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RESEARCH ARTICLE

Village Community Adaptation to Agricultural Downstreaming

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Abstract

Agricultural downstream innovation in Buru Regency, Maluku, has significant potential to absorb local labor, reduce unemployment, and improve the welfare of rural communities. The region's abundant natural resources should be utilized to support national food security through efficient agricultural processing. This study employed a qualitative method with an explanatory case study approach to examine the causal relationships between variables. Thirty informants were selected purposively from seven villages. Data were collected through in-depth interviews and participant observation, then analyzed thematically using MAXQDA 24.4.1 software. The findings indicate that rural communities are actively adapting to agricultural downstreaming through social and economic strategies, while preserving cultural heritage. This process combines value-added creation, risk management, and social capital utilization. However, for socio-economic resilience to be sustainable, support is needed in the form of technology adoption, resource access, and inclusive social participation. Future policies should strengthen social capital, preserve local values, economic innovation, and community participation. Further research is recommended to explore the impact of value changes, technological barriers, social capital mapping, and a comparison of adaptation models.

Keyword: Adaptation, Downstreaming, Agriculture, Village, Culture.

Introduction

Agriculture is a sector that plays a vital role in the social and economic life of rural communities in Indonesia. However, farmers in Buru Regency still face the challenge of low added value due to the limited downstreaming process. Agricultural downstreaming involves processing agricultural products into value-added products before they are sold to the market.(Raden et al., 2024), is one of the strategies that is expected to improve the welfare of farmers and reduce their dependence on the raw material market.(Lahadalia et al., 2024).

In a socio-cultural context, the people of Buru Regency possess local wisdom that has long been an integral part of their agricultural system. Traditional values such as mutual cooperation, deliberation, and customary agricultural practices are still practiced in the lives of farmers. However, when agricultural downstreaming is introduced, clashes between modernization and traditional values that have been passed down through generations are highly likely. This leads to variations in farmers' social adaptation patterns to the changes brought about by agricultural downstreaming.

In reality, some farmers are able to adapt by adopting new technologies and building wider economic networks, while others experience difficulties in adapting due to limited access to information, capital, and the shifts in social values they face.(Azhar et al., 2022)Therefore, studying the adaptation of rural communities to agricultural downstreaming is crucial for understanding the patterns of adaptation that occur, the factors that influence them, and how local wisdom is maintained in the agricultural downstreaming process.

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Buru Regency has significant agricultural potential, with a diversity of superior commodities offering opportunities for further development. These commodities have considerable potential and can serve as a foundation for the achievements of rural communities in Buru Regency. However, the agricultural sector in this region still faces various structural challenges, including low added value of agricultural products and minimal innovation in agricultural processing.(Hentihu et al., 2021)The majority of farmers still rely on a primary commodity-based economic system, where crops are sold in their raw form at relatively low and volatile prices. This reliance on raw product sales not only impacts farmers' incomes but also hinders the optimization of the agricultural sector as a driving force of the local economy.(Daulay et al., 2024)This situation provides a foundation for the development of agricultural downstreaming aimed at improving household incomes in rural communities.

Agricultural downstreaming is an effort to increase the added value of agricultural products through processing before they reach consumers.(Hamim & Vianda, 2019)According to several studies, downstreaming can increase farmers' income and reduce their dependence on raw material markets.(Dwiartama et al., 2018; Kinanda et al., 2023)However, the success of downstreaming does not only depend on economic aspects, but also on the social and cultural readiness of the farming community in adopting changes.(Heyojoo & Sharma, 2013)Local wisdom encompasses cultural values, traditional practices, and social norms passed down through generations within a community. In the agricultural context, local wisdom plays a role in sustainable agricultural systems, natural resource management, and building social solidarity among farmers.(Azarov et al., 2024; Brown et al., 2021)This study will explore how communities adapt to the downstreaming of agriculture to maintain sustainable socioeconomic values.

Methods

The research method used is a qualitative model that utilizes a case study approach, which allows the author to explore and

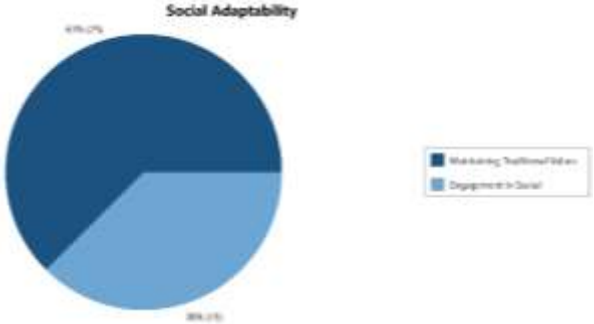
understand certain phenomena or events in a real-life context through a comprehensive analysis of one or more specific cases. Case study methodology allows researchers to examine a case by analyzing various influencing factors, including the social, cultural, political, and historical contexts and the dynamics that exist within these frameworks.(Panke, 2024). The selection of Parbulu, Seith, Waegeren, Waitele, Hatawano, Wamlana, and Waeperang Villages as research locations is based on the characteristics of rural communities.

This qualitative research uses interview techniques to examine the experiences of informants. (García-Jurado et al., 2021; Johansson et al., 2024). The data collection process was carried out by determining the focus of the interview and the specific objectives to be achieved, and the researcher built a familial relationship with the informant so that the informant felt comfortable and free to speak and the researcher asked the informant for permission to record information and statements provided during the interview. The author used purposive sampling, a research method characterized by deliberate selection based on certain criteria, to identify informants. As identified by the author, the criteria for informants considered suitable for this study include those who have experience and in-depth understanding of agriculture, downstreaming and food security so that the informants that the researcher considered suitable for in-depth research include; farmers, local business actors, housewives and farmer groups. The study was conducted in farming households in the villages of Parbulu, Seith, Waegeren, Waitele, Hatawano, Wamlana and Waeperang with reference to the characteristics of rural communities.

