JURNAL STUDI KOMUNIKASI

Volume 10 **Ed 2, July 2026** **Page 359 - 372**

Strengthening health literacy for heatstroke early warning systems in rural Banten

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How to Cite This Article: Putri, L.D. *et al.* (2026). Strengthening health literacy for heatstroke early warning systems in rural Banten. *Jurnal Studi Komunikasi*, 10(1). doi: 10.25139/jsk.v10i2.11630
Received: 20-02-2026, Revision: 05-05-2026, Acceptance: 19-05-2026, Published: 02-07-2026

Abstract Heat stress among smallholder farmers in Indonesia is a livelihood and cultural dilemma, where physical endurance is often prioritised over well-being in the pursuit of *rezeki* (sustenance). This creates a tension in which farmers normalise environmental risk as part of their identity and limit adaptive responses to climate change. This study aims to apply the Communication Theory of Resilience (CTR) as a communication framework in heat-stress extension to strengthen the adaptive capacity and resilience of the farming community in Tirtayasa Village, Banten. This study investigated: how can the Communication Theory of Resilience (CTR) reconfigure agricultural extension from information delivery into a communicative process that transforms how farmers interpret and respond to heat stress? Using a qualitative case study approach, post-training interviews were conducted with 13 farmers following a participatory workshop organised by Serang Raya University and its international partners. Data were analysed thematically based on five dimensions of CTR. The findings show that CTR reconfigures the communicative logic of farming communities. Farmers began to shift from silent endurance toward shared reflection, mutual support, and collective interpretation of heat stress as a communal challenge rather than an individual burden. However, this transformation remains uneven, particularly among senior farmers who tend to maintain fatalistic perspectives and habitual routines. These findings suggest that CTR-based extension redefines agricultural extension from instruction to co-construction. At a broader level, this communicative shift has implications for stabilising rural livelihoods, reducing health vulnerabilities, and strengthening community-based adaptation to climate change.

Keywords: communication theory of resilience; emotional awareness; identity strengthening; intervention; routine formation

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ISSN: 2549-7294 (Print), 2549-7626 (Online)
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INTRODUCTION

Climate change, which increases ambient air temperature, poses significant health and safety threats to humans, including farmers (Parikoglou & Finger, 2025). This threat can take the form of heat stress (Nyambe, 2024). Heat stress is the combination of external heat load and internal heat (Parikoglou & Finger, 2025) generated by physical work (Pacheco-Zenteno et al., 2021). This condition is a threat to farmers who work in the fields every day to manage their farm, relying on their muscles as a physical resource. Farmers are exposed to a range of heat-related existential threats and technical hazards that can seriously threaten their well-being, from kidney problems to heat-induced strokes (Spencer et al., 2022). Yet despite these dangers, heat stress among farmers is still rarely discussed in the literature as a significant social issue (Mondal, et al., 2024).

The heat stress mitigation is an issue of resilience. Resilience is a dynamic capability to proactively engage in construction behaviour both personally and socially in facing challenges (Pang, 2025). According to the Communication Theory of Resilience (CTR), resilience is not an individual trait, but rather it is a communication phenomenon. This indicates that resilience can be enhanced through the exchange of messages, narration and conversation (Pang, 2025). In the Indonesian rural context, communication is embedded in everyday social structures such as *kelompok tani* (farmer groups) and practices of *gotong royong* (cooperation), which function as primary networks through which knowledge, norms, and adaptive behaviours are shared and negotiated.

Communicative Theory of Resilience (CTR) conceptualises resilience as a set of discursive processes through which individuals and communities construct meaning in the face of disruption (Buzzanell, 2010). In the context of farming communities, these processes are particularly significant in challenging the deeply rooted stoic identity, where hardship, including environmental stress, is often normalised, endured silently, and framed as an inevitable part of life.

CTR offers a framework to understand how such taken-for-granted narratives can be gradually reworked through communication. Resilience emerges as farmers begin to rearticulate their daily realities, not by denying difficulty, but by reconstructing it through shared meaning-making. This includes efforts to re-establish a sense of normalcy in changing conditions, reaffirm valued aspects of identity beyond mere endurance, and actively engage in communication networks that enable the exchange of support, knowledge, and adaptive practices. At the same time, resilience involves the reinterpretation of environmental stressors through alternative logics while also legitimising emotional responses as part of the adaptive process rather than signs of weakness. This alternative logic is transforming perceptions of heat stress from unavoidable suffering into a manageable and collectively understood challenge.

CTR has been demonstrated to be relevant and has succeeded in improving community resilience in the context of the COVID-19 pandemic (Amankwah et al., 2022; King et al., 2023; Lillie et al., 2021; Mousavi & Gu, 2023). CTR is highly relevant in educating farming communities in facing heat stress due to global warming, particularly in relation to communication strategies, community engagement, and social adaptation toward climate change. CTR can help farmers establish a new normal amid extreme weather conditions, reinforce their identity as guardians of the land and family, build resilient communication networks by involving local leaders, farmer groups, and religious leaders, encourage farmers to interpret extreme weather as a shared challenge, and acknowledge the concerns, fatigue, and losses felt by farmers.

Although promising, CTR is rarely implemented in agricultural education design in the face of the global warming risk. Nevertheless, there has only been one research study that employed CTR in the context of farmer resilience (Daigle & Heiss, 2020). This gap encourages this research to focus on efforts to use CTR to enhance farmers' resilience in facing heat stress.

This research applies CTR to design community-based extension programs in rural areas of Indonesia that are exposed to heat stress. This research was carried out in Banten Province, one of the largest rice-producing regions in Indonesia that has also been heavily impacted by heat stress. In recent years, Banten has experienced rising temperatures, erratic rainfall, and prolonged dry seasons, which have triggered both droughts and floods, ultimately reducing agricultural productivity and disrupting ecosystem stability (Wibowo, 2025; Oktarina et al., 2025). These agroclimatic stressors are further intensified by higher evaporation rates, declining soil moisture, and increased pest and disease risks, which place additional pressure on smallholder farming systems (Budiawati et al., 2025; Mulyaqin et al., 2025).

In November 2023, Tangerang City became the second-longest location globally to experience extreme heat for 17 days straight, from 7 to 24 October (Wijaya, 2023). At the same time, 24 of Tangerang Regency's 29 subdistricts were experiencing drought (Dany, 2023). This was a major event that threatened the livelihoods of nearly half a million people who work as smallholder farmers (farmers who own less than 0.5 hectares of land) in the province (BPS, 2023). Empirical studies have shown that such conditions expose farmers to significant risks, including declining yields, crop failure, pest outbreaks, and income instability (Puteh et al., 2024; Indrawan & Setiawan, 2025).

