

SMART FAMILY in Dunggala Village: Integrating Household Mapping, Appreciative Inquiry, and Ecoliteracy in a Participatory Food-Security Program

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ABSTRACT

Latar belakang: Program ketahanan pangan rumah tangga sering kali menangani kesenjangan informasi, praktik ekologis, dan pengembangan usaha kecil secara terpisah, sehingga hubungan antara kebutuhan masyarakat dan potensi sumber daya yang tersedia belum sepenuhnya terintegrasi. Tujuan: Artikel ini mengkaji logika pelaksanaan dan luaran yang terdokumentasi dari program SMART FAMILY di Desa Dunggala, Indonesia, serta mengidentifikasi bukti yang diperlukan untuk menguji manfaat yang diharapkan dari program tersebut. Metode: Analisis proses deskriptif berbasis dokumen dilakukan dengan menggunakan narasi program, deskripsi kegiatan, dan dokumentasi foto yang disediakan. Pelaksanaan kegiatan yang dilaporkan, luaran yang ditargetkan, serta hasil yang masih memerlukan verifikasi empiris dikategorikan secara terpisah. Studi-studi relevan dari daftar pustaka yang disediakan digunakan untuk mendukung interpretasi kritis tanpa menggantikan data yang seharusnya diperoleh secara langsung dari Desa Dunggala. Hasil: Program yang dilaporkan berlangsung selama 45 hari ini melibatkan 15 mahasiswa perguruan tinggi dan menyasar 30 rumah tangga. Tujuh komponen utama program meliputi koordinasi, pemetaan rumah tangga, Appreciative Inquiry, pengembangan kapasitas, ecoliterasi, kewirausahaan keluarga, dan perencanaan evaluasi. Tiga kegiatan tambahan mencakup pencegahan penyalahgunaan narkoba, pencegahan stunting, dan peningkatan partisipasi masyarakat. Kegiatan demonstrasi meliputi pengolahan pepaya dan pembuatan briket dari tongkol jagung. Dokumentasi yang tersedia menunjukkan bahwa berbagai kegiatan program telah dilaksanakan, tetapi belum memuat distribusi hasil survei rumah tangga yang dapat dianalisis, hasil pengukuran berpasangan sebelum dan sesudah intervensi, data penjualan yang terverifikasi, pengukuran lingkungan, maupun data longitudinal mengenai keberlanjutan penerapan praktik yang diperkenalkan. Pembahasan: Jalur pelaksanaan dalam empat tahap, yaitu pemetaan, perancangan bersama, praktik, dan pengelolaan berkelanjutan, memperjelas mekanisme potensial program serta mekanisme serah terima tanggung jawab antarorganisasi yang diperlukan untuk menjamin keberlanjutannya. Kerangka ini juga mengungkap sejumlah risiko, antara lain partisipasi yang tidak merata, kualitas data yang tidak konsisten, dan kelayakan komersial yang belum teruji. Kesimpulan: SMART FAMILY merupakan contoh keterlibatan masyarakat desa secara terpadu yang telah terdokumentasi, tetapi efektivitasnya sebagai intervensi ketahanan pangan belum terverifikasi. Evaluasi prospektif dengan menggunakan indikator rumah tangga, catatan teknis, dan tata kelola data lokal yang akuntabel, termasuk perlindungan yang memadai terhadap informasi sensitif rumah tangga, diperlukan sebelum klaim mengenai dampak program terhadap gizi, ekonomi, maupun lingkungan dapat dibuktikan secara ilmiah.

Utilizing local food sources is one strategy to broaden public awareness regarding diverse dietary options for families, particularly for toddlers. Moringa leaves, for instance, are a locally available plant with the potential to be transformed into more appealing food products. This initiative aimed to introduce the use of Moringa leaves as a local food ingredient—specifically by making Moringa pudding—while enhancing the community's knowledge and skills in preparing simple, homemade

Background: Household food-security programs may address information deficits, ecological practices, and small-enterprise development separately, obscuring the connections between community needs and available assets. Objective: This article examines the implementation logic and documented outputs of SMART FAMILY in Dunggala Village, Indonesia, and identifies the evidence required to test its anticipated benefits. Methods: A descriptive document-based process analysis was undertaken using the supplied program narrative, activity descriptions, and photographic records. Reported delivery, intended outputs, and outcomes requiring empirical verification were categorized separately. Relevant studies from the supplied bibliography informed critical interpretation without supplying substitute data for the village. Results: The reported 45-day initiative involved 15 university students and targeted 30 households. Seven core components encompassed coordination, household mapping, Appreciative Inquiry, capacity building, ecoliteracy, family entrepreneurship, and evaluation planning. Three additional activities addressed drug prevention, stunting prevention, and community participation. Demonstrations included papaya processing and corn-cob briquette production. The available record documents program activities but contains no analyzable household-level survey distributions, paired assessments, verified sales, environmental measurements, or longitudinal adoption data. Discussion: A four-stage pathway—mapping, co-design, practice, and stewardship—clarifies potential mechanisms and the organizational handoffs needed for continuation. It also exposes risks involving selective participation, inconsistent data quality, and untested commercial feasibility. Conclusion: SMART FAMILY is a documented example of integrated village engagement, not yet a verified effective food-security intervention. A prospective evaluation using household indicators, technical records, and accountable local data governance, including appropriate protection of sensitive household information, is necessary before claims of nutritional, economic, or environmental impact can be sustained.