Researchers used MAXQDA 24.4.1 software developed by VERBI GmbH, to analyze interview transcripts, focus group discussions, and documents during the data processing phase.(Guetterman & James, 2023)This software assists researchers in organizing, coding, annotating, retrieving, and analyzing document collections. For data analysis, the authors used a four-stage pattern: category collection, direct interpretation, pattern formation, search for equivalence among categories, and development of naturalistic generalizations. The method used offers the benefits of sensitivity to detect every symptom in the research subjects (social situations), the ability to investigate data sources through comprehensive interviews, and the ability to disseminate research findings to a wider audience.

Results and Discussion

This study yields data on village community adaptation to agricultural downstreaming, using interview results systematically compiled in tabular format. Interview data were processed using MAXQDA 24.4.1 software developed by VERBI GmbH, which allows researchers to code text, identify themes, analyze relationships between categories, and generate data visualizations, as illustrated in the following figure.



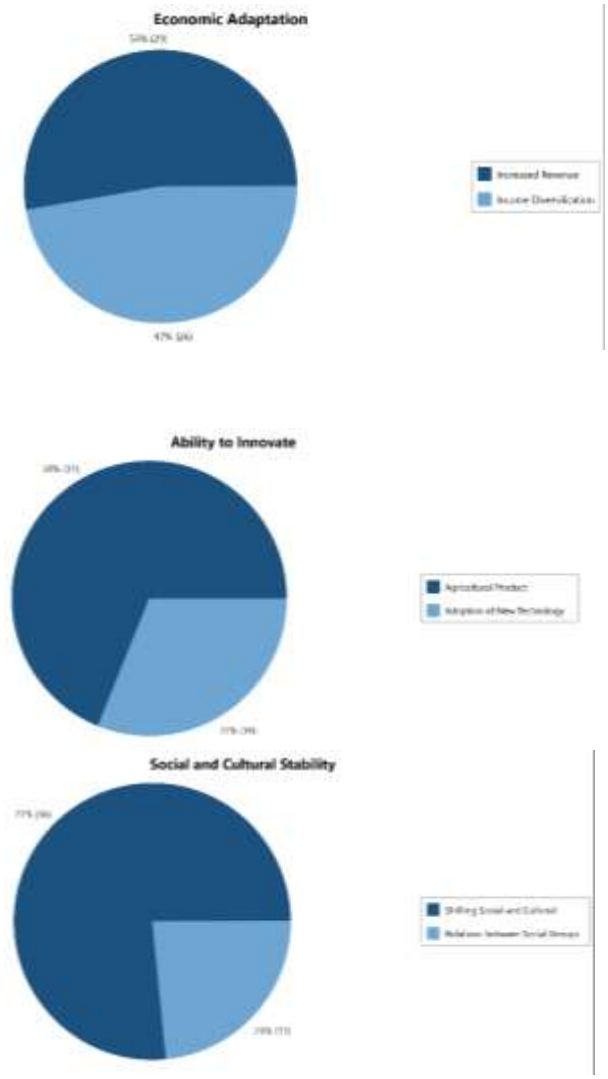


Fig 1. Figure 1. Inter-Coding Patterns for All Categories
Source: Field Data Processing with MAXQDA 24 Software

Based on the data visualization results, it can be seen that in terms of social and cultural stability, the majority of informants (77%) perceived social and cultural changes in their environment, while only 23% highlighted relationships between social groups as dominant. This indicates that social and cultural dynamics are undergoing significant shifts in society. Regarding the ability to innovate, the majority of informants (69%) emphasized innovation in the form of agricultural product development. Meanwhile, only 31% mentioned the adoption of new technology as a form of innovation. This means that community innovation still relies more on the primary production sector than on the widespread use of modern technology. Regarding economic adaptation, informants were fairly evenly divided between those experiencing increased income (53%) and those diversifying their sources of income (47%). This indicates that the community is building economic resilience through both increased yields and expanding livelihoods.

Meanwhile, in terms of social adaptability, 63% of informants indicated a strong tendency to maintain traditional values as part of their social adaptation strategy. Meanwhile, 38% emphasized the importance of engaging in social activities as a means of adapting to social change. Overall, this data suggests that communities are undergoing a complex process of change and adaptation. They maintain their traditional roots while striving to improve economic conditions and innovation in the agricultural sector. However, technology adoption and social participation remain areas that need to be strengthened to support sustainable socio-economic resilience.

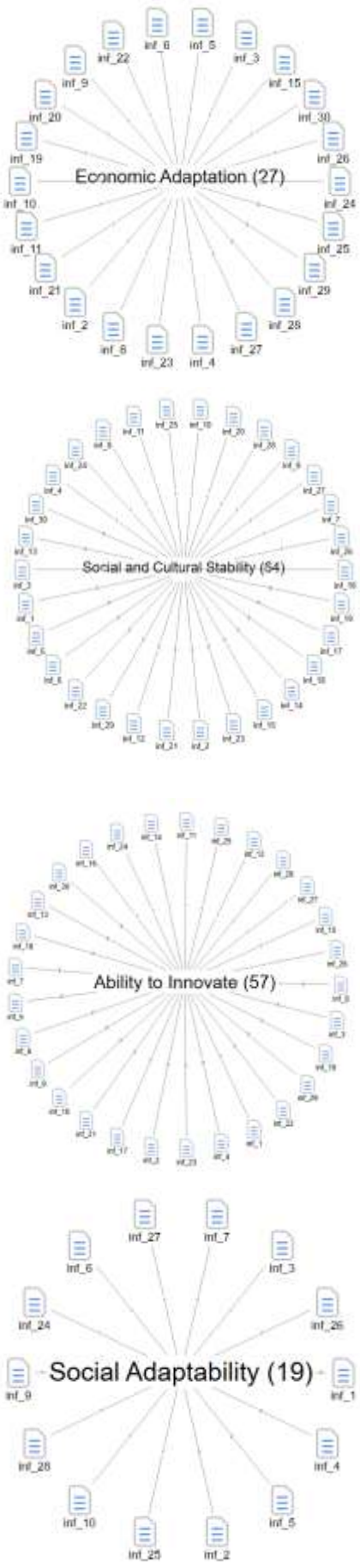


Fig 2. Figure 2. Code Distribution Model Source: Field Data Processing with MAXQDA 24 Software