Beyond ecological and economic vulnerabilities, heat stress also constitutes a serious occupational health risk. Evidence from agricultural workers in comparable tropical contexts indicates that prolonged exposure to high temperatures leads to fatigue, dizziness, dehydration, and physiological strain, which directly affect productivity and long-term health (Hamzah et al., 2022). In Indonesia, studies have further highlighted that although farmers are aware of increasing heat exposure, their adaptive behaviours remain limited and are often not aligned with the actual level of risk (Yovi et al., 2023; Permatasari et al., 2024). This reveals a critical gap between risk exposure, perception, and adaptive action.

However, in the context of Banten, this gap cannot be understood solely as a lack of knowledge or technology. Farming practices are deeply embedded in cultural values, intergenerational identity, and moral-economic logics of survival (*rezeki*), where enduring hardship is often normalised as part of being a farmer (Purwanti et al., 2025; Okta dan Saefullah, 2025). As a result, environmental stress such as extreme heat is frequently interpreted as a condition to be accepted and endured. This creates a structural tension between health protection and livelihood persistence, where farmers may prioritise continuous work over their physical well-being. This indicates that heat stress is a socially mediated condition shaped by norms, values, and communication practices. Therefore, addressing heat-related risks also requires a transformation in how farmers collectively interpret, discuss, and respond to these risks.

Despite various institutional efforts, such as the introduction of drought-resistant crops, irrigation improvements, and climate adaptation training (Wibowo, 2025; Indrawan & Setiawan, 2025), existing extension approaches largely remain instructional and technocratic, focusing on transferring knowledge rather than transforming how farmers interpret and respond to environmental risks. Consequently, adaptation strategies often fail to fully engage with farmers' lived realities, social relations, and communicative practices.

Previous studies on heat stress and agricultural adaptation in Indonesia have predominantly emphasised knowledge transfer, behavioural change, and technological or informational interventions. For instance, a quasi-experimental study by Azizah et al. (2025) in rural Jember demonstrates that increasing health literacy through social media significantly improves farmers' knowledge, attitudes, and first aid practices related to heatstroke. Similarly, Yovi et al. (2023) show that knowledge and risk perception play a critical role in shaping precautionary behaviour among farmers and forestry workers in several regions of Indonesia. Other studies highlight structural constraints, such as limited access to health information and the influence of socio-demographic factors on adaptive behaviour, as observed in West Sumatra (Riviwanto et al., 2024). At a broader level, systematic reviews of community-based heat interventions (Johar et al., 2025; Hasan et al., 2021) emphasise the importance of localised, participatory, and culturally sensitive approaches, yet also note that many interventions produce inconsistent behavioural outcomes and remain limited in low- and middle-income contexts, including rural Indonesia. Collectively, these studies demonstrate a consistent pattern in which heat adaptation is predominantly framed as a problem of knowledge, behaviour, and access to information, with relatively limited attention to the social and communicative processes that sustain or constrain these adaptations.

Despite these contributions, existing studies tend to conceptualise adaptation primarily as an outcome of increased knowledge, access to information, or technological systems, such as early warning systems and ICT-based interventions (Fajrillah et al., 2024; Castro & Delina, 2025). While these approaches are valuable, they often underemphasise the communicative and cultural processes through which farmers interpret environmental risks and translate knowledge into action. In many cases, adaptation is treated as an individual cognitive or behavioural response, with limited attention to how social interaction, shared narratives, and collective

identity shape resilience practices. This limitation is particularly evident in studies that report improved knowledge and attitudes but provide less insight into how such changes are sustained or embedded within everyday farming practices and community dynamics.

In contrast, the context of Banten, particularly among smallholder farmers in Serang, reveals a distinct socio-cultural configuration in which environmental stress is mediated not only by knowledge or access to resources, but also by deeply embedded cultural values, religious interpretations, and communal communication practices. As reflected in previous studies (Purwanti et al., 2025; Okta & Saefullah, 2025), farming in this region is closely tied to moral-economic logics of *rezeki*, intergenerational identity, and norms of endurance, where hardship is often normalised and even valorised. This creates a unique condition in which heat stress is not always interpreted as a risk requiring adaptation, but as a lived reality to be accepted. Such a communicative and cultural orientation differentiates Banten from other study sites in Indonesia, where adaptation has been more frequently framed in terms of knowledge gaps or infrastructural limitations.

Therefore, this study addresses an important gap by shifting the analytical focus from knowledge-based and technocratic models of adaptation toward a communicative perspective. By applying the Communication Theory of Resilience (CTR), this research seeks to understand how resilience is constructed through discourse, interaction, and shared meaning-making within farming communities. In doing so, it offers a distinct contribution by positioning communication as a central mechanism that shapes how farmers interpret, negotiate, and respond to heat stress within their socio-cultural context.

This study, therefore, addresses the following research problem: how can the Communication Theory of Resilience (CTR) reconfigure agricultural extension from information delivery into a communicative process that transforms how farmers interpret and respond to heat stress? This research aims to examine the effectiveness of CTR-based extension programs among farmers in Banten province in enhancing their resilience to heat stress. The analytical contribution of this paper is that we show that CTR can reframe 'heat endurance as a badge of honour'.

The training was conducted using the CTR protocol, which consists of four stages. The first stage was pre-activity preparation with the aim of building positive initial perceptions relevant to the farmers' identities. This stage was carried out by identifying local narratives and farming routines, framing messages that respected farmers' identities, and training the facilitator team using an empathetic and participatory approach. The facilitator team was trained at universities and consists of lecturers and students.

The second stage was co-learning, which aimed to create two-way communication that built meaning and solidarity. This stage was the core activity conducted with the farmers in Tirtayasa Village. This stage began with an initial group reflection, followed by presentation of scientific knowledge with local social narratives, focus group discussions, and participatory case studies, as well as several role-playing and simulations. The outcome of this stage is that farmers not only receive information, but they also experience a resilient communication process that builds collective understanding, solidarity, and adaptive capacity.

The third stage was emotional validation, aimed to ensure farmers' emotions, experiences, and new meaning were integrated into their daily routines. This stage was carried out after the session break in the form of a final reflection session, reframing and affirming the positive identity, commitment to collective actions, and continued communication networks. The outcome of this stage was the emergence of a resilient communication community, where farmers supported each other, shared solutions, and collectively reframed extreme heat as a shared challenge.