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INTRODUCTION

Household food security and economic independence are important components of sustainable community development. Families need access to adequate and nutritious food as well as the capacity to manage household resources productively. The Food and Agriculture Organization has described farmer field schools as a setting for practical agricultural learning, offering relevant context for community-oriented resource management (Food and Agriculture Organization [FAO], 2022). At the village level, home gardens, agricultural products, local knowledge, and mutual-help practices can serve as assets for strengthening household resilience.

Household food security cannot be reduced to the availability of staple crops or the output of a single training session. It is also shaped by household capacities to access, prepare, diversify, and use food; by the management of land and waste; and by decisions about expenditure, labor, and small-scale enterprise. In village development, these dimensions are often addressed through separate projects. A home-gardening activity may target food availability, while an entrepreneurship workshop concentrates on value addition and an environmental campaign treats waste as an independent concern. Such separation can obscure how the same household assets contribute simultaneously to nutrition, resource efficiency, and income opportunities. A useful program design must therefore articulate the connections between activities instead of assuming that co-location alone produces integrated outcomes.

The household scale also requires attention to the diversity of food access pathways, not just aggregate production. Research on rural Nigerian households combined food-insecurity, dietary-diversity, and coping measures rather than treating one proxy as sufficient (Ezeh et al., 2026). Work with Ghanaian households identifies meal planning and gendered responsibility as relevant to household nutrition (Abraham, 2023), while studies of Arctic food systems emphasize culturally and economically

conditioned decisions about food sources (Farquhar et al., 2026). The Dunggala mapping framework should therefore distinguish food availability from dietary use, household decision-making, and the costs of obtaining food; none of those distributions can be derived from the current program narrative.

Dunggala Village, Batudaa District, Gorontalo Regency, has agricultural resources and local assets that can be developed to support household food security and the family economy. However, the program report identifies several needs, including better use of home gardens, diversification of local food products, utilization of organic waste, increased value added to agricultural products, and more structured household information to support village planning. These needs call for an empowerment approach that connects data collection, environmental awareness, and community participation.

The connection between local food production and nutrition is plausible but conditional. An ethnobotanical study of Indonesian home gardens documented cultivated species and traditional knowledge relevant to food security and biodiversity (Hakim et al., 2026). Research on edible green infrastructure in a disadvantaged South African community explored residents' perceived opportunities and barriers (Botes & Breed, 2025), and a study of rural youth farming in Lagos examined the relationship between cultivation and household food security (Oladoja et al., 2008). These settings differ materially from Dunggala: they justify investigating gardens as one component, but cannot establish that participating Dunggala households increased food consumption.

The Dunggala case offers an opportunity to examine these connections at the level of program implementation. The SMART FAMILY initiative combined a data-oriented mapping component, a strengths-based dialogue process, practical skills development, and wider community engagement within one thematic student-service program. Its reported ambition was broader than any single technology or product: households would become more visible in village planning, community members would identify their own productive assets, and local partners would continue selected practices after student involvement ended. These ambitions constitute a coherent theory of action, but they are not themselves empirical evidence that food security or incomes improved. Distinguishing proposed mechanisms from observed results is essential when transforming a program report into a defensible academic article.

The program's Driven Data Statistics approach was designed to collect and map information about food security, home-garden use, household socioeconomic conditions, sanitation, and local potential. Information collected through surveys, observations, and interviews can help village authorities identify priorities based on local conditions. At the same time, ecoliteracy encourages people to understand the relationship between household activities, resource use, and environmental sustainability (Orr, 1992).

The immediate research gap is consequently an implementation-and-evidence gap. The source document describes diverse activities and their intended benefits, yet it does not provide the individual-level observations, baseline indicators, comparison groups, product sales, or repeated measurements needed to estimate change. Moreover, a list of activities does not reveal which stages depend on one another, which actors are responsible for follow-up, or which indicators would establish that expected effects occurred. The present study addresses this narrower but important gap by reconstructing the program as an integrated sequence, auditing the level of support behind each reported output, and specifying a feasible evaluation pathway. It does not claim to resolve the broader empirical question of the program's effectiveness.

