeling flooded when pulling, getting hit by rubbish from a clogged sports hall, feeling the change in weather when it is hot but the wind is cold.	Feeling and sight
It feels drier, the weather is unpredictable, and the changes in weather are extreme, so it has an impact on health.	Feeling
Changes from summer to rainy season, warm body temperature due to changing weather, and disturbing	Feeling
Shifting of dry and rainy seasons, Global warming	Feeling
There is information about rising seawater volume, extreme weather and changes in planting patterns.	Feeling and hearing
It should be the rainy season, but now it is a long, dry season	Vision
There is often transitional weather in Indonesia, and in countries with 4 seasons, the weather often lags behind predictions.	Feeling



Uncertain rainfall	Vision
Winter and summer shifts	Feeling
Feeling climate change following the seasons, such as the dry season or the rainy season.	Feeling
Seeing: In coastal areas, some people have lost their homes because the land is sinking. Hearing: There are many protests to do something about climate change; there are also many countries that have conditions that are very affected by climate change, such as NZ and the Netherlands (many dams and dykes are getting lower because the sea level is rising). Feeling: Bali is really hot now. The weather is unpredictable.	Taste, sight and hearing

Balinese people's perceptions of the need for and actions to adapt to climate change in Bali using Conventional Content Analysis. After conducting interviews regarding responses to the Governor's Regulation Number 48 of 2019 concerning the Use of Battery-Based Electric Motor Vehicles, which contain traffic restrictions as referred to, is carried out in the following manner:

- prohibition of the use of fossil fuel-powered motor vehicles entering the area with the exception of residents living in the area, emergency vehicles and certain other permitted vehicles;
- prohibition of parking on the roadside;
- provision of parking pockets (park and ride); and
- provision of non-motorized vehicles and/or Battery-Based KBL for services within the area.

There were three groups of respondents' responses, namely agree, disagree, and neutral/undecided.

The **agreed** response was obtained in the response,
 "Very good for the environment."
 "Agreed, but the use of public transportation needs to be prioritized...." (interview, September 09, 2023).
 "Good. Mainly the use of public transportation...." (interview, September 09, 2023).

Disagreement responses were obtained in the response,
 "Disagree because I prefer to use a regular motorbike and can own it myself...." (interview, September 09, 2023).
 ".... but for electric-based vehicles, not yet, even though they are more economical, but to fill up you have to go to the office after work" (interview, September 09, 2023).
 "..... as a tourist, I prefer to walk rather than use an electric vehicle." (interview, September 09, 2023).
 "..... as a seller whose house is quite far from the sales area, it is difficult with an electric vehicle" (interview, September 09, 2023).
 "..... because the Sanur area is a tourist destination, as well as an area with many religious ritual activities (nganyut, melasti, etc.)" (interview, September 09, 2023).

A **neutral** response was obtained in the response,



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"... If the prohibition of the use of fossil fuel-powered motor vehicles entering the area with the exception of residents living in the area, emergency vehicles and certain other vehicles that are permitted is less agreed because it is okay for those who work in offices or have money, but there are also many middle-class tourism workers, especially those who live far away. The provision of non-motorized vehicles and/or Battery-Based KBL for services in the area can be agreed upon or not depending on what the plan is like." (interview, November 15, 2023).

In addition to the responses, it is known that respondents will feel the disadvantages and benefits of the regulation. As seen in the summary (table 2),

Table 2. Categories of Opinions on Regulations

Open Coding	Categories (Loss/Benefits)
...Afraid of running out of fuel while delivering, if I have to use an electric motorbike it will limit me to Sanur....	Loss
...I do not agree if it is mandatory,... I feel sorry for the online (drivers)...	Loss
... the loss is more in terms of time and also maintenance, such as having to replace the battery, which is certainly expensive...	Loss
...less time efficient because it has to be charged for several hours...	Loss
...not necessarily able to carry merchandise...	Loss
... All of us, where there will be friction in the field between the authorities (Police or Satpol PP) and the community...	Loss
...Not efficient...	Loss
...reduce regional pollution...	Benefit
... For employees, you can provide a shuttle for staff or collaborate with electrical brands....	Benefit
...have bought a motorbike, if it is an electric bike I will buy another one....	Loss
...More neatly organized, public awareness of clean energy.....More neatly organized, public awareness of clean energy...	Benefit
...reduce pollution, parking becomes orderly traffic flow...	Benefit
...more fossil fuel vehicles than electric vehicles...	Loss



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...reduce pollution levels in the Sanur area.	Benefit
...maybe there will be a loss of market consumers...	Loss
...not everyone can or is able to own an electric motor vehicle. Those who want to visit the Sanur area will certainly find it a hassle...	Loss
...I do not really agree because it is okay for those who work in offices or have money, but many tourism workers are middle class, especially those who live far away...	Loss
...the longest walk from the parking lot to the workplace...	Loss

Most people feel the loss both personally and as a community with the existence of Governor Regulation Number 48 of 2019 concerning the Use of Battery-Based Electric Motor Vehicles. This is because there are still many people, be they tourists, traders, or those working in the Sanur Area, who come from outside Sanur. The multiplier effect phenomenon of the Sanur tourism area in Denpasar City is one of the factors that attracts people from other regencies and cities to carry out their economic activities in the Sanur Area. Moreover, many MSMEs and workers who do not have access to electric vehicles will feel material losses if they are required to switch to electric vehicles.

CONCLUSION

Based on the responses and grouping of respondents, most respondents have a perception of climate change based on sensory stimuli. The public still feels the stimulus in the form of extreme temperature changes, and not many can directly connect extreme weather changes with climate change conditions. In addition, some respondents agree, disagree, and are neutral with the regulations related to vehicle restrictions using battery-based vehicles. It is very unfortunate when the government only imposes restrictions on the use of types of vehicles in certain areas, because the public still does not understand the benefits and objectives of establishing a fuel-free vehicle zone. If this regulation is intended to improve air quality and climate change adaptation, the government can conduct socialization and dissemination of accurate information related to climate change adaptation.

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