The first diagram on the top left displays "Social and Cultural Stability" (54) as the main concept, where the number 54 indicates a significant number of references related to social and cultural stability. The various sub-factors "inf_X" surrounding it (ranging from inf_1 to inf_30, with examples such as inf_4, inf_8, inf_11) describe aspects that shape this stability. The second diagram on the top right focuses on "Economic Adaptation" (27), a concept with 27 references, which is subordinate to socio-cultural stability. The sub-factors "inf_X" here (e.g. inf_6, inf_5, inf_3) describe various elements that contribute to economic adaptability, such as income diversification or income-generating strategies.

The third diagram on the bottom left displays "Social Adaptability" (19) as the main theme, with 19 references, making it the concept with the fewest references among the four. However, the connected sub-factors of "inf_X" (such as inf_27, inf_6, inf_24) still indicate the complexity of social adaptation, which can involve network engagement or the preservation of traditional values. Finally, the fourth diagram on the bottom right focuses on "Ability to Innovate" (57), which is the concept with the most references (57), indicating how dominant or rich the concept of innovation is in the analyzed data set. The various sub-factors of "inf_X" (e.g., inf_14, inf_11, inf_25) comprehensively depict the various elements that promote or hinder the ability to innovate.

Overall, these four diagrams effectively visualize the results of the thematic analysis or qualitative coding, where each "inf_X" likely represents a code or category of raw data that is then grouped under broader, central themes. The varying number of references to each central concept (54, 27, 19, 57) provides an idea of the weight or frequency with which each theme is discussed or appears in the source data. Although the specific content of each "inf_X" is not explained, this visual representation is very helpful in understanding the structure and dimensions of each concept under study.

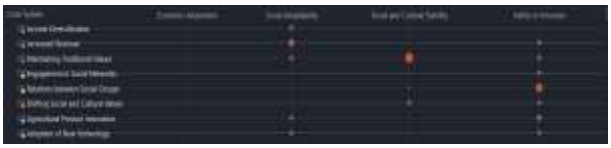


Fig 3. Code Relationship. Source: Field Data Processing with MAXQDA 24 Software

Data visualizations demonstrate the relationship between code system themes and four key dimensions of societal adaptation: economic adaptation, social adaptability, social and cultural stability, and the capacity for innovation. Within the economic adaptation dimension, two key themes emerged: income diversification and increased revenue. This indicates that communities tend to respond to economic challenges by expanding their sources of income and seeking to increase the economic value of existing activities.

Meanwhile, in terms of social adaptability, two dominant themes were maintaining traditional values and engagement in social networks. This demonstrates that social adaptability is determined not only by involvement in social networks, but also by a community's steadfastness in upholding traditional values as the foundation of their social life.

In the social and cultural stability dimension, the theme of shifting social and cultural values appears most prominent, along with relations between social groups. This demonstrates that socio-cultural stability is greatly influenced by changes in societal values and the quality of relationships between social groups. The tension and harmony within these relationships are crucial factors in maintaining the sustainability of the social order.

In terms of innovation capability, agricultural product innovation dominates, followed by the adoption of new technology, and some are also related to shifting social and

cultural values. This indicates that innovation in society is primarily manifested in the development of agricultural products, while the use of new technology and socio-cultural dynamics also play a role in this innovative process.

Fig 4. Code-Subcode-Segment Model (Economic Adaptation). Source: Field Data Processing with MAXQDA 24 Software

The diagram presented is a structured visual representation of the concept of "Economic Adaptation," which serves as the primary goal or outcome to be achieved in an economic context. This central concept, which has 27 sub-elements or related factors, is broken down into two crucial strategic pillars: "Increased Revenue" and "Income Diversification." These two pillars, which encompass 29 and 26 specific factors, respectively, are the primary pathways to successful economic adaptation.

The first pillar, "Increased Revenue," highlights various strategies and factors focused on the income side of the economy. With 29 supporting elements represented by green circles labeled "inf_X, Y" (e.g., inf_1_1 to inf_21_1), this pillar indicates that revenue growth is a complex area with many aspects to consider, ranging from operational efficiency and new product development to pricing strategies and market expansion. The use of green implicitly implies a positive connotation, referring to growth, success, or a favorable impact in revenue-raising efforts. On the other hand, the "Income Diversification" pillar emphasizes the importance of risk-sharing and developing diverse revenue streams. With 26 factors represented by gray circles, this pillar demonstrates that diversification is not simply about adding a single new revenue stream but involves a multifaceted set of strategies, such as entering new markets, developing different product/service lines, or investing in diverse assets. The color difference (gray versus green) between these two pillars may indicate different factor categories, stages of adaptation, or even levels of strategic maturity.

Overall, this diagram provides a comprehensive analytical framework for understanding how entities (be they individuals, businesses, or communities) can achieve economic adaptation. Further analysis of the specific content of each "inf_X, Y" will be essential for gaining in-depth insights into the specific adaptation mechanisms, the relative weight of each factor, and the practical implications for formulating strategies in the face of changing economic dynamics.

