Participatory Design: A Facet of Sustainable Development in Indonesia

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ABSTRACT

Participatory design, a method of engaging the people who will use a system or tool in the creation process, can empower communities. Unlike a top-down approach where non-users of a tool or system are the sole designers, participatory design methods collect the perspectives of individuals who will use and be impacted by the system prior and during development. Through a review of academic studies, (**RQ1**) I examine the domains, purposes, and populations of participatory design in Indonesia. (**RQ2**) I argue that participatory design is necessary for sustainable development in Indonesia based on the richness of the method, opportunities for knowledge sharing, and possibilities to adapt the method to Indonesian local ways of working as evidenced by the reviewed studies. Findings add another dimension to a framework that aligns sustainable development goals and public planning to incorporate the role of participatory design.

Participatory design in action (Paul Keskeys, 2018).

INTRODUCTION

Participatory design is a democratic process that involves the end users in the creation of the tool or system. Urban planning and human-computer interaction, among other fields use participatory design methods for decision making for community projects and in the design of technologies respectively (Bratteteig & Wagner, 2012). The method was born in the 1960s and 1970s out of ideas from the civil rights movement, and the want to participate in decisions that effect one's day to day (Robertson & Simonsen, 2012). Participatory design presents the opportunity for marginalized groups to elevate their voices and impact through the involvement in creation of the systems that they will use (Thinyane et al., 2020). As a result, citizens can become empowered by the democratic process of designing the systems that they will eventually use.

Public participation, similar to the goals of participatory design, encompasses citizen involvement in plans and administration that will influence policies and actions (Akbar et al., 2020). Sustainable development goals can be thematically conceptualized to align with public participation best practices as depicted in **Image 1** (Akbar et al., 2020). Knowledge sharing, integration of different types of knowledge, social learning, new creative ideas for solutions are paramount to participatory design. There is an interplay between the goals of sustainable development and public participation. The democratically inclusive facet includes "access to process", "accessibility of resources for participation", and "representativeness". When partaking on a participatory design process, is important that participants are able to attend the participatory design sessions, benefit from participating by compensation of other means,

and that the selected group of people is representative of the needs and wants of the people that will use the designed system.

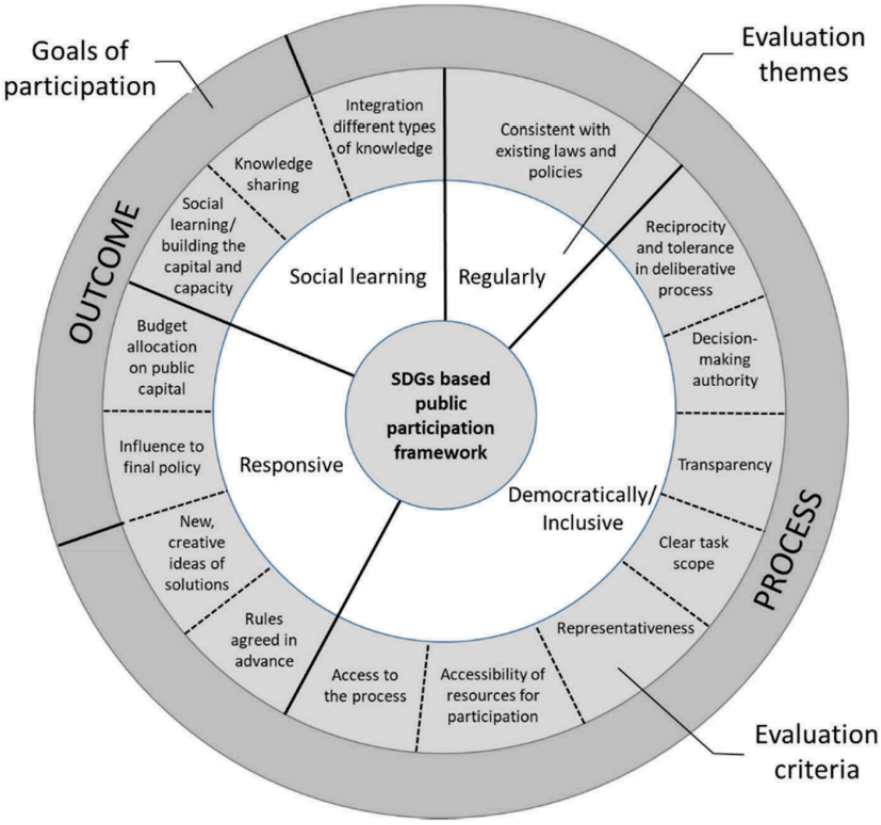


***Image 1**. Sustainable development goals aligned with goals of participation, evaluation themes, and evaluation criteria of public participation (Akbar et al., 2020)*