The final stage was post-program sustainability, which aimed to ensure that communication resilience continues and is embedded in the community. This stage was carried out through routine monitoring by farmer ambassadors and student assistants, follow-up meetings, and sharing of success stories, as well as integration with environmental programs such as reforestation and greening. The outcome of this stage is that resilience becomes a sustained communicative practice of interpreting and responding to heat stress within the community, not just a temporary effect of the agricultural extension program. This stage reflects how CTR reconfigures agricultural extension into a communicative process, where farmers collectively interpret and respond to heat stress through sustained dialogue and shared practices.

Table 1. Training success criteria

No	CTR dimension	Criteria
1	Crafting normalcy	High: new routines are clear and reflective Moderate: awareness exists, but inconsistent Low: old routines are maintained without reflection
2	Affirming identity anchor	High: strong and positive identity Moderate: identity is mentioned but not deeply explored Low: no reflection on identity
3	Maintaining and using the communication network	High: active social network Moderate: passive/limited assistance Low: individual, isolative narrative
4	Putting alternative logics to work	High: adaptive and reflective strategies Moderate: solutions mentioned without reflection Low: no new meaning created
5	Legitimising negative feelings while foregrounding productive action	High: emotions are acknowledged and integrated with action Moderate: emotions are acknowledged without action Low: only complaints without positive direction

Source: Author (2025)

METHODOLOGY

This study employed a qualitative approach with a case study method that focuses on a farming community in Tirtayasa Village, Tirtayasa Sub-District, Serang Regency, Banten Province. This case study aimed to gain an in-depth understanding of the application of the Communication Theory of Resilience (CTR) in the context of health extension related to heat stress prevention among farmers.

Data were collected through post-training interviews with 13 farmers who participated in a participatory workshop organised by Universitas Serang Raya in collaboration with international partners. The interviews were conducted to explore the farmers' responses, reflections, and experiences after participating in CTR-based health communication training.

Table 2. Research informants

Kode	Name	Gender	Age (years old)
R01	Rubiah	Female	70
M02	Masyuah	Female	54
M03	Misbah	Male	57
S04	Suariyah	Female	66
P05	Pojah	Female	67
J06	Juhra	Female	66
H07	Hadijah	Female	65
K08	Kawah	Male	64
M09	Maemunah	Female	60
J10	Jarima	Female	60
N11	Nafisah	Female	68
M12	Murniah	Female	64
R13	Roji	Male	59

Source: Author (2025)

Guided interview instruments were distributed after the third stage. The final stage is currently ongoing. Among 22 farmers who participated, only 13 were able to complete the guided interview instrument, as some had limited literacy skills. Among those who responded, ten were women, and three were men, with ages ranging from 50 to 70 years old. Each question in the guided interview instrument was designed to evaluate the dimensions of the CTR theory while maintaining accessibility for farmers, who generally expressed ideas in a simple and concise manner. All data collection using the guided instrument was conducted through facilitator-assisted interviews, in which questions were read aloud and, when necessary, explained using locally familiar language. Participants were encouraged to respond verbally in

their own words, and facilitators recorded these responses. This approach ensured that limited literacy did not restrict participation or distort responses.

In addition to asking farmers to complete the guided interview instrument, facilitators also observed things discussed by each participant and recorded their observations in a 150-word reflection report for each farmer. This reflection served as a communicative synthesis that captures how participants show signs of crafting normalcy, affirming identity, networking, reframing challenges, and legitimising emotions. This also helped trainers understand the patterns of resilience communication that emerge spontaneously from the community.

CTR emphasises that resilience is not measured by psychological scores but rather by changes in how people communicate about themselves, their communities, and their experiences after facing stress (in this case, heat stress due to global warming) (Buzzanell, 2010). Thus, the success of the training is reflected through shifts in communication patterns, not merely factual knowledge**.** The research team determined that the training was interpreted as demonstrating thematic dominance when resilience-related communication patterns appeared consistently across most participant narratives (approximately ≥70%), indicating pattern convergence rather than statistical generalisation. There were 'emergent themes' such as new solidarity', 'work time adjustments', 'body awareness', or 'appreciating nature and community', and a shift in speech patterns from 'the weather is making things difficult' to 'we are learning to adapt'. The high, moderate, and low indicators for each CTR aspect are shown in Table 2.

This study applies a qualitative pattern-matching strategy, where empirical narratives are compared against theoretically derived CTR dimensions. Pattern matching is commonly used in qualitative case study research to compare empirical patterns with theoretically predicted constructs (Vargas-Bianchi, 2025). The use of numerical expressions in this study is descriptive and heuristic, supporting interpretive clarity rather than statistical inference to assign a high, moderate, or low rating, researchers read a guided interview instrument filled out by farmers corresponding to each CTR dimension. In addition, researchers paid attention to the observation results from the facilitators. Two of the research team members independently assessed the guided interview instrument and reflections based on their interpretation. Next, the two assessors compared their assessments and discussed any discrepancies until they reached agreement. A third research team member then reviewed the results and decided whether to agree or disagree with the results. When the disagreement occurred, the three of them would discuss until a consensus was achieved. Hence, there are three layers of data: guided interviews, facilitator reflections, and observation results. These layers form data triangulation to ensure robustness.

RESULTS AND DISCUSSION

Crafting normalcy

The findings reveal a stratified pattern of adaptation rather than a uniform shift. A small subset of participants demonstrates what can be interpreted as routine inertia, where traditional practices are reproduced without reflective engagement. In these cases, heat exposure is normalised as an inevitable condition of farming, and no meaningful reinterpretation of risk is evident. This suggests that, for this group, crafting normalcy has not been activated as a communicative process but remains embedded in pre-existing, taken-for-granted routines. Such inertia is likely reinforced by long-standing habitus, age-related rigidity, and limited communicative exposure, indicating that behavioural persistence is structurally conditioned.

In contrast, most participants exhibit emergent reflexivity, characterised by an increasing awareness of environmental change and the need for adaptive responses. However, this awareness does not automatically translate into stable behavioural transformation. Instead, the data suggest a gap between cognitive recognition and routine institutionalisation, where farmers acknowledge the importance of practices such as hydration but have not fully integrated them into consistent daily patterns. This indicates that crafting normalcy operates as a gradual and uneven process, requiring not only knowledge acquisition but also repeated social reinforcement.

> "If the weather is not good, I rest for a while... wearing a hat, sandals, and drinking water" (Suariyah, S04, 26 September 2024)

Crucially, the findings suggest that adaptation becomes more meaningful and sustainable when it is anchored in culturally resonant narratives. Farmers are more likely to adopt and internalise new routines when these are framed not as individual health interventions, but as extensions of collective values, such as protecting family well-being, preserving farming heritage, and sustaining intergenerational continuity. In this sense, crafting normalcy is more about the rearticulation of everyday practices within a shared moral and cultural framework.