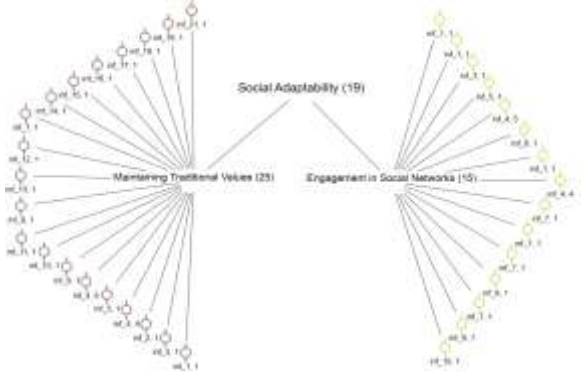


Fig 5. Code-Subcode-Segment Model (Social Adaptability). Source: Field Data Processing with MAXQDA 24 Software

The diagram shown is a hierarchical model that breaks down the concept of "Social Adaptability" into two main, complementary components. The concept of "Social Adaptability" itself, which is listed as having 19 supporting elements, demonstrates that social adaptation is a multidimensional construct involving various aspects. From this main concept, two important pillars emerge that contribute to an individual's or group's ability to adapt socially.

The first pillar is "Maintaining Traditional Values," which is indicated by 25 supporting factors. This indicates that, within the context of this model, the preservation or consistency of cultural and traditional values plays a significant role in social adaptation. Each of these supporting factors is represented by a light brown circle labeled "inf_X, Y" (e.g., inf_1_1 to inf_21_1), which likely refers to the specific traditional norms, beliefs, or practices being maintained. The light brown color may hint at the foundation, heritage, or sustainability of these values. Meanwhile, the second pillar is "Engagement in Social Networks," which encompasses 15 supporting factors. This pillar emphasizes the importance of social interaction and connectivity as key to adaptation. The supporting factors are represented by lime green circles also labeled "inf_X, Y" (e.g., inf_1_1 to inf_10_1), indicating various forms or levels of engagement in a community or social group. This lime green color may symbolize vitality, dynamism, or growth that emerges from social interaction.

Overall, this diagram presents a strong conceptual framework, underscoring that social adaptability depends not only on an individual's capacity to interact and connect with their environment, but also on their ability to maintain and value the traditional values that underlie their social identity. Thus, this model highlights the interplay between conservative elements (traditional values) and dynamic elements (social networks) in achieving effective social adaptation.

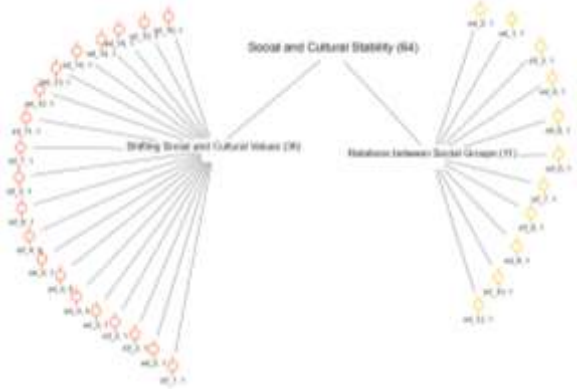


Fig 6. Code-Subcode-Segment Model (Social and Cultural Stability). Source: Field Data Processing with MAXQDA 24 Software

In general, this graph displays the hierarchical relationship between the main themes (parent nodes) and the sub-themes or supporting codes (child nodes) extracted from the data. There are two main central themes that are the focus of the analysis: "Shifting Social and Cultural Values" located on the left side, and "Relations between Social Groups" located on the right side. The number in parentheses after each theme, such as (36) for "Shifting Social and Cultural Values" and (11) for "Relations between Social Groups", indicates the number of references or data items related to that theme, indicating the extent to which the theme appears in the analyzed data. At the top, there is the theme "Social and Cultural Stability" with (64) references, which appears to function as a context or dimension that interrelates with the two main themes below it. The arrows connecting "Social and Cultural Stability" to "Shifting Social and Cultural Values" and "Relations between Social Groups" suggest an

interconnection, where stability may influence or be influenced by shifting values and the dynamics of relationships between groups.

Furthermore, each main theme is broken down into several more specific sub-themes or codes, represented by smaller colored circles. On the left side, "Shifting Social and Cultural Values" is associated with numerous red and orange codes, such as "inf_1_1," "inf_2_1," and "inf_16_1." This large number of codes indicates that "shifting social and cultural values" is a complex and deeply explored area with various nuances from the raw data. Meanwhile, on the right side, "Relations between Social Groups" is associated with yellow codes, such as "inf_1_1," "inf_2_1," and "inf_12_1," although there are fewer of them compared to the themes on the left side. Overall, this conceptual map provides an overview of how the data has been organized and analyzed to identify patterns and themes around the dynamics of change and stability in social and cultural contexts, and their implications for relationships between social groups.

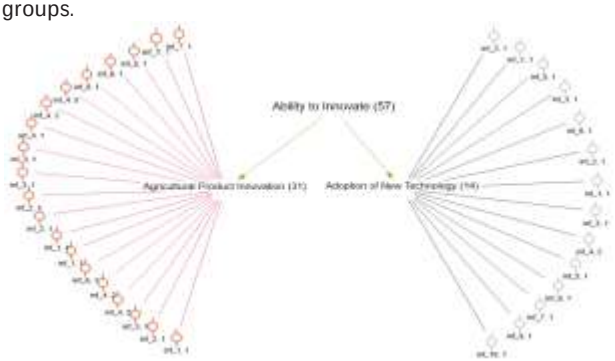


Fig 7. Code-Subcode-Segment Model (Innovation Ability). Source: Field Data Processing with MAXQDA 24 Software

Fig 8.