Participatory design activities range from early stage ethnographic methods where a researcher lives amongst the population and learns in an immersive fashion to engaging participants in low-fidelity prototyping shown in **Image 2** (Muller & Kuhn, 1993). Tools and techniques can be broadly groups by their purposes: (i) making tangible things, (ii) talking, telling, and explaining, and (iii) acting, enacting and playing as described in **Image 3** (Sanders

et al., 2010). Unlike public planning, tangible artifacts are cornerstone to participatory design processes. For example, in early-stage prototyping, sketches serve to communicate ideas in a rough form. The paper and pencil drawings invite critique and inspire discussion amongst participants. The tangible artifact sparks discussion on opportunities for improvement so that the design can better fit the needs of the target population. In sessions involving multiple modalities that participants can express their input, like that of inviting participants to use sticky notes along with their voice, those who might not speak up in a wider group session have the opportunity to contribute their ideas.

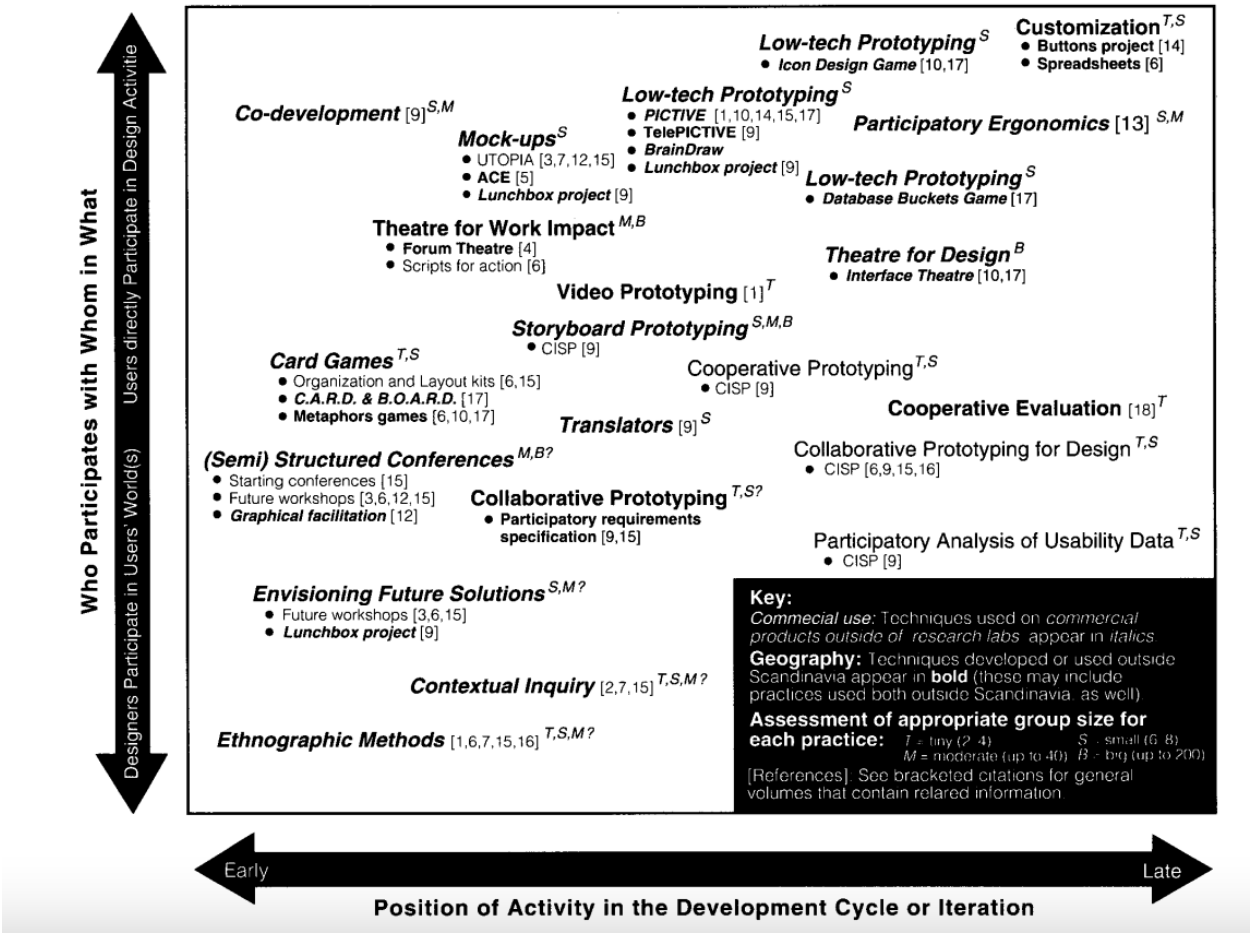


Image 2. *Participatory design methods mapped for stage of development and relationship between designers and participants in activities (Muller & Kuhn, 1993).*

TOOLS AND TECHNIQUES	PROBE	PRIME	UNDERSTAND	GENERATE
MAKING TANGIBLE THINGS				
2-D collages using visual and verbal triggers on backgrounds with timelines, circles, etc.	X	X	X	X
2-D mappings using visual and verbal components on patterned backgrounds		X	X	X
3-D mock-ups using e.g. foam, clay, Legos or Velcro-modeling			X	X
TALKING, TELLING AND EXPLAINING				
Diaries and daily logs through writing, drawing, blogs, photos, video, etc.	X	X	X	
Cards to organize, categorize and prioritize ideas. The cards may contain video snippets, incidents, signs, traces, moments, photos, domains, technologies, templates and *what if* provocations.			X	X
ACTING, ENACTING AND PLAYING				
Game boards and **game pieces and rules** for playing		X	X	X
Props and **black boxes**			X	X
Participatory envisioning and enactment by setting users in future situations				X
Improvisation				X
Acting out, skits and **play acting**			X	X