From an analytical perspective, the intervention demonstrates conditional effectiveness. On one level, there is clear evidence of early-stage transformation, particularly in the adoption of simple adaptive behaviours and the emergence of more reflective narratives around farming and environmental change. On another level, the persistence of routine inertia among certain farmers highlights the limits of short-term interventions in disrupting deeply embedded practices. This duality suggests that crafting normalcy should be understood as a threshold process, where initial awareness must be continuously supported to evolve into stable and socially reinforced routines.

Affirming identity anchor

The findings demonstrate a gradient in identity reflexivity. On the one hand, there are groups of farmers who can articulate their identity deeply, linking farming practices to family heritage, social responsibility, and spiritual values. K08 and R13 demonstrated this pattern by articulating identity through narratives of hard work, pride, and collective belonging. In this case, identity functions as a generative anchor, not only maintaining self-meaning but also strengthening adaptive capacity through a sense of purpose and social connectedness.

> "I feel like I'm working as part of my family... even though it's hard, I'm happy when I enjoy lunch together in the rice fields" (Mrs Rubiah, R01, 26 September 2024)

Conversely, some participants demonstrated a form of identity that is descriptive but not yet reflective. Identity is mentioned as a background (for example, as a legacy from parents), but has not been processed into an active source of meaning in the face of change. For example, H07 and J10 referenced parental influence, health, and spiritual practices such as prayer, but without elaborating on how these elements shape their understanding of themselves as farmers in the context of environmental change. This suggests that the mere existence of identity is not enough; what is crucial is the extent to which it is communicatively activated as a framework for interpreting risk and change.

On the other hand, there are also indications of limited identity reflection, where narratives about self and community emerge minimally and are not integrated with adaptation experiences. Participants such as M09, N11, and M12 provided brief or fragmented accounts, often limited to mentions of health, family members, or social relations without further elaboration. This situation suggests that the identity dimension in CTR has not yet been fully internalised as a source of resilience.

At the collective level, the findings reveal the presence of locally embedded alternative logics that mediate how farmers interpret and respond to heat stress. Farmers construct meaning through religious-ecological narratives, expressions of gratitude to God, land, and weather, and symbolic practices such as communal eating and shared reflection. In this context, environmental stress is positioned as a relational condition to be endured, respected, and negotiated.

This indicates that CTR in this setting is rearticulated through local cultural logics, including intergenerational identity, communal solidarity, and spiritual interpretations of nature. These "local alternative logics" function as cognitive and moral anchors that both enable and constrain adaptation. On the one hand, they foster acceptance, solidarity, and emotional stability; on the other hand, they may also normalise risk and limit critical reflection on health vulnerability.

Maintaining and using communication networks

The findings indicate variations in the depth of communication networks. At a more developed level, social networks are not only functional but also reflective, characterised by meaningful shared practices such as sharing experiences, mutual support, and the integration of social and spiritual values into daily interactions. For instance, P05 described routines of togetherness such

as sharing meals or coffee, engaging in communal prayer, and providing mutual support, indicating that communication is intertwined with relational and symbolic practices. In this setting, communication serves as a collective mechanism for constructing meaning and strengthening resilience.

> "Fellow farmers help each other...eat together, drink together...involvement with farmer groups as a means of communication" (Juhra, J06, 26 September 2024)

However, at a more moderate level, communication networks tend to be instrumental, limited to practical cooperation without exploring deeper meaning. Although social interactions persist, the reflective dimension, such as the exchange of adaptation experiences or discussions about risks, remains limited. For example, S04 emphasised cooperation in daily farming activities, yet did not elaborate on how these interactions contributed to shared understanding or adaptive strategies. This suggests that social networks have not been fully optimised as a space for the co-construction of adaptive knowledge.

Furthermore, a small proportion of participants reported limited social engagement, with narratives that were more individualistic and minimal interaction. For instance, M09 did not explicitly refer to social relations, and his responses were centred on individual experience rather than collective processes. This situation indicates barriers to accessing or activating social networks as a source of resilience.

Putting alternative logics to work

The findings indicate that some participants have developed a deeper sense of meaning, where the experience of facing the heat is understood not only as a hardship but also as a context for strengthening solidarity, responsibility, and work values. M03 reinforced this pattern by connecting family heritage, social solidarity, and health maintenance strategies, suggesting that adaptation is being reframed within a collectively meaningful logic. In this case, alternative logic serves as a mechanism for cognitive transformation, connecting personal experiences with broader social values.

However, most participants remain at the cognitive transition stage, where adaptive actions have emerged but are not yet accompanied by strong reflection on meaning. Practices such as rest or hydration are undertaken, but more as practical responses than as a result of reinterpreting the situation. M09 described social conditions such as togetherness and food sufficiency without indicating any reinterpretation of these experiences. This indicates a gap between action and meaning, where behavioural changes are not yet fully supported by changes in thinking.

Meanwhile, at a lower level, participants' narratives remain descriptive in nature without any indication of a change in perspective. Participants such as H07, J10, and N11 provided minimal narrative elaboration, focusing primarily on routine activities or physical conditions without connecting them to new interpretations or adaptive reasoning. This situation suggests that this dimension is one of the most challenging aspects, as it requires a deeper and more iterative process of reflection.

Legitimising negative feelings while foregrounding productive action

The findings indicate that most participants were able to articulate emotions such as fatigue, worry about the weather, and uncertainty about harvest yields. Interestingly, in many cases, these emotions were not merely passive expressions but were linked to simple actions such as maintaining health, resting, or strengthening social relationships. For example, R01 explicitly acknowledged feeling 'worried' due to weather uncertainty while simultaneously expressing 'happiness' derived from togetherness and actively maintaining physical and mental well-being. This suggests an initial integration between emotion and action, an important indicator of communicative resilience.

However, the depth of this integration varied. In some participants, emotions were acknowledged but not followed by clear reflection or action, thus remaining at the level of expression without transformation. For instance, while M03 emphasised positive emotions such as happiness during harvest, there was limited articulation of negative emotional experiences or strategies for managing them. Meanwhile, in other cases, narratives tended to avoid expressing

negative emotions and emphasised positive aspects, which may indicate limitations in emotional exploration as a source of learning.

When analysed as a whole, the five dimensions of CTR do not develop evenly, but instead exhibit a systematic pattern of differentiation. Dimensions rooted in existing social structures, such as identity and communication networks, tend to be stronger. Conversely, dimensions requiring cognitive reflection and meaning transformation, such as crafting normalcy and alternative logics, develop more slowly. This pattern suggests that the success of an intervention is determined not only by knowledge transfer, but also by the extent to which the intervention is able to intervene in socially and culturally entrenched meaning-making processes. In other words, resilience is not formed instantly, but through a gradual process involving the interaction of habits, values, and reflection.