Figure 7 illustrates the hierarchical and causal relationships between the various concepts or themes emerging from the research data. Essentially, "Ability to Innovate" is positioned as the central concept and the primary determining variable in this model. With a quantitative weight (57), this figure indicates that this theme is the most frequently occurring or most frequently referenced in the data, demonstrating its dominance and significant relevance in the research context. The arrows pointing outward from "Ability to Innovate" strongly indicate that this ability has a direct and substantial influence on the other two concepts, making it an essential foundation for progress in the agricultural sector.

The two concepts affected are "Agricultural Product Innovation" and "Adoption of New Technology." "Agricultural Product Innovation" is on the left side of the diagram, with a quantification (31), indicating that this theme is also discussed quite frequently in the data, reflecting various agricultural product development and innovation efforts. Below it, there are various smaller nodes labeled "inf_x_y" (e.g., inf_1_1, inf_2_1), which most likely represent specific informants or data sources providing information or perspectives on aspects of agricultural product innovation. These numbers not only identify the sources, but may also indicate subcategories or nuances of detail of the information conveyed by each informant.

Meanwhile, "Adoption of New Technology" is located on the right side of the diagram, receiving influence from the ability to innovate with quantification (14). This figure shows that the theme of technology adoption, although important, may not be discussed as much as agricultural product innovation in the collected data. Similarly, on the left side, there are "inf_x_y" nodes (e.g., inf_2_1, inf_5_1) that provide empirical support and specific details regarding the types of technologies adopted or how the adoption process occurs in the field. The presence of supporting nodes on both sides emphasizes that these concepts are not mere abstractions, but are supported by rich primary data from various informants, providing concrete evidence for the research findings.

Overall, this model implies that success in developing innovative agricultural products and accelerating the adoption of cutting-edge technologies depends heavily on the strength of the Capacity to Innovate among agricultural sector actors. This highlights the importance of focusing on enhancing innovative capacity through various interventions and policies, which in turn will drive significant progress in product innovation and the adoption of new technologies.

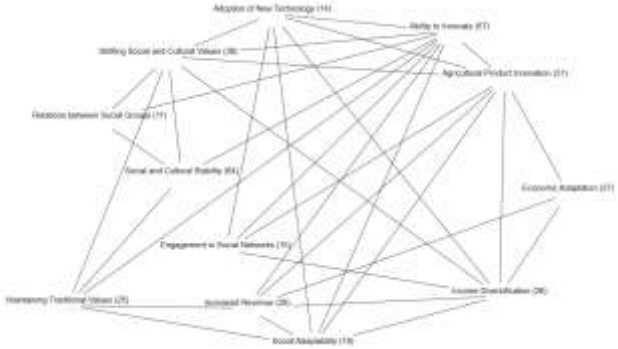


Fig 9. Code Co-occurrence Model (Code Intersection). Source: Field Data Processing with MAXQDA 24 Software

Diagram 8 highlights several concepts with a very high frequency of occurrence (number of references or coding), making them central pillars of your findings. "Social and Cultural Stability" (64) emerged as the most dominant theme, indicating that stability in social and cultural aspects is a very frequent and crucial issue discussed by informants or in documents. Almost parallel, "Ability to Innovate" (57) also shows a very significant weight, confirming its position as a core capacity or determining factor in the context of your research. The presence of these two themes as the most prominent implies that the dynamics between the ability to innovate and stable socio-cultural conditions are central to your data narrative.

The concept of "Ability to Innovate" (57) is a central point that radiates connections to many other themes. Its strong relationship with "Agricultural Product Innovation" (31) and "Adoption of New Technology" (14) is the most direct and logical finding. It confirms that the internal ability to innovate (whether at the individual, organizational, or community level) is directly manifested in new agricultural product development practices and the willingness to adopt advanced technologies. The higher frequency of "Agricultural Product Innovation" (31) compared to "Adoption of New Technology" (14) may indicate that product innovation is discussed more frequently or is more diverse in the context of your data than the adoption of specific technologies.

The three economic concepts of "Increased Revenue" (29), "Economic Adaptation" (27), and "Income Diversification" (26) show a close interconnectedness. "Economic Adaptation" as a theme with fairly broad connectivity within this group, implies that economic adaptation efforts are a bridge to increased income and income diversification strategies. This may reflect how the entity in your study faces economic challenges or seeks new opportunities for growth. The relationship of these economic concepts to "Ability to Innovate" and other themes suggests that economic innovation and adaptation are integral to the ability to survive and thrive.

In addition to the dominant "Social and Cultural Stability" (64), two other concepts, namely "Shifting Social and Cultural Values" (36) and "Maintaining Traditional Values" (25), enrich the understanding of the socio-cultural landscape. The existence of these three concepts simultaneously shows the tension or dialectic between the desire to maintain tradition, the reality of shifting values, and the need for stability. The connection between these themes with "Ability to Innovate" and "Adoption of New Technology" can imply that innovation and adoption of technology do not occur in a vacuum, but are strongly influenced by, or even contribute to, the dynamics of existing social and cultural values. The concepts of "Engagement in Social

Networks" (15) and "Relations between Social Groups" (11), although with lower frequency, highlight the importance of the interpersonal and community dimensions. Their relationship with "Social Adaptability" (19) suggests that participation in social networks and the quality of intergroup relationships can be key factors in social capacity to adapt to change. Their links with other themes also indicate that social networks can facilitate or hinder processes of innovation, technology adoption, or economic adaptation.