Digitization studies provide an important comparison without implying that SMART FAMILY implemented advanced agricultural technology. Reviews describe potential food-security applications of digital agriculture and smart farming but also identify implementation constraints and sustainability challenges (Aliev et al., 2023; Munir et al., 2026). A cross-country synthesis likewise discusses uneven digital adoption and the need for inclusive collaboration (Tindjete et al., 2026). The novelty claimed here is consequently not a new algorithm or precision-farming system; it is the explicit coupling of low-resource household mapping to participatory decisions, hands-on practice, and proposed village stewardship, together with an auditable boundary between reported delivery and unmeasured impact.

The program also adopted Appreciative Inquiry as a strengths-based approach to identify community assets and good practices. Cooperrider and Srivastva (1987) described appreciative inquiry as an approach to change that draws on positive experiences and strengths. In Dunggala Village, the approach was used to identify local assets, formulate shared aspirations, design activities, and encourage follow-up commitments. This article therefore describes the implementation and reported outputs of the

SMART FAMILY program based on its progress report, including core activities and additional activities supporting education and community participation.

Three analytical questions guide the manuscript. First, how were data mapping, Appreciative Inquiry, ecoliteracy, and family-economy activities assembled into an operational program in Dunggala? Second, which outputs are supported by the available narrative and photographic documentation, and which remain intentions or unverified outcomes? Third, what minimum measurement and governance arrangements are needed to determine whether the initiative contributes to sustained household practice? Answering these questions is relevant to community-engaged education because evidence of delivery, engagement, and impact often becomes conflated in short-duration interventions. By treating these as different objects of inquiry, the analysis provides a more transparent basis for future assessment.

The conceptual premise combines complementary functions rather than interchangeable theories. Data literacy is treated as the capacity to collect, interpret, and use household information responsibly. Appreciative Inquiry provides a participatory sequence for eliciting assets and forming shared plans (Cooperrider & Srivastva, 1987). Ecoliteracy locates household practice within ecological relationships and material cycles (Orr, 1992). Experiential learning through demonstration and guided practice offers a plausible route from instruction to skills, although skill acquisition must still be measured (Bandura, 1986). The manuscript proposes that these functions can be mutually reinforcing when their handoffs are explicit: mapping informs priorities, dialogue creates ownership, practice tests feasibility, and local governance sustains the resulting activities.

Food security can also intersect with education and preventive health, without making these outcomes interchangeable. A review of maternal and child nutrition in the COVID-19 context emphasized vulnerabilities in nutrition systems (Akseer et al., 2020). A case-control study in rural West Aceh examined locally relevant determinants of child stunting and proposed integrated prevention strategies (Fitriani et al., 2026). A dietary assessment among riverine Brazilian households illustrates the additional measurements required to characterize food consumption (Colombo-Souza et al., 2025). These studies motivate the program's broader family-health orientation but do not validate any nutritional effect of a single stunting-awareness session.

METHOD

The SMART FAMILY program was implemented in Dunggala Village, Batudaa District, Gorontalo Regency, as part of the Thematic Community Service Program. The progress report states that 15 university students participated for 45 days, with 30 households as the main target group, alongside the Family Welfare Empowerment group (PKK), farmer groups, the village-owned enterprise (BUMDes), community health volunteers, and village authorities. The program used a participatory approach combining Participatory Action Research (PAR), Appreciative Inquiry, data mapping, and ecoliteracy.

Study design and evidentiary boundary. This article is a document-based, descriptive process analysis of the SMART FAMILY implementation narrative embedded in the supplied JERKIN-formatted manuscript. The unit of analysis is the reported program activity or intended output, not an individual participant. Its empirical materials comprise the written description of the intervention, the program summary, and photographic panels appearing in that manuscript. There is no separately provided respondent-level dataset, instrument file, attendance register, pre-test or post-test spreadsheet, sales ledger, or longitudinal monitoring record. Statements about participants and delivery are therefore attributed to the report, while the existence or magnitude of behavioral and economic change cannot be independently verified.

Program context and target population. The reported implementation involved 15 university students over 45 days, and the stated main target group comprised 30 households. These are program descriptors rather than counts of complete survey responses or verified participants in each workshop. The broader set of stakeholders included village authorities, PKK representatives, farmer groups, BUMDes, Posyandu volunteers, young people, and educational partners. Because household selection procedures, eligibility criteria, demographic distributions, and the number of actual respondents are not provided, no household-level sampling frame or response rate can be reconstructed. The manuscript therefore refrains from labeling the 30 households as an analyzed sample.

Information gathering involved coordination meetings and focus group discussions (FGDs), household surveys, field observations, and interviews. The data collection was intended to describe household food security, home-garden use, household economic conditions, environmental sanitation, and local resources. The report planned descriptive statistical analysis and data visualization to make the information accessible. However, detailed survey results and statistical values were not fully included in the reviewed progress-report material; therefore, this article does not report numerical survey findings or statistical tests.