Discussion

The findings of this research suggest that resilience communication operates as a generative mechanism through which adaptive capacity is socially produced. CTR-based training helped strengthen farmers' social networks and sense of identity. However, encouraging them to develop consistent narratives of normalcy remained challenging, an expected pattern within the Indonesian context. Rice farmers live in a collectivist cultural environment that prioritises shared values, making it easier for them to improve communication between farmers, share over meals or coffee, and support one another when persuasively encouraged by facilitators (Qu, 2023). Likewise, due to this collective nature, it is easy for farmers to perceive themselves as part of the community and family heritage and gain high psychosocial resilience. Collective societies tend to be more concerned with maintaining harmonious relationships with community members, and the boundaries between the self and others are much more blurred than in individualistic societies (Ren et al., 2021).

On the other hand, farming communities often exhibit a high tendency toward fatalism. Fatalism refers to the belief that consequences are caused by predetermined destiny and that any efforts made will have no effect. People with fatalistic beliefs do not feel they have control over their lives (Michelle et al., 2025). Inertia towards monotonous daily life is significant due to low life dynamics. As a result, it is difficult for external people, such as research teams, to encourage farmers to normalise heat-related risk with critical or transformational awareness. Such resignation to fate has been observed in many traditional agriculture-based communities in Indonesia (Putri et al., 2024) as well as among individualistic communities such as farmers in Colorado, United States (Childs et al., 2020) and non-rice farming populations in Türkiye (Yılmaz & Çakır, 2025). Therefore, fatalism is not tied to a particular cultural or religious group.

Fatalism among farmers is a form of maladaptation stemming from low-risk perception (Ricart et al., 2023). It is a form of coping strategy that focuses on emotions (Heidenreich & Thieken, 2024). This interpretation is consistent with broader literature that positions fatalism as a communicatively constructed response to uncertainty. For instance, Zanin et al. (2023) conceptualise coping as a discursive process, where individuals reproduce culturally available narratives, such as resignation or inevitability, when facing stressors. Similarly, studies on disaster contexts show that fatalistic orientations (e.g., 'come what may') can limit proactive decision-making and hinder adaptive responses (Bagnas & Choy, 2025). In health communication, fatalism has also been identified as a maladaptive response associated with avoidance and denial when individuals encounter threatening information (Chen & Kim, 2024). These perspectives reinforce the empirical finding that farmers' fatalism is not simply a passive attitude but is actively sustained through everyday communication and shared cultural meanings (Putri et al., 2025).

Importantly, this study demonstrates that such maladaptive orientations are not fixed, but transformable through communication-based interventions. The CTR framework provides a mechanism for this transformation by fostering reflexivity and collective meaning-making. Through facilitated discussions, farmers were encouraged to reflect on their experiences, articulate concerns, and reinterpret environmental stressors in relation to their own practices. This aligns with the concept of critical co-reflexivity, where individuals engage in collaborative reflection that transforms personal understanding into shared adaptive capacity (Kamrath & Tracy, 2026). In this study, moments of collective dialogue served as sites where fatalistic narratives were subtly challenged, and alternative interpretations began to emerge. This

moment exists particularly when farmers shared stories of heat exposure and coping strategies. To clarify the mechanism through which CTR reconfigures agricultural extension into a communicative process, Figure 1 illustrates the transformation from fatalistic orientations to adaptive communicative practices.

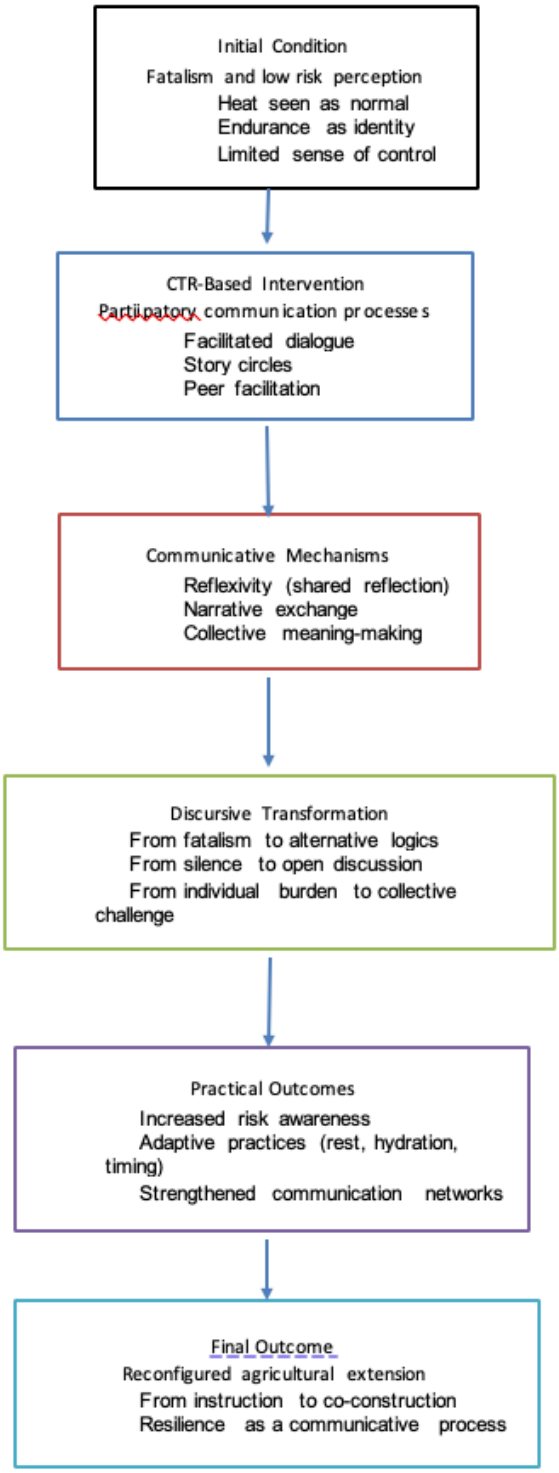

Figure 1. Communicative mechanism of CTR in transforming farmers' responses to heat stress
Source: Author (2025)

Furthermore, communication-based interventions can disrupt fatalism by introducing new discursive resources that reframe risk and agency. Within a culture-centred approach, meaning is not imposed externally but co-constructed through dialogue that respects local knowledge

and lived experience (Sastry et al., 2021). This was evident in how farmers began to connect abstract concepts such as 'heat risk' with tangible practices like hydration management and adjusted work schedules. Such shifts indicate the emergence of alternative logics, where environmental stressors are no longer seen solely as uncontrollable threats but as conditions that can be partially managed through collective adaptation. Therefore, communication efforts aimed at increasing risk perception and knowledge as well as community empowerment, can help reduce fatalism and increase crafting normality within the CTR framework (Mesmer et al., 2024).