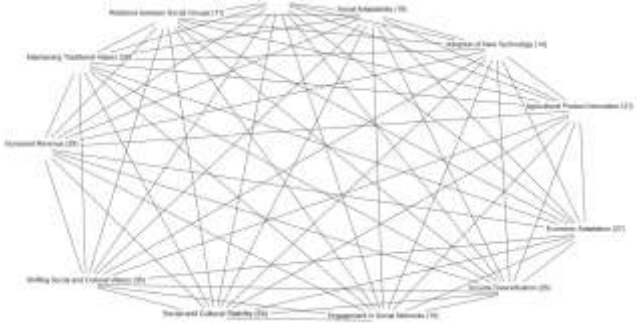


Fig 10. Code Co-occurrence Model. Source: Field Data Processing with MAXQDA 24 Software

The diagram presented depicts a complex system full of interconnections, where each factor directly influences each other, reflecting the high interdependence between its elements. With "Social and Cultural Stability" standing out as the factor with the highest weight (64), it is clear that social and cultural stability is the core or main goal in this system. However, the presence of "Shifting Social and Cultural Values" (36) with a weight that is also significant indicates an inherent dynamic, namely the tug-of-war between maintaining traditional values and adapting to change.

Economic aspects also play an important role, as seen from the high weighting of "Agricultural Product Innovation" (31), "Increased Revenue" (29), "Economic Adaptation" (27), and "Income Diversification" (26). This indicates that innovation in the agricultural sector and economic growth in general are key drivers or important consequences in this system. The extensive interaction between economic and socio-cultural factors highlights that changes in one area will spill over into others; for example, agricultural innovation can increase income, which can then influence the shift or maintenance of social values.

Although with a lower weighting, "Engagement in Social Networks" (15) and "Relations between Social Groups" (11) underscore the importance of social interactions and connections as facilitators or mediators in the dynamics of this system. Overall, this diagram paints a picture of an entity (possibly a society or community) that is constantly adapting ("Social Adaptability") amidst the tension between tradition and modernity. To manage or understand this system, a holistic approach is needed that considers all factors and their interactions, because any intervention at one point will most likely have a ripple effect throughout the network.

Discussion

The dynamics of rural communities' social adaptation to agricultural downstreaming is a complex and multifaceted phenomenon, extending beyond a passive response to external pressures. It is an ongoing process deeply rooted in the concept of "Social Adaptability," supported by a variety of specific elements. The essence of this adaptation is embodied in the dynamic interaction between two key pillars: "Maintaining Traditional Values" and "Engagement in Social Networks." While these two pillars complement each other, they reflect inherent tensions and differing preferences in adaptation practices at the community level. This study will explore how rural communities navigate the structural changes brought about by downstreaming, striking a balance between maintaining a strong cultural identity and leveraging social connectivity to build resilience amidst economic transformation.

Dynamics of Social Adaptation to Downstreaming

The dynamics of rural social adaptation to agricultural downstreaming constitute a rich and multidimensional case study, extending beyond a mere passive response to external pressures. It represents a complex process rooted in the concept of "Social Adaptability," a construct supported by 19 specific elements. The essence of this adaptation unfolds in the dynamic interaction between two main pillars, which, while complementary, reflect inherent tensions and differing preferences in community adaptation practices.

The first pillar, "Maintaining Traditional Values," emerged as the dominant adaptation strategy, with 63% of informants strongly prioritizing the preservation of cultural values and traditions as a solid foundation for their social adaptation. This emphasis is not simply nostalgia or a rejection of modernity, but rather an adaptive mechanism reinforced by 25 specific factors. These factors reflect how traditional norms, beliefs, rituals, and practices continue to be maintained, internalized, and integrated amidst the structural changes brought about by downstreaming. These values act as moral and ethical guides, helping communities navigate the dilemmas and decisions that arise from economic transformation. From a social resilience perspective, these traditional values serve as essential anchors of collective identity and social cohesion.(Egamberdiev, 2024)They provide a moral and normative framework that enables societies to maintain internal stability and face uncertainty without losing their sense of identity.(Sha et al., 2024)In the context of downstreaming, where economic dislocation or shifts in livelihoods occur, the existence of strong values can prevent social fragmentation and maintain a sense of community. This indicates that adaptation for rural communities is not about erasing cultural heritage, but rather about using it as valuable adaptive capital to navigate change and maintain community sustainability.

Second, "Engagement in Social Networks" is also a crucial pillar of adaptation, with 38% of informants emphasizing the importance of social interaction and connectivity as a means of adapting to social transformation. Supported by 15 specific factors, this pillar highlights the vitality of horizontal (between residents) and vertical (with external parties, such as government or companies) interactions within communities. These networks can include kinship ties, community organizations, religious groups, or even informal forums that enable the exchange of information and resources. Within the framework of social capital theory, these networks serve as crucial channels for accessing relevant information regarding downstreaming practices and opportunities.(Dahlberg & Sandström, 2024), for example, about new agricultural techniques, market access, or government assistance programs. Furthermore, social networks provide a means of emotional support, helping communities cope with the psychological and social stressors of change. They also pave the way for new economic collaborations, such as the formation of cooperatives or joint venture groups that capitalize on opportunities from downstreaming. Active involvement in these social networks significantly enhances communities' external adaptive capacity, enabling resource exchange, collective learning, and the mobilization of collective strength to respond more effectively to external pressures.

Overall, these adaptation dynamics illustrate a complex, ongoing negotiation between preserving inherited cultural heritage and embracing inevitable change. Villagers don't simply choose one path or the other, but rather seek a dynamic balance between the two. Traditional values act as a filter for new innovations, while social networks facilitate the adoption of modern practices compatible with existing values.