Analytical procedure. Each described program component was coded along four fields: purpose, mode of activity, reported evidence, and prospective outcome. A first pass established whether the report described an activity as delivered, documented it photographically, or presented it as a planned step. A second pass differentiated immediate process outputs (meetings, demonstrations, sessions), proposed material outputs (database, dashboard, product commercialization), and outcomes requiring measurement (knowledge gains, waste reduction, income improvement, sustained adoption). A third pass linked the components in a prospective implementation pathway. This reconstruction is transparent and reproducible at the level of the supplied document, although no independent field audit was possible.

Documented participation was interpreted with reference to methodological literature rather than treated as proof of empowerment. A multi-community Australian food-security project studied the feasibility of participatory, multisector continuous improvement, emphasizing links to community governance (Brimblecombe et al., 2017). Citizen-science scholarship describes both the promise and accessibility challenges of involving residents in data processes (Beck & Mitkiewicz, 2025), while a youth photovoice study illustrates how participatory methods can surface experiences underrepresented in institutional accounts (Springer et al., 2024). These works inform the appraisal criteria here: participation requires traceable voice, decisions, and follow-up, beyond attendance or photographs.

The program stages comprised: (1) preparation and coordination; (2) Driven Data Statistics mapping; (3) Appreciative Inquiry through Discovery, Dream, Design, and Destiny; (4) community capacity building; (5) ecoliteracy implementation; (6) family economic strengthening; and (7) monitoring, evaluation, and sustainability planning. Additional activities included drug-prevention education, stunting-prevention education, and the Dunggala Festival.

Evidence classification was deliberately conservative. 'Reported activity' indicates that the narrative states that an event or practice took place; a photograph adds contextual documentation but does not establish attendance, dosage, competency, or downstream impact. 'Planned output' indicates that the report identifies an intended deliverable without demonstrating its finalized form or use. 'Unverified outcome' covers changes that would require baseline or follow-up data, such as household dietary diversity, garden yield, entrepreneurial revenue, or retention of training content. These labels are applied consistently in the results and tables. They are not ratings of the program's social value and should not be interpreted as judgments about the participants.

The article uses a descriptive qualitative analysis of the activities and outputs documented in the progress report. Interpretation is linked to literature on Appreciative Inquiry, ecoliteracy, and community empowerment. Since detailed pre-test and post-test results were not available in the reviewed material, the findings are discussed as process and activity outputs rather than conclusive evidence of increased knowledge or income.

Quantitative treatment and visualization. The only directly extractable numerical descriptors are 15 students, 45 implementation days, and 30 targeted households, plus the report's classification of seven core and three additional program components. These values are summarized descriptively. Calculating percentages of households achieving an outcome, means or standard deviations of knowledge scores, paired tests, regression coefficients, confidence intervals, or causal effect sizes would be methodologically invalid without observations at the correct unit of analysis. For this reason, the manuscript provides a structured evidence matrix and a prospective indicator specification rather than invented statistical tests. The figures visualize the intervention logic and reproduce existing photographic documentation; they do not depict estimated program effects.

The proposed future data architecture needs safeguards against the appearance of precision without reliable inputs. Work on regional food-security management identifies potential uses of indicators in data-driven planning (Dulambayeva et al., 2023); rural development research has also emphasized community-level information needs (Midgley et al., 2005). Reviews of community-based health information systems highlight the distinction between gathering records and using them for

locally relevant decisions (Kuvuna et al., 2024). An integrated review of agricultural data quality points to intertwined technical and social challenges (Silva et al., 2025). Therefore, indicator definitions, missingness, governance, and documented decisions should precede any dashboard-based claims.

Ethics and reporting limitations. The supplied draft contains images of residents and students, but it provides no documentation of research ethics approval, image-release procedures, or individual consent to publication. The photographs are reproduced solely as materials furnished in the source manuscript, and permission for further external publication should be checked with the authors and the relevant participants. Any subsequent household database should contain a documented purpose, restricted access rights, retention rules, and procedures for correction or deletion. A future impact evaluation would also require an approved consent and privacy protocol appropriate to household socioeconomic and health-related information.

The implementation pathway reconstructed from these elements appears in Figure 1. Its arrows express a proposed sequence of program mechanisms, while the two evidence categories beneath them prevent a reader from confusing delivered activities with measured outcomes.



Figure 1. Prospective SMART FAMILY implementation pathway and evidence boundary reconstructed from the supplied manuscript.