Peer facilitators, people who have been made aware of the importance of helping to achieve the program, play a crucial role (Delisle et al., 2016). They become influential figures within farming communities, which are a much-needed source of social support in collectivist societies (Muralidharan et al., 2021). Facilitators from the farmers themselves can build mutual commitment using methods based on collectivism, such as story circles (Baldwin, 2025). A story circle is a method where farmers gather in a group to share their experiences, challenges, and solutions related to a particular phenomenon.

Although this study is based on a relatively small qualitative sample, the findings offer broader conceptual implications for agricultural adaptation policy. The communicative shifts observed among farmers indicate that resilience-building may be more effective when agricultural extension is framed as a participatory and culturally embedded process. In this sense, micro-level transformations in dialogue, collective reflection, and peer communication may provide a foundation for scaling community-based heat adaptation strategies within wider rural development programmes. Integrating CTR-informed approaches into local agricultural institutions, farmer groups, and climate adaptation policies could strengthen socially grounded responses to environmental stress, particularly in vulnerable rural communities.

CONCLUSION

The implementation of CTR-based heat stress extension demonstrated a dynamic process of collective social construction in shaping resilience-based communication capacity within farmer communities in rural Banten. Narrative analysis and participant reflections revealed that the strengthening of self-identity and communication networks emerged as the most salient dimensions of change. Farmers increasingly articulated a sense of shared identity and demonstrated greater engagement in communicative exchanges within their social environment.

At the same time, while participants showed signs of adaptive reframing and the ability to integrate emotional experiences into more constructive narratives, the process of translating these shifts into stable daily routines (crafting normalcy) remained less developed. This suggests that the intervention primarily functioned as a communicative space that fostered social solidarity, reinforced collective identity, and enabled reflective dialogue. Through this process, farmers began to reinterpret extreme heat not merely as an individual burden, but as a shared ecological challenge, although the consolidation of these insights into consistent behavioural practices is still evolving.

This study demonstrates that CTR-based extension fundamentally redefines agricultural extension from a unidirectional model of instruction into a participatory process of communicative co-construction. The intervention enabled farmers to collectively negotiate meaning, reconstruct shared identities, and mobilise social communication networks in response to heat stress as an ecological challenge. In this sense, resilience is treated as a socially embedded communicative process that shapes how communities interpret risk, coordinate responses, and sustain adaptive practices.

Importantly, this form of social resilience carries broader structural implications. By fostering collective awareness of heat-related risks and encouraging adaptive communication practices, CTR-based extension has the potential to support more consistent health-protective behaviours, which may contribute to reducing heat-related health burdens at the community level. At the same time, the strengthening of social coordination and adaptive dialogue can enhance the stability of farming practices under climate stress, thereby indirectly supporting local food security systems.

However, the findings also reveal a persistent tendency toward fatalistic interpretations and limited adaptive reflection, particularly among senior farmers, which may constrain the long-term

consolidation of new practices. This indicates that one-off interventions are insufficient. A more sustainable approach is needed, involving peer-led facilitation models that are culturally grounded and continuously embedded within the community.

Story circles and photovoice are powerful participatory and reflexive methods. To strengthen long-term impact, future programs should adopt more deeply participatory and reflexive methods like these to expand farmers' capacity for critical reflection and collective learning. These approaches should be integrated with practical adaptation strategies, including hydration management and safe work scheduling, to ensure that communicative transformation is translated into everyday practices. Hence, this study positions CTR-based extension as a transformative framework for aligning local knowledge, social interaction, and adaptive action in addressing the growing challenges of climate-induced heat stress.

ACKNOWLEDGMENTS

The author would like to express special thanks to the Shine Bright Award program for providing research inspiration and recognition that motivated the completion of this study. The author gratefully acknowledges the support of Universitas Serang Raya (UNSERA) for facilitating academic resources and institutional assistance during the research and writing process.

REFERENCES

Amankwah, A. S., Gyamfi, P. A. D. U., & Oduro, A. N. (2022). Cultivating communication resilience as an adaptive-transformative process during a global pandemic: Extending the purview of the communication theory of resilience. *International Journal of Communication*, *16*, 21-21. https://ijoc.org/index.php/ijoc/article/view/17736/3965

Azizah, A., Yunanto, R., Setioputro, B., Haristiani, R., Rondhianto, R., & Rokhani, R. (2025). Strengthening Health Literacy Using Social Media: A Quasi-Experimental Study on Rice Farmers' Heat Stroke Risk in Rural Agricultural Areas of Indonesia. *Journal of Health Literacy*, *11*(1), 47–63.

Bagnas, N. C., & Choy, A. H. C. (2025). "Come What May": An Interpretative Phenomenological Analysis of Disaster Survivors' Resilience and Meaning-making of Fatalism. *BMC Psychology*, *13*(1), 1175. https://doi.org/10.1186/s40359-025-03423-3

Baldwin, B. J. (2025). Centering the voices of African American women with cancer: A story circle approach to address communication disparities. *Journal of Psychosocial Oncology*, 1–14. https://doi.org/10.1080/07347332.2025.2559638

BPS. (2023). *Number of Farmers Using Agricultural Land and Smallholder Farmers by Region, INDONESIA, 2023*. BPS. https://sensus.bps.go.id/topik/tabular/st2023/215/0/0

Budiawati, Y., Widiati, S., Mardiyanti, E., Aggraeni, D., & Mulyati, S. (2025). Comparative Study of Climate Variability and Disaster Exposure on The Resilience of Sustainable Agricultural Systems in Two Climate Different Regions. *IOP Conference Series: Earth and Environmental Science*, *1572*(1), 012006. https://doi.org/10.1088/1755-1315/1572/1/012006

Buzzanell, P. M. (2010). Resilience: Talking, Resisting, and Imagining New Normalcies Into Being. *Journal of Communication*, *60*(1), 1–14. https://doi.org/https://doi.org/10.1111/j.1460-2466.2009.01469.x

Castro, J. R. R., & Delina, L. L. (2025). Enhancing ICT utilisation for urban extreme heat adaptation: Perspectives from Southeast Asia. *Sustainable Futures*, *10*, 101368. https://doi.org/10.1016/j.sftr.2025.101368