Image 3*. Tools and techniques for participatory design (Sanders et al., 2010).*

I focus on Indonesia, a country comprised of many islands, with diverse religions and opinions pressured to make wise decisions in their sustainable development. The pressure of being under an international microscope creates wicked problems, that perhaps only participatory design can solve. The land is rich with local knowledge preserved by its 50-70 million indigenous people (Maharjan & Maharjan, 2017). To balance preservation and development, it is necessary to account for cultural practices and environmental impact (Utami et al., 2022).

Harnessing local intuition and existing solutions is key to answering difficult questions in sustainable development. By exploring how participatory design methods are used in Indonesia, I uncover how participatory design and sustainable development are interrelated. Through a review of academic literature on participatory design, I answer the following research questions:

> ***RQ1****: What domains, purposes, and populations are used in participatory design studies in Indonesia?*
>
> ***RQ2****: Is participatory design necessary for sustainable development in Indonesia?*

Building onto a framework that aligns sustainable development goals and participatory planning, I add the lens of participatory design practices through analysis of the reviewed studies, underscoring the necessity of participatory design in sustainable development.

METHODS

I performed a literature search on Google scholar with the term "participatory design Indonesia". At the time of search, Google scholar retrieved 329,000 results. I reviewed the first 5 pages (50 results) ranked for relevancy to the search term. The cap on 50 results was due to significantly reduced relevancy of results after the first 5 pages. For example, articles about general participatory design methods unspecific to Indonesia were returned.

The main criteria for inclusion were primary studies that used participatory design methods, that is the paper discussed findings from engaging users in the design process. Studies that

took place outside of Indonesia were excluded. Reviews of other studies and participatory design method papers that did not include data collection were excluded.