RESULT AND DISCUSSION

Results of the Core Program Activities

Preparation and Coordination

The preparation and coordination stage began with meetings involving the Dunggala Village Government, the Family Welfare Empowerment group (PKK), farmer groups, the village-owned enterprise (BUMDes), community health volunteers from Posyandu, youth groups, and other community representatives. The meetings aimed to communicate the SMART FAMILY program plan, establish a shared understanding of the program objectives, and build a joint commitment to strengthening household food security and the family economy. The manuscript describes subsequent focus group discussions (FGDs), field observations, and interviews to identify village assets, household needs, the use of home gardens, environmental conditions, and opportunities for economic development based on local resources. At this stage, the team also prepared survey instruments for household data collection. The outputs included an agreement on program implementation, a schedule of activities, prepared survey instruments, and the formation of a village implementation team involving government and community representatives. These preparations provided a foundation for implementing the subsequent SMART FAMILY activities in a more structured, participatory, and locally relevant manner.

As an implementation result, the coordination stage is most securely characterized by the presence of stakeholder meetings and preparatory activities. The draft identifies scheduled work, a survey instrument, and an implementation team as outputs, but does not attach minutes, a finalized questionnaire, or an appointment record. The defensible interpretation is therefore that the program established a collaborative starting point rather than that all institutional commitments were formally secured. A subsequent evaluation should preserve meeting minutes, stakeholder roles, and a dated activity plan to assess whether the initial agreement translated into continuity.

Comparable local-development research underscores why assigned roles deserve explicit documentation. Analysis of village-fund governance in Indonesia discusses participation, transparency, and accountability in resource allocation (Ardiputra et al., 2025). An evidence-based green-economy study in an Indonesian thematic village used interviews and group discussion to inform local management (Muttaqijn et al., 2025). A rural community leadership case study highlights opportunities for connections across participants and other community members (Majee et al., 2012). A participatory rural-design study in India similarly combined community solutions with quantitative modeling (Ganesh et al., 2026). These findings suggest plausible governance mechanisms, but the Dunggala record does not show whether roles were formalized or whether involvement extended beyond the mobilization period.

Driven Data Statistics Mapping

Driven Data Statistics Mapping involved collecting and mapping data to obtain an overview of household food security and socioeconomic conditions in Dunggala Village, Batudaa District, Gorontalo Regency. The activity focused on documenting the use of home gardens as a household food source, household economic conditions, environmental sanitation, and local assets that could be developed to improve community well-being. Data were collected through surveys using prepared instruments, direct observation of household environments and gardens, and interviews with target families. The collected data were intended to be processed using descriptive statistical analysis to describe community conditions according to predetermined indicators. The planned results were to be presented in tables, charts, and data visualizations to make the information easier to understand and use in planning empowerment activities. The targeted outputs included a household database, the SMART FAMILY Dashboard, and a food-security profile for Dunggala Village. These outputs are expected to provide information for the village government and partners when setting development priorities, developing household food gardens, improving environmental sanitation, and strengthening family economies based on actual community conditions and local potential. In this way, village development decisions can become more focused, measurable, and data-driven.

The mapping strand illustrates both the potential and the present evidentiary boundary of data-driven empowerment. Its domains are substantively relevant, yet the reported manuscript contains no frequency distributions, household-level tables, missing-data audit, or operational definitions of food-security status. Thus it is not possible to state how many of the targeted households cultivated home gardens, experienced food insecurity, or identified a sanitation constraint. Neither a completed dashboard nor a validated village profile can be inferred from an intention to create them. A field-ready next step is to link each mapping variable to a clear decision and to document completeness before producing summaries.

The proposed SMART FAMILY Dashboard is better understood as an institutional question than merely an interface. Digital-village analytics offers a conceptual route from information to local planning (Fobiri et al., 2024), whereas community-centered technology scholarship warns that locally developed systems require co-creation and evaluation of social effects (Hsu et al., 2022). Food-system information-service design likewise stresses integration of distinct kinds of resource data (Lawford, 2019). Food-security analytics has been framed as a means of converting data into decisions (Teh et al., 2023), and research on Chinese food-security digitization describes possible management applications (Song et al., 2023). None establishes that the proposed Dunggala dashboard was completed or used.

Appreciative Inquiry (Discovery–Dream–Design–Destiny)

Appreciative Inquiry was implemented through a participatory empowerment approach focused on identifying the potential, positive experiences, and good practices already present in Dunggala Village. The approach involved four stages: Discovery, identifying community strengths and best practices; Dream, exploring aspirations and developing a shared vision; Design, designing solutions and activities; and Destiny, establishing commitments and implementing action plans. During Discovery, students and community members identified local assets, including home-garden use, the availability of corn and other agricultural products, local food crops, and community skills in processing available resources. The Dream stage used focus group discussions and brainstorming to formulate shared aspirations for household food security and economic improvement. During Design, community members and the SMART FAMILY team developed program plans aligned with local needs and potential. In the Destiny stage, the plans were translated into action steps covering priority activities, role allocation, schedules, and stakeholder support. Appreciative Inquiry, FGDs, brainstorming, and

participatory planning were used to encourage active community involvement in decision-making. The targeted outputs were a SMART FAMILY roadmap and a community action plan to guide household food-security activities in a structured and sustainable manner. Through this approach, community members were expected not merely to receive benefits but also to become key actors in developing local assets, strengthening family self-reliance, and improving community well-being.