Chen, M., & Kim, H. K. (2024). Cancer Fatalism in the Information Age: A Meta-Analysis of Communicative and Behavioral Correlates. *Communication Research*, *51*(1), 83–111. https://doi.org/10.1177/00936502231205735

Childs, S. J., Schumacher, R. S., & Demuth, J. L. (2020). Agricultural Perspectives on Hailstorm Severity, Vulnerability, and Risk Messaging in Eastern Colorado. *Weather, Climate, and Society*, *12*(4), 897–911. https://doi.org/https://doi.org/10.1175/WCAS-D-20-0015.1

Daigle, K., & Heiss, S. (2020). Supporting Agricultural Resilience: The Value of Women Farmers' Communication Practices. *Journal of Agriculture, Food Systems, and Community Development*, *9*(4), 45–63. https://doi.org/10.5304/jafscd.2020.094.010

Dany, F. W. W. (4 October 2023). Darurat: 24 dari 29 kecamatan di Kabupaten Tangerang kekeringan. *Kompas*. https://www.kompas.id/artikel/1276-hektare-sawah-terdampak-kekeringan-di-tangerang

Delisle, V. C., Gumuchian, S. T., Kloda, L. A., Boruff, J., El-Baalbaki, G., Körner, A., Malcarne, V. L., & Thombs, B. D. (2016). Effect of support group peer facilitator training programmes on peer facilitator and support group member outcomes: a systematic review. *BMJ Open*, *6*(11), e013325. https://doi.org/10.1136/bmjopen-2016-013325

Fajrillah, A. A. N., Hartanto, R., & Nugroho, L. E. (2024). Factors Affecting Long-Term Effectiveness of Community-Based Early Warning Systems (EWSs) in Rural Areas: A Systematic Review. *2024 8th International Conference on Information Technology (InCIT)*, 231–236. https://doi.org/10.1109/InCIT63192.2024.10810638

Hamzah, N. A., Azli, M. S., Anua, S. M., Abdul Samad, N. I., Mohd Nawi, M. N., Mohd Nawi, M. N., & Mamat, M. N. (2022). Evaluation of Environmental Heat Exposure, Heat-related Symptoms, and Acute Physiological Changes among Farmers in Pasir Puteh and Bachok, Kelantan. *Journal of Energy and Safety Technology (JEST)*, *5*(1), 21–30. https://doi.org/10.11113/jest.v5n1.103

Hasan, F., Marsia, S., Patel, K., Agrawal, P., & Razzak, J. A. (2021). Effective Community-Based Interventions for the Prevention and Management of Heat-Related Illnesses: A Scoping Review. *International Journal of Environmental Research and Public Health*, *18*(16), 8362. https://doi.org/10.3390/ijerph18168362

Heidenreich, A., & Thieken, A. H. (2024). Individual heat adaptation: Analyzing risk communication, warnings, heat risk perception, and protective behavior in three German cities. *Risk Analysis*, *44*(8), 1788–1808. https://doi.org/https://doi.org/10.1111/risa.14278

Indrawan, R., & Setiawan, F. (2025). Presenting Farmers' Welfare through the Agricultural Innovation System (AIS): A Case Study of the Harvest Moon CSR Program by PT PLN Indonesia Power UBP Banten 3 Lontar. *INFLUENCE: International Journal of Science Review*, *7*(3), 1–12. https://doi.org/10.30872/ls.v6i2.5702

Johar, H., Abdulsalam, F. I., Guo, Y., Baernighausen, T., Jahan, N. K., Watterson, J., Leder, K., Gouwanda, D., Letchuman Ramanathan, G. R., Lee, K. K. C., Mohamed, N., Zakaria, T. A., Barteit, S., & Su, T. T. (2025). Community-based heat adaptation interventions for improving heat literacy, behaviours, and health outcomes: A systematic review. *The Lancet Planetary Health*, *9*(7), 101207. https://doi.org/10.1016/S2542-5196(25)00007-5

Kamrath, J. K., & Tracy, S. J. (2026). The social construction and reciprocity of resilience: Enacting resilience interactionally through affirmative sensemaking and critical co-reflexivity. *Communication Quarterly*, *74*(1), 23–49. https://doi.org/10.1080/01463373.2025.2587950

King, J., Kam, J. A., Cornejo, M., & Mendez Murillo, R. (2023). Enacting resilience at multiple levels during the COVID-19 pandemic: exploring communication theory of resilience for U.S. undocumented college students. *Journal of Applied Communication Research*, *51*(5), 539–558. https://doi.org/10.1080/00909882.2023.2178855

Lillie, Helen M, Chernichky-Karcher, Skye, & Venetis, Maria K. (2021). Dyadic coping and discrete emotions during COVID-19: Connecting the communication theory of resilience with relational uncertainty. *Journal of Social and Personal Relationships*, *38*(6), 1844–1868. https://doi.org/10.1177/02654075211009302

Mesmer, K. R., Mitra, R., & Buzzanell, P. M. (2024). Graduate students' resilience and resistance: exploring adaptive-transformative possibilities in higher education. *Journal of Applied Communication Research*, *52*(6), 661–681. https://doi.org/10.1080/00909882.2024.2430278

Michelle, G.-D. U., Brennan, A., Freeman, B. J., Mandujano, E., Morano, E., Keiser, D., & McMoran, D. (2025). Agricultural Workers' Perspectives on Stressors, Stress Management Topics and Support Options: A Case Study from the Western U.S. In *International Journal of Environmental Research and Public Health* (Vol. 22, Issue 8). https://doi.org/10.3390/ijerph22081180

Mondal, T., Sen, J., Goswami, R., & Nag, P. K. (2024). Community Adaptation to Heat stress− Social Network Analysis. *Climate Risk Management*, *44*, 100606. https://doi.org/10.1016/j.crm.2024.100606

Mousavi, R., & Gu, B. (2023). Resilience Messaging: The Effect of Governors' Social Media Communications on Community Compliance During a Public Health Crisis. *Information Systems Research*, *35*(2), 505–527. https://doi.org/10.1287/isre.2021.0599

Mulyaqin, T., Nurmalina, R., Kusnadi, N., & Trisasongko, B. H. (2025). Effect of climate and economic factors on rice production: Machine learning approach. *Journal of Innovations and Sustainability*, *9*(2), 7–24. https://doi.org/10.51599/is.2025.09.02.07

Muralidharan, A., Peeples, A. D., Hack, S. M., Fortuna, K. L., Klingaman, E. A., Stahl, N. F., Phalen, P., Lucksted, A., & Goldberg, R. W. (2021). Peer and Non-Peer Co-Facilitation of a Health and Wellness Intervention for Adults with Serious Mental Illness. *Psychiatric Quarterly*, *92*(2), 431–442. https://doi.org/10.1007/s11126-020-09818-2