Anthony Giddens' Structuration Theory provides an in-depth lens for understanding this process, where village communities are not seen as passive recipients of the downstreaming process (as an imposing external structure), but rather as active agents who continuously shape and are shaped by social structures.(Giddens, 1982)They use their agency—that

is, their capacity to act and make choices—to maintain traditional values (as internal structures reproduced and reaffirmed through everyday practices) while simultaneously shaping and strengthening relational structures through active participation in social networks. The finding that 77% of informants perceived a "social and cultural shift" further underscores the dynamic and dialectical nature of this process. This suggests that sociocultural structures are not static entities completely resistant to change; rather, they are constantly negotiated, reproduced, and reshaped through everyday adaptive practices. These shifts occur in the interpretation of traditional values to suit new contexts, or in the emergence of new norms that facilitate participation in the downstream economy.

While this adaptation process demonstrates the inherent strength of communities in responding to pressures, significant challenges remain in terms of broader technology adoption and increasing proactive social participation. For example, access to new technologies or skills training required by downstream industries may remain limited. Similarly, participation in decision-making forums or collective initiatives may not be optimal across all segments of society. These areas are crucial and require targeted interventions and sustained support from various parties, including the government, non-governmental organizations, and the private sector. Empowerment through education, training, and facilitating access to resources can optimize community adaptive strategies. This underscores that while adaptation is ongoing, there is significant potential to enhance the effectiveness of adaptive strategies through targeted empowerment and innovation, leading to comprehensive and sustainable socio-economic resilience in the era of agricultural downstreaming.

Community Economic Strategy in the Downstream Chain

The economic strategies of communities in the downstream agricultural chain, as extracted from the attached data, represent a complex manifestation of "Economic Adaptation," a multidimensional concept comprising 27 specific elements. This adaptation process is not simply a reactive response to market or policy pressures, but rather a proactive effort by communities to secure their economic sustainability, fundamentally realized through the dynamic interaction between two main pillars: "Increased Revenue" and "Income Diversification." These two pillars, while complementary, reflect different priorities and capacities in implementing strategies at the local level.

The first pillar, Income Enhancement, was identified as the dominant strategy by 53% of informants who reported increased income. This is a direct indicator of a community's ability to identify and capitalize on the economic opportunities offered by agricultural downstreaming. Supported by 29 elements, this pillar encompasses a broad spectrum of approaches, from optimizing operational efficiency at the primary production level, developing new processed products with higher sales value, implementing competitive pricing strategies, and aggressively expanding into new markets. This income enhancement is fundamentally aligned with the Value Added Theory, which emphasizes that the transformation of primary products, such as raw agricultural produce, into finished or processed products, significantly increases their economic value along the supply chain, and in turn contributes directly to increasing the income of farmers or business actors at the community level.(Dentzman et al., 2023)This is a shift from a subsistence or raw commodity economy to an economy based on higher-value processed products.

On the other hand, the second pillar, Income Diversification, was emphasized by 47% of informants, underscoring the urgency of their efforts to expand and diversify their sources of income. This pillar, supported by 26 diverse factors, includes strategies such as entering different market segments, developing product or service lines not directly related to primary agricultural commodities, or even reinvesting profits in other economic sectors to reduce dependency. This approach is highly relevant to Risk Management Theory, where the primary goal is to reduce a community's economic vulnerability to volatile primary commodity price fluctuations, the increasingly unpredictable impacts of climate change, or unexpected external market shocks.(Shojaei & Haeri, 2019)Thus, diversification serves not only as an economic safety net but also as a proactive strategy to build the economic resilience of the community as a whole, making it more resilient to uncertainty.

Comprehensively, the implementation of these two pillars collectively contributes to building community economic resilience. This means that communities not only strive to improve their economic outcomes in the short term but also strategically expand and secure their livelihoods in the long term. This approach aligns closely with the principles of Local Economic Development Theory, which explicitly advocates community-based initiatives to create inclusive, equitable, and sustainable economic growth.(Peck, 1996)Through this kind of economic adaptation, communities can gain greater control over their own product value chains, reduce their dependence on fluctuations in raw commodity markets that they cannot control, and ultimately increase their economic autonomy.

Furthermore, the dynamics of this community's economic adaptation are strongly correlated with "Ability to Innovate," which appears as the dominant theme in the data, with 57 references. Specifically, the data shows that innovation at the community level focuses more on Agricultural Product Innovation, which appears with 31 references, significantly higher than the Adoption of New Technologies, which has only 14 references. This indicates that while communities have a significant capacity for creativity in developing end-products with market value, the widespread adoption of modern technology in production or marketing processes remains an area that requires strengthening. In the context of the Economic Innovation Theory popularized by Joseph Schumpeter, this innovation is the primary driver of economic growth; communities' ability to develop new agricultural products and adopt relevant technologies is key to seizing opportunities from downstream processing and significantly increasing their economic competitiveness in the broader market.(Schumpeter, 2021).

The interconnectedness of these economic strategies extends beyond technical or market aspects to social and cultural dimensions, as clearly demonstrated in the code co-occurrence model. "Economic Adaptation" demonstrates considerable connectivity with other themes such as "Shifting Social and Cultural Values" and "Relations between Social Groups." This indicates that changes in sociocultural values within a community can directly influence or be influenced by the economic strategies adopted. For example, the success of agricultural product innovations that increase incomes can trigger shifts in social structures, alter power dynamics, or even strengthen intergroup relationships through successful economic collaboration. Conversely, strong traditional values can facilitate the adoption of innovations if they are perceived as aligned with community norms.