The four-stage format gives the program an interpretable participatory logic. Discovery identifies existing assets; Dream makes aspirations discussable; Design prioritizes feasible actions; and Destiny assigns implementation responsibilities. However, the report does not supply participant quotations, ranked priorities, attendance by group, or a signed roadmap. It is therefore stronger evidence of the use of an Appreciative Inquiry process than of consensus, ownership, or long-term collective action. To assess the latter, future records should identify who proposed each priority, who agreed to implement it, and whether vulnerable households had equivalent opportunities to influence decisions.

A strengths-based dialogue must still confront differences in household resources and influence. Community empowerment work with coastal fishers in Demak linked local asset mapping with product-development strategies (Banowati et al., 2024). A disaster-resilient village study in South Kalimantan examined empowerment through questionnaire-based community assessment (Deasy et al., 2025). Research on Colombian peasant-food communities described participatory organization and design around territorial food sustainability (Méndez-Villamizar et al., 2024). Read together, these accounts suggest that an asset-oriented pathway gains analytical credibility when the mechanism connecting identified strengths, community choices, and concrete action is recorded.

SMART FAMILY Capacity Building

SMART FAMILY capacity building was designed to improve the knowledge and skills of Dunggala Village residents in supporting household food security and the family economy through the use of local resources. The activities focused on using home gardens as food sources, diversifying local foods, processing agricultural products, developing data literacy, and identifying household business opportunities. Workshops, coaching clinics, demonstrations, and field practice were conducted by university students in collaboration with community members. Practical activities included processing papaya into fried papaya as an alternative local food product and making briquettes from corn-cob waste as a way to turn agricultural residues into useful products. Participants were introduced to processing steps, tools and materials, and potential product development pathways for sustainable use. Beyond technical skills, the activities aimed to improve participants' ability to understand basic household data, identify economic opportunities, and plan businesses based on local resources. The training was participatory, allowing community members to share experiences, discuss ideas, and practice the knowledge gained. Through these activities, residents were expected to strengthen household food-security practices, use agricultural products more productively, and initiate household economic opportunities suited to Dunggala Village's potential.

Papaya processing and corn-cob briquette making are concrete examples of resource transformation, not yet evidence of commercially feasible innovations. The report does not provide batch yields, standard recipes, fuel performance, food-safety tests, product acceptance scores, or repeat production volumes. Product viability would require technical and economic assessment in addition to observing a demonstration. A minimum pilot ledger could record inputs, processing time, recoverable product mass, unit cost, user feedback, and any revenue, while also noting unsuccessful trials. Such records would help distinguish a memorable workshop from a replicable household enterprise.

The processing demonstrations should also be situated within the distinction between technical possibility and viable value addition. A Nigerian cassava-processing study investigated a specific local value chain using processor survey data (Dennis et al., 2025), illustrating how empirical records can support economic assessment. For Dunggala, a similar evaluative principle would require repeated batches, production costs, acceptable quality, and actual sales; it would be unsound to transfer another crop's findings to papaya. A Kenyan smallholder study of digital literacy used baseline and endline survey information to examine livelihood-related competencies (MacHaria & Obuya, 2025), reinforcing the need to test newly taught skills rather than count training sessions alone.

The source photographs accompanying the first four components are combined in Figure 2. These images document the settings and participation associated with program delivery, without quantifying learning or changes in household welfare.



Figure 2. Photographic documentation of the first four core components: (A) coordination, (B) household mapping, (C) Appreciative Inquiry, and (D) capacity-building practice. Images reproduced from the supplied manuscript.

Ecoliteracy Implementation

Ecoliteracy activities aimed to increase residents' awareness and skills in environmental protection through practices that could be applied in everyday life. These activities were integrated into SMART FAMILY to support household food security, the use of local resources, and the development of clean, healthy, and sustainable residential environments. The activities included assisting families in establishing household food gardens by using available yard space to grow food crops and vegetables suited to local conditions. Residents were also introduced to organic waste management through composting household organic materials, such as vegetable scraps and dry leaves. Other activities included waste sorting, reusing materials that remained useful, environmental conservation, and environmentally friendly farming practices. The methods involved mentoring, demonstrations, and hands-on practice with community members. Students explained the activities, guided practical work, and encouraged families to adopt the practices independently in their homes. Thus, ecoliteracy was treated not only as environmental knowledge but also as a basis for concrete everyday habits and actions.