Studies that were strictly personal information technology development related were excluded. For example, "Participatory design of interactive TV user interface for elderly people in Indonesia" (Octavia, 2015) was not included based on its scope of information technologies. Unfortunately, due to my language limitations, studies in languages other than English were not included. Articles such as "MENINGKATKAN KUALITAS MELALUI PERAN KOMUNITAS: Penerapan Participatory Design pada Museum Musik Indonesia" (Haswati et al., 2020) are likely relevant, but are excluded due to being written in Indonesian. **Table 1** summarizes the literature search process.

Database	**Search term**	**Inclusion criteria**	**Exclusion criteria**
Google	"participatory design Indonesia"	• Primary study • Participatory design methods	• Personal information technology • Languages other than English

Table 1*. Literature search process.*

FINDINGS

Of the possible studies on participatory design in Indonesia, 8 were included in analysis based on database searched, and inclusion and exclusion criteria. The findings from the literature

review provides a sampling that answers **RQ1**: What domains, purposes, and populations are used in participatory design studies in Indonesia?, outlined in **Table 2**. The resulting domains, purposes, and populations are not exhaustive list of all participatory design ever practiced Indonesia, but instead the sampling demonstrates the diversity of the areas, goals, and people involved in participatory design in Indonesia.

Through the literature search, I grouped Agriculture, Craftsmanship, Environment, and Urban Design as domains of focus for participatory design in Indonesia based on thematic affinity. The reviewed articles span urban and rural populations in Indonesia. Kusnandar et al., Malasan et al., Zulaikha & Brereton, Rosenqvist, Laumonier et al., and Adianto et al. were focused in involving the direct end-users in their participatory studies while Utami et al. and Marino et al. were more liberal, including members of government, academia and private industry that spanned outside the direct end-user.

There is merit to both approaches, as involving the direct end-user ensures that the design is truly focused on the needs of the people who will use the system. Incorperating perspectives of government improves the likelihood of adoption as local regulations can be taken into consideration. However expanding the group that is involved in participatory design risks drowning out the voices of the users. Referring back to sustainable development goals and participatory planning, involving government stakeholders increases the liklihood that the outcome considers policy, and harmonizes with policies (Akbar et al., 2020).

Domain	Study	Purpose of Participatory Design Process	Population
Agriculture	(Kusnandar et al., 2019)	Knowledge sharing on farming practices and wholesaler-farmer economic relationship	Farmers and wholesalers
	(Utami et al., 2022)	Exploring problems and solutions in environment and ecosystems, traditional values and farming culture, crafting skills, manufacturing, and the local economy in rural communities and farming culture	Farmer's association, government collectives, members of academia, community members
Craftsmanship	(Malasan et al., 2020)	Identify objectives of the design center, target market set by designers, and needs of craftswomen	Craftspeople
	(Zulaikha & Brereton, 2013)	Improve economic and social capital of craftspeople	Craftspeople

Environment	(Rosenqvist, 2018)	Redirecting public opinion on urban wastewater governance	Community members
	(Laumonier et al., 2008)	Document local perceptions and use of the environment, land use changes and disturbances, and steps toward participatory development in tropical forest landscape management	Elders, customary and religious leaders
Urban design	(Adianto et al., 2014)	Improve living conditions in urban slum settlements	Local leaders, community members
	(Marino et al., 2018)	Strategize on the design of public spaces for water management while improving community life and public health	Community members, Government agencies, utility companies, planning departments and community representatives

Table 2*. Domains, purposes, and populations of reviewed participatory design studies.*

DISCUSSION

The reviewed studies support the argument that answers **RQ2**: Is participatory design necessary for sustainable development? Participatory design is necessary for sustainable development in Indonesia because it produces rich insight and creates opportunities for knowledge sharing. However, the process should be amended to fit local ways of working.

Richness of participatory design

The qualitative method leads to rich insights as it does not treat each variable of sustainable development separately, but instead leans into the multifaceted and conflicting nature of several priorities, as evidenced by the urban design project that aimed to improve the environmental aspect of water control, while also considering human-aspects of city living.