However, the data also highlights challenges that need to be addressed, particularly the still-limited adoption of technology and the need for more proactive social participation from all levels of society. While communities have demonstrated complex and progressive adaptation, these areas are crucial for further strengthening to achieve sustainable socio-economic resilience in the era of agricultural downstreaming. Technology gaps, for example, can hinder production efficiency and competitiveness in modern markets. Similarly, suboptimal social participation can limit the potential for collaboration and collective innovation. Targeted interventions, such as skills training programs tailored to local needs, facilitating access to affordable technology and capital, and developing inclusive collaboration platforms, are essential to optimize existing adaptive strategies. These strategies must take into account the local social and cultural context for effective acceptance and implementation.

Thus, community economic strategy in the context of agricultural downstreaming is a dynamic process involving a

smart combination of value-added creation through product innovation, risk management through income diversification, and leveraging strong social and cultural capital. While significant adaptation has occurred, continuously identifying and strengthening areas of vulnerability will be key to ensuring that rural communities can fully capitalize on the opportunities of downstreaming and build a more resilient, inclusive, and sustainable economic future. This process requires a holistic approach that integrates economic, social, cultural, and technological aspects.

Social Resilience through Village Collaboration

Based on the data, "Social Resilience through Village Collaboration" can be understood in depth through the analysis of "Social and Cultural Stability" and "Relations between Social Groups." Although the term "Village Collaboration" does not explicitly appear as a main category, its essence can be traced in how communities maintain their social and cultural stability amidst shifting values, and how relationships between social groups play a role in this dynamic. "Social and Cultural Stability" emerged as the most dominant theme with 64 references, indicating that social and cultural stability is a very frequent and crucial issue discussed by informants. However, the core of this resilience is not static; it is influenced by two interacting pillars: "Shifting Social and Cultural Values" and "Relations between Social Groups." The majority of informants (77%) perceived social and cultural changes in their environment, while only 23% highlighted relationships between social groups as dominant. This indicates that the community is in a process of adaptation involving negotiations between tradition and modernity.

In the context of village collaboration, "Relations between Social Groups" (11 references), although having a lower frequency than "Shifting Social and Cultural Values" (36 references), still emphasizes the importance of interpersonal and community dimensions. The quality of intergroup relations, whether harmonious or filled with tension, is a crucial factor in maintaining the sustainability of social order and facilitating collaboration. This relationship, along with "Engagement in Social Networks" (15 references) under "Social Adaptability," suggests that participation in social networks and the quality of intergroup interactions are key factors in social capacity to adapt to change.

Theoretically, this is highly relevant to Social Cohesion Theory. Social cohesion refers to the level of bonds and solidarity within a society, which facilitates cooperation and minimizes conflict.(Gearhart, 2024)Here, preserved traditional values can serve as social glue, maintaining collective identity amidst change. However, changing values can challenge this cohesion, requiring communities to find new balance points or new mechanisms for maintaining unity.

In addition, Social Capital Theory is very relevant in understanding how village collaboration occurs. "Relations between Social Groups" and "Engagement in Social Networks" are key components of social capital.(Griffen, 2024)These networks provide a foundation of trust, norms of reciprocity, and connections that facilitate collective action and collaboration. In the context of downstreaming, high levels of social capital enable communities to collaborate on new projects, share risks, and mobilize resources to achieve shared economic goals, such as product development or market access. For example, "Agricultural Product Innovation" (31 references) and "Increased Revenue" (29 references) can be the result of effective collaboration among social groups.

While data demonstrates adaptation, the need to strengthen social participation and the adoption of new technologies remains a challenge. This suggests that despite efforts to maintain social stability and engage in networks, the full potential of collaboration may not yet be fully realized. To build deeper social resilience through village collaboration, interventions are needed that focus not only on economic development but also on strengthening existing social structures, facilitating intergroup dialogue, and empowering communities to actively shape their future amidst the dynamics of downstreaming. This is a holistic approach that integrates social, cultural, and economic aspects to create a more resilient and adaptive system.

Conclusion

The adaptation of rural communities to agricultural downstreaming is a highly complex and multidimensional process, centered on the concept of "Social Adaptability." This process is characterized by two main, complementary pillars: "Maintaining Traditional Values," which was dominant among 63% of informants as a foundation for social adaptation and a source of resilience, and "Engagement in Social Networks," which was emphasized by 38% of informants as a vital channel for access to information, support, and economic opportunities through Social Capital. This dynamic reflects the ongoing negotiation between preserving cultural heritage and embracing change, as explained by Giddens' Structuration Theory, where communities actively shape their responses to downstreaming, rather than being passive recipients. Nevertheless, the finding that 77% of informants perceived "social and cultural shifts" underscores the dynamic nature of this adaptation process, which demands flexibility and continuous adjustment.

Economically, this adaptation is manifested through "Economic Adaptation," which is broken down into "Increased Revenue" (53% of informants) and "Income Diversification" (47% of informants). Income increases were largely driven by Agricultural Product Innovation, consistent with Value Added Theory and Economic Innovation Theory, while diversification serves as an important risk management strategy. The strong link between economic adaptation and innovation confirms that product development is key, although the adoption of new technologies remains an area for improvement. The broad interplay between economic, social, and cultural factors suggests that changes in one area will have ripple effects across others, highlighting the holistic nature of adaptation.

While communities have demonstrated significant resilience and adaptation by leveraging traditional values and social networks, there are clear challenges in broader technology adoption and fostering more proactive social participation. Social resilience through village collaboration, while not yet fully realized, is crucial; relationships between social groups are a crucial component of social capital that facilitates cooperation and minimizes conflict, which is necessary to fully capitalize on downstream opportunities. Therefore, building comprehensive and sustainable socio-economic resilience requires a holistic approach and targeted interventions to empower communities through education, training, resource access, and collaboration facilitation, ensuring that adaptation is not just about survival, but also about thriving amidst transformation.

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