The ecological rationale is circular at the household scale: gardens can use space and potentially composted organic residues, while improved sorting may preserve materials suited to recovery. The intervention narrative does not establish which households adopted these practices, how many gardens remained active, or how much waste was diverted. The program should therefore be presented as exposure to and participation in environmental practices, not as measured environmental improvement. A practical verification design would use repeated garden observations, simple cultivation logs, and periodic weighing or classification of household organic waste before making impact claims.

Broader agricultural literature supports examining ecological practices as interconnected resource decisions rather than as isolated demonstrations. Research on organic farming and social capital identifies context-dependent collective conditions associated with adoption (Kitano, 2025). A review of farming systems considers efficient natural-resource utilization alongside food security and environmental sustainability (Maqbool et al., 2025). Research on urban agricultural-waste planning assesses alternative resource-management strategies (Ma et al., 2025), while a regional food-security review considers water availability and data-informed management (Moussa et al., 2025). These are rationales for measuring Dunggala's gardens, residues, and water constraints, not evidence of local environmental gains.

Strengthening the Family Economy

Family economic strengthening aimed to improve the skills of Dunggala Village residents in developing household businesses based on local resources. The activities focused on diversifying food products, increasing the added value of agricultural products, improving product packaging, and using digital media for promotion and marketing. Training, mentoring, and practical business activities involved university students and community members. One potential activity was processing papaya into fried papaya as an alternative local food product. Residents were guided through the processing stages, food hygiene practices, suitable packaging, and the calculation of production costs and selling

prices. Other agricultural products could also be identified for value-added development according to market needs and opportunities. The activities introduced simple digital marketing through WhatsApp, Facebook, and other social media platforms to display product photos, share prices, and reach prospective customers. Mentoring also addressed basic entrepreneurship, household and business financial management, and income-and-expense recording to support more systematic economic management.

The economic strand is best understood as entrepreneurship orientation. Packaging, price estimation, bookkeeping, and social-media promotion were introduced in connection with locally available raw materials. Whether households sold products, earned net profit, or developed repeat customers remains unknown. Digital promotion is a potential distribution channel rather than proof of market access. For an evaluable enterprise pathway, the program would need evidence of product consistency, food safety, direct and indirect costs, actual transactions, and demand beyond the training setting. This distinction is particularly important when household income is a stated development objective.

Market linkage is a separate empirical step after a product demonstration. A study in China examined the digital economy and sustainable agricultural management using farmer-survey data (Kuang et al., 2025); a proposed e-commerce agriculture-hub model describes possible links between data, market coordination, and food security (Rahman et al., 2024). Neither supports an assumption that social-media instruction generated sales in Dunggala. A rigorous program follow-up should ask whether participants can calculate variable and fixed costs, record real transactions, and distinguish gross revenue from household profit, then test whether these capacities persist once student facilitators have departed.

Monitoring, Evaluation, and Sustainability

Monitoring, evaluation, and sustainability activities were intended to assess implementation of the SMART FAMILY program in Dunggala Village, Batudaa District, Gorontalo Regency, and to help ensure that the activities could provide lasting benefits to the community. The focus was on tracking implementation, measuring indicator achievement, identifying challenges, and preparing recommendations for future program development. Monitoring involved field observations and reviews of activity documentation to assess alignment with the agreed plan. Evaluation was planned through pre-tests and post-tests to measure changes in participants' knowledge, interviews with community members and stakeholders, and participatory evaluation to gather feedback on benefits, challenges, and opportunities for further development. The results would be analyzed to identify achievements, areas for improvement, and follow-up strategies. For sustainability, the SMART FAMILY team prepared recommendations for developing household food security and family economies based on local potential and activity evaluation. One important planned step was to hand over the SMART FAMILY Dashboard to the Dunggala Village Government, provided that the dashboard had been completed and was ready for use. The handover should include guidance on dashboard use, data management and updating, and the appointment of a person or team responsible for maintenance.

The source describes evaluation as a planned component but does not provide completed pre-test/post-test results or a post-program follow-up series. Accordingly, no knowledge-change estimate or sustainability rate is calculated. The planned dashboard handover also remains conditional on completion and readiness. Documentation of a working dashboard should include a demonstration of functions, a named data steward, user access rules, a data dictionary, and a schedule for updates. Without these, transferring a file or interface would be an administrative event rather than evidence of usable community information infrastructure.

Sustainability is a question of repeated practice and organizational capacity, not a one-time handover. The Australian multisector food-security feasibility study emphasizes governance integration and resourcing (Brimblecombe et al., 2017), and Indonesian local-budget research draws attention to accountability in village institutions (Ardiputra et al., 2025). For SMART FAMILY, a named steward, a current data dictionary, documented monthly updates, and a traceable case of a village decision informed by data would be stronger indicators of dashboard utility than the existence of a software file alone.