> *The challenges faced by developing cities in relation to poor water management can be addressed with the use of a more Water Sensitive approach that helps to leapfrog cities and communities to a more friendly relationship with water, whilst simultaneously improving community life and public health by the promotion of active mobility options such as walking or bicycling, and helping to reduce the dependency on motorized transport options fueled by pollutants sources (Marino et al., 2018).*

The project does not isolate the need for walking and biking infrastructure from the need for flooding infrastructure considerations. Unlike research methods that consider variables in isolation, like a survey, participatory design allows for the expression of multiple wants and priorities at once. Participatory design can be synchronized with other research methods, such

as environmental sensing to calibrate environmental concerns with human concerns (Laumonier et al., 2008). The multidimensionality of the approach helps to consider livelihood and environmental challenges which is cornerstone to making trade-offs in sustainable development plans.

The power of knowledge sharing

Knowledge sharing associated with the development goal of social learning and building capital and capacity, is underscored in the reviewed studies as a benefit to participatory design (Akbar et al., 2020). Unlike one-on-one interviews and surveys, participatory design methods that use a group setting create the opportunity for knowledge sharing, consensus building, and action planning.

> *Participatory development shows potential to enhance the fit among ecological, socio-cultural, and economic systems through two dimensions: the generation and sharing of information to understand trends and the generation of new coordination practices that allow stakeholders to voice environmental concerns (Laumonier et al., 2008).*

In sustainable development, striking a balance between competing priorities is paramount, and to achieve consensus stakeholders must work together. The social nature of participatory design creates the opportunity for mutual learning and problem solving, especially among segments of the population that have little interaction, like farmers and members of government (Utami et al., 2022).

Participatory design events create the opportunity for people with a shared occupation, like farming, to learn from one another.

> *…farmers and wholesalers had specific knowledge questions regarding high quality seeds, methods to kill a kind of pest, method to measure pH of soil, market access, and administrative procedures to establish a formal farmer group (Kusnandar et al., 2019).*

The sessions can empower participants as they are share best practices with their peers. Participatory design helps with far future solutioning and near-term problem solving for farmers. The immediacy has a direct benefit to participants while helping to inform the design of future systems and policies.

Bridging the learnings collected by lived experience with expert knowledge is promising in the design of urban spaces (Adianto et al., 2014).

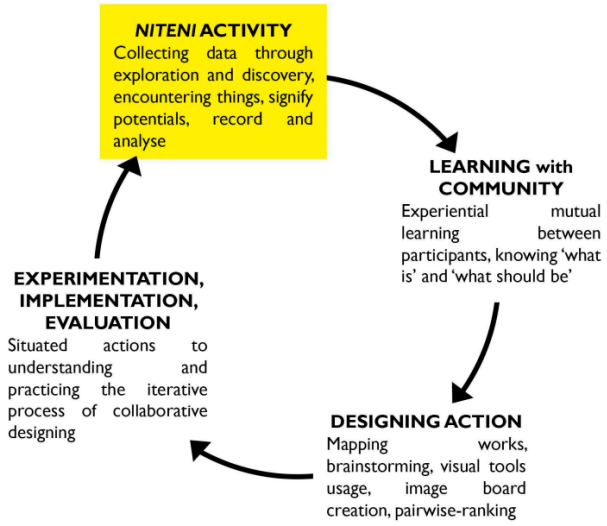
> *…we learned that it is important for architect to identify and apply critically those unwritten guidelines, in order to create well-suited architectural work without compromising the building safety aspects…The shared knowledge about informal area management with local residents and professionals and community's active involvement in each design and construction phase would be indispensable to improve living condition in urban slum settlement (Adianto et al., 2014).*

By blending both local knowledge with expert knowledge acquired through formalized training, communities can make better decisions on their housing plans. Importantly, the perspectives of those who live in the community are not ignored. Knowledge sharing on the

dimensions of environmental change, farming, and housing, all important issues in sustainable development, are encouraged through the participatory design process.

Incorporating local ways of working into participatory design process itself

The participatory design process originated in Scandinavia, and thus does not contain Indonesian ways of operating. However, researchers successfully adapted the participatory design process to meet local contexts. A study on local economy and farming introduced an Indonesian activity into the participatory design process (Utami et al., 2022). Incorporating the Niteni activity, "the act of observing, signifying, recording, and relating to phenomena associated with nature and wildlife in order to determine the processes of farming and planting" from the indigenous Javanese education system localized the participatory design process to Indonesian contexts. Through adaptation, the localized design process better fits the cultural norms of the participants (Utami et al., 2022).