Nyambe, A. (2024). Exploring climate change perception and heat stress adaptation among Zambian farmers using participatory tools. *Regional Environmental Change*, *24*(2), 46. https://doi.org/10.1007/s10113-024-02206-7

Okta, S., Saefullah, R., & Halim, N. (2025). Ethnoscience-Based Climate Change Adaptation: Survival Strategies for Agricultural Communities in Panimbang Regency. *International Journal of Ethno-Sciences and Education Research*, *5*(3), 78–85. https://doi.org/10.46336/ijeer.v5i3.1047

Oktarina, S. D., Ruhiat, Y., & Oktarisa, Y. (2025). Rainfall and Temperature Analysis for Predicting Drought-Prone Areas in Tangerang Regency. *Lensa: Jurnal Kependidikan Fisika*, *13*(1), 171–180. https://doi.org/10.33394/j-lkf.v13i1.15818

Pacheco-Zenteno, F., Glaser, J., Jakobsson, K., Weiss, I., Arias-Monge, E., & Gyllensten, K. (2021). The Prevention of Occupational Heat Stress in Sugarcane Workers in Nicaragua—An Interpretative Phenomenological Analysis. *Frontiers in Public Health*, *9*, 713711 . https://doi.org/10.1136/oem-2021-epi.223

Pang, S. (2025). *Distress-Disclosure Skills and the Communication Theory of Resilience (CTR) in College Students' Stress and Positive Adaptation*. PHD Dissertation, University of Georgia. https://openscholar.uga.edu/record/26979/files/Pang_uga_0077E_16125.pdf

Parikoglou, I., & Finger, R. (2025). The effect of heat stress on risk and efficiency in dairy farming. *European Review of Agricultural Economics*, *52*(2), 187–215. https://doi.org/10.1093/erae/jbaf013

Permatasari, N., Yovi, E. Y., & Kuncahyo, B. (2023). Mitigating Heat Exposure: Exploring the Role of Knowledge, Risk Perception, and Precautionary Behaviour. *Jurnal Sylva Lestari*, *12*(1), 11–26. https://doi.org/10.23960/jsl.v12i1.773

Purwanti, E., Anam, K., Ilah Holilah, & Kamaluddin Nurdin Marjuni. (2025). Interaction of religion and local culture in symbolic communication of agricultural ruwat for strengthening indigenous authority across Javanese ethnics. *Penamas*, *38*(2), 207–219. https://doi.org/10.31330/penamas.v38i2.1010

Puteh, A. C. A., Sahrasad, H., & Rahadi, S. D. (2024). Coping up with climate change: A Case Study of a Banten Muslim Community. *Journal of Contemporary Islam and Muslim Societies*, *8*(1), 124–156. https://doi.org/10.30821/jcims.v8i1.21201

Putri, L. D., Agustin, H., Bakti, I., & Suminar, J. R. (2024). Addressing Health Illiteracy and Stunting in Culture-Shocked Indigenous Populations: A Case Study of Outer Baduy in Indonesia. *International Journal of Environmental Research and Public Health*, *21*(9). https://doi.org/10.3390/ijerph21091114

Putri, L. D., Agustin, H., Bakti, I., & Suminar, J. R. (2025). Genetic perception versus nutritional factors: analyzing the indigenous Baduy community's understanding of stunting as a health issue. *International Journal of Environmental Research and Public Health*, *22*(2), 145. https://doi.org/10.3390/ijerph22020145

Qu, D. (2023). Collectivism culture and green transition: An empirical investigation for the rice theory. *Frontiers in Environmental Science*, *11*, *1129170* https://doi.org/10.3389/fenvs.2023.1129170

Ren, Xiaopeng, Cang, Xiaohui, & Ryder, Andrew G. (2021). An Integrated Ecological Approach to Mapping Variations in Collectivism Within China: Introducing the Triple-Line Framework. *Journal of Pacific Rim Psychology*, *15*, 1834490921991436. https://doi.org/10.1177/1834490921991436

Sastry, S., Stephenson, M., Dillon, P., & Carter, A. (2021). A Meta-Theoretical Systematic Review of the Culture-Centered Approach to Health Communication: Toward a Refined, "Nested" Model. *Communication Theory*, *31*(3), 380–421. https://doi.org/10.1093/ct/qtz024

Spencer, S., Samateh, T., Wabnitz, K., Mayhew, S., Allen, H., & Bonell, A. (2022). The Challenges of Working in the Heat Whilst Pregnant: Insights From Gambian Women Farmers in the Face of Climate Change. *Frontiers in Public Health*, *10*, 785254. https://doi.org/10.3389/fpubh.2022.785254

Vargas-Bianchi, L. (2025). Pattern matching analysis: Overview of its rationale and application in qualitative research. *Methodological Innovations*, *18*(1), 66-75. https://doi.org/10.1177/20597991251325451

Wibowo, D. A. (2025). Extreme Weather Changes and Their Impact on Marine and Terrestrial Ecosystems in Banten Province. *KnE Social Sciences*, *10*(26), 301–307. https://doi.org/10.18502/kss.v10i26.20007

Wijaya, S. Y. (10 November 2023). Jakarta and Tangerang Among Cities with Longest Streak of Hot Days in the World: Study Found. *The Jakarta Post*. https://www.thejakartapost.com/indonesia/2023/11/10/jakarta-tangerang-among-cities-with-longest-streak-of-hot-days-in-the-world-study.html

Yılmaz, G., & Çakır, Ö. (2025). Evaluation of farmers' disaster risk reduction activities against meteorological disasters in Türkiye: a qualitative study. *Natural Hazards*, *121*(13), 16087–16119. https://doi.org/10.1007/s11069-025-07414-w

Yovi, E. Y., Nastiti, A., & Kuncahyo, B. (2023). Heat-Related Knowledge, Risk Perception, and Precautionary Behavior among Indonesian Forestry Workers and Farmers: Implications for Occupational Health Promotion in the Face of Climate Change Impacts. *Forests*, *14*(7), 1455. https://doi.org/10.3390/f14071455

Zanin, A. C., Avalos, B. L., Town, S., Tracy, S. J., & Stanley, B. L. (2023). Discursive, Communal, and Individual Coping Strategies: How U.S. Adults Co-constructed Coping During Preliminary COVID-19 Stressors. *Health Communication*, *38*(7), 1373–1387. https://doi.org/10.1080/10410236.2021.2010347

Appendix