Niteni activity incorporated into the process of participatory design (Utami et al., 2022).

	Activities				
	Initiation Meeting	***Niteni* Treasure Mapping**	**Idea Generation and Future Priorities**	**Craft Design Workshops**	**Project Reflection and Evaluation**
Methods	Focus group discussions (FGDs) and learning with the community	Observations, taking notes and pictures, interviews, treasure mapping, and FGDs	Potential future development idea mapping, pairwise ranking, and FGDs	Priority-based activity design, craft workshops, logo design, storytelling, rapid prototyping, social media establishment, and FGDs	Short survey and FGDs
Sample size and participants' description	A total of 6 key persons from farmers' associations, 2 government collectives, 6 student representatives, and 2 lecturers	A total of 58 individuals, including 28 from outside the community, 24 from the community, and 6 key persons from the farmers' associations and government collective	A total of 58 individuals, including 28 from outside the community, 24 from the community, and 6 key persons from the farmers' associations and government collective	A total of 6 key individuals from the farmers' associations, including 2 from the government collective, 6 student representatives, and 3 lecturers	A total of 12 farmers from the farmers' associations
Duration and date	2 December 2020 for 3 h to 4 h December 2020 for 3 h	15 January 2021–22 January 2021, 10 March 2021–17 March 2021, 13 May 2021–20 May 2021, 3 July 2021–10 July 2021, 3 h each day	3 August 2021–10 August 2021, 3 h each day	13 August 2021–15 August 2021, 3 h each day	17 August 2021 for 5 h

Range of participatory design activities including the Niteni activity (Utami et al., 2022).

In a study on urban planning in Bogor, there is a women's group (Marino et al., 2018). The idea of having women work together is signature of the study, as gender-based grouping is less common in participatory design projects but fits the local Javanese context. For participatory design projects to be effective, participants must feel comfortable expressing themselves. By defining grouping that fits how people in Java organize themselves typically, the outcomes of the session are likely to contain greater detail and thus have a greater impact on the designed solution.

Women's group round table (Marino et al., 2018).

In the participatory design projects, who is chosen to participate can be parameterized to local norms. The study on tropical forests includes different types of community leaders- elders, customary and religious leaders (Laumonier et al., 2008). An understanding of who should be involved in decision-making is necessary to correctly interpret what participation means to a particular community.

Limitations & Future work

Future work includes the performance of a systematic literature that is exhaustive. The above study is based on a sampling of 8 English research articles; however, many more articles exist. A more exhaustive review would generate diverse insight and strengthen the robustness of arguments.

Conclusion

Through the review of 8 studies on participatory design in Indonesia, that spanned agriculture, craftsmanship, environment, and urban planning, I argue that participatory design is necessary

for sustainable development due to the richness of the data produced, opportunities for knowledge sharing, and ability to localize the method. The purpose of participatory design in the reviewed studies was diverse from identifying the needs of craftspeople to swaying the opinions on wastewater management.

Building onto work aligning sustainable development goals and public participation, **Image 4** highlights areas that participatory design interacts with sustainable development goals in the public participation framework (Akbar et al., 2020). By involving government stakeholders, laws and policies are considered in participatory design projects, as demonstrated by including government representation in two of the participatory studies (Marino et al., 2018; Utami et al., 2022). Knowledge sharing aligned with social learning creates opportunities for building capital within communities (Malasan et al., 2020). Representation, especially on who is included and who represents the voices of the community whether that be customary leaders (Laumonier et al., 2008) or individuals themselves helps to ensure the process is democratic and inclusive. The purpose of participatory design is to create new creative ideas to solutions, and by incorporating the end users themselves is responsive to community need both in the short term and long term.

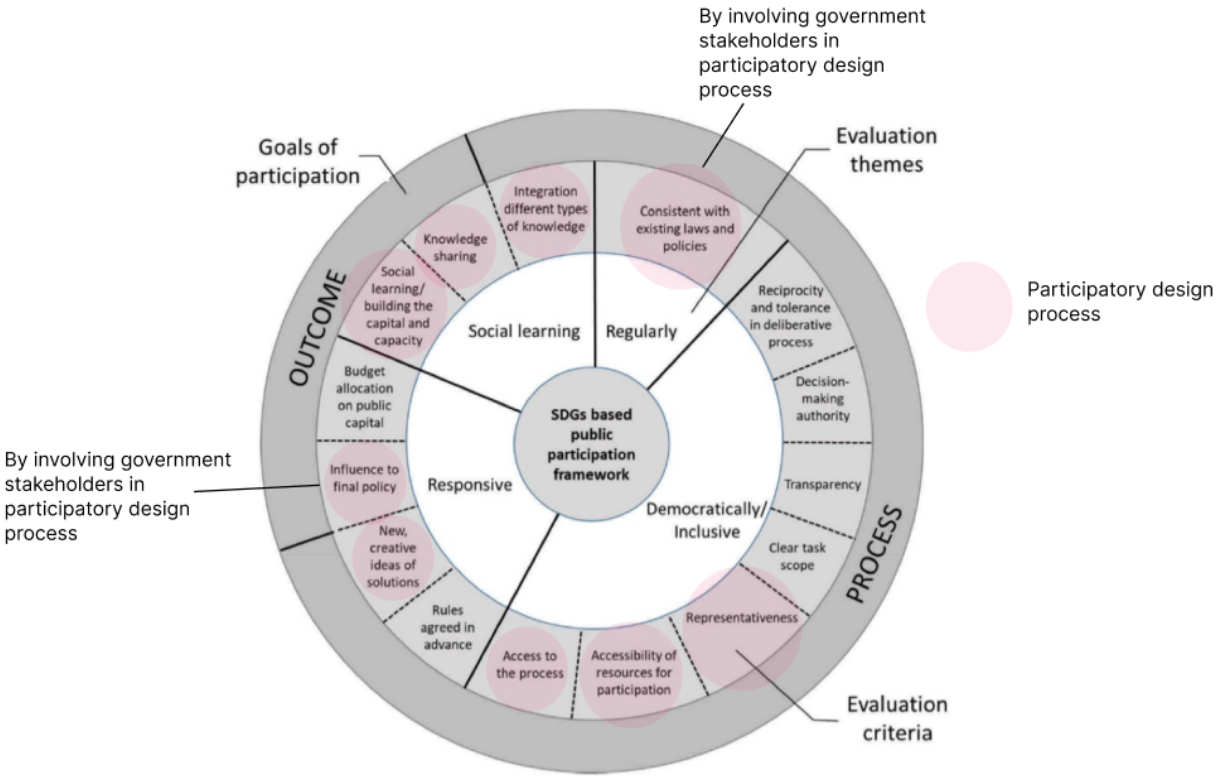


Image 4*. Highlights of the participatory design process within the sustainable development goal public participation framework*

Supply chain decision making (Kusnandar et al., 2019), farming practices (Kusnandar et al., 2019; Utami et al., 2022), local economies (Kusnandar et al., 2019), including crafting (Malasan et al., 2020; Zulaikha & Brereton, 2013) are areas where participatory design has the opportunity to bring the perspectives, lived experience, and expertise of people in the design of the systems and policies with that they will live. Environmental management (Laumonier et al., 2008; Rosenqvist, 2018), housing choices (Adianto et al., 2014), and urban planning (Marino et al., 2018) informed by participatory design present viable pathways forward that are informed closely by the people who need them.

Populations in the participatory design process included farmers, customary leaders, and community members among others. When working with a community, it's paramount for researchers to understand "how participation is understood and practiced" (Robertson & Simonsen, 2012), and that there are inherent power structures in participatory design, as participation is negotiated and defined (Robertson & Simonsen, 2012).

For development to be sustainable, it needs to take in the perspectives of the population. In Indonesia, the people living in communities have experience that is essential to consider in planning and will improve the likelihood of success. Crowdsourcing knowledge could bring simple, straight forward solutions that are overlooked by policy writers due to lack of lived experience. The traditionally top-down approach is unsatisfactory. Not only is it undemocratic, but the sole expert approach free of input from people experiencing life at the community level risks overlooking solutions and capturing the true needs.

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