Photographic documentation of the three remaining core components is assembled in Figure 3. The visual record complements, but does not substitute for, technical, financial, or longitudinal measurements.



Figure 3. Documentation of (A) ecoliteracy, (B) family economic activities, and (C) monitoring and evaluation. Source: supplied program manuscript.

Table 1 makes the source-to-claim boundary explicit across the full program. In particular, a scheduled output or photograph of an event should not be mistaken for a measured change in household conditions.

Table 1. Activity documentation and evidence needed to assess claims

Component	Support in the available record	Additional evidence required
Preparation and coordination	Meetings, FGDs, observations, and planning described; photographs available	Signed minutes, instrument version, attendance, designated implementers
Household mapping	Survey, observation, and interview procedures described; intended database/dashboard	Completed records, response count, variable dictionary, validity and completeness
Appreciative Inquiry	Discovery–Dream–Design–Destiny sessions described; photographs available	Agreed roadmap, documented priorities, who participated and who is accountable
Capacity building	Papaya processing and corn-cob briquette demonstrations described	Measured competency, reproducible recipes, product-quality or performance tests
Ecoliteracy	Garden guidance, composting, sorting and field practice described	Repeated household adoption, garden production and measured waste diversion
Family economy	Packaging, costing and social-media promotion introduced	Batch-level costs, verified sales, net margin and repeat consumer demand
Monitoring and continuity	Field review and future handover plans described	Completed tests, follow-up observations and operational dashboard handover
Drug-prevention education	Education session at SMK Negeri 1 Batudaa described	Attendance, knowledge or awareness assessment and safeguarding records

Component	Support in the available record	Additional evidence required
Stunting-prevention education	Village-office nutrition session described	Participant evaluation, referral uptake and validated follow-up measures
Dunggala Festival	Inter-hamlet volleyball and community event described	Attendance and evidence of subsequent participation or sustained networks

Note. Status refers only to evidence available in the supplied program manuscript; intended outputs are not treated as completed outcomes.

Results of Additional Program Activities

1. Drug-Prevention Education

The drug-prevention education session at SMK Negeri 1 Batudaa was conducted in collaboration with the National Narcotics Agency (BNN) of Gorontalo Province. The activity aimed to improve students' knowledge and awareness of the dangers of drug misuse, its effects on health and future opportunities, and the importance of maintaining healthy social relationships. Through presentations, learning materials, and interactive discussions, students were encouraged to refuse drugs and actively contribute to creating a safe, healthy, and drug-free school environment.

This session represents a cross-sector extension rather than a direct measure of household food-security outcomes. Collaboration with the provincial BNN broadens the institutional network and situates youth prevention within the community-service agenda. The available evidence supports delivery of an educational event; it does not demonstrate changes in risk perception, intentions, or substance-use behavior. Evaluation should be matched to the activity's educational purpose and should not be combined uncritically with indicators of agricultural production or household income.

2. Stunting-Prevention Education

The stunting-prevention education session was held at the Dunggala Village Office to improve community understanding of balanced nutrition and family health, particularly for pregnant women, breastfeeding mothers, infants, and young children. The session provided information about exclusive breastfeeding, nutritious complementary foods for breastfed infants, regular child-growth monitoring through Posyandu, clean and healthy living practices, and nutritional needs during pregnancy. The activity was intended to increase awareness of early stunting prevention and encourage community participation in supporting healthy families and optimal child development in Dunggala Village.

The nutrition session intersects more directly with food security through knowledge of child feeding, maternal nutrition, and preventive services. Even so, no nutrition assessment, growth monitoring dataset, or follow-up behavioral survey is available. It would be inappropriate to infer reductions in stunting or improvements in child growth from an awareness-raising activity. Future monitoring could measure attendance, comprehension of key messages, referral uptake where appropriate, and continued participation in Posyandu services, subject to relevant privacy and safeguarding standards.

Research outside Dunggala indicates why education, household circumstances, and measured health outcomes should remain conceptually distinct. The West Aceh stunting study evaluated candidate determinants using case and control groups rather than assuming that information provision was sufficient (Fitriani et al., 2026). Household food-access analysis in a Canadian Arctic community highlights economic and cultural constraints in food decisions (Farquhar et al., 2026). Consequently, the nutrition session can be reported as delivered educational support, while claims about feeding behavior, nutritional status, or child growth require separate, appropriately governed observations.

3. Dunggala Festival (DunFest)

The Dunggala Festival (DunFest) was a community event organized to strengthen togetherness among residents through talent development, sportsmanship, and active participation. One of the festival's main activities was a volleyball competition between hamlets, involving young people and other residents as players and supporters. The competition provided an opportunity for residents to demonstrate their athletic abilities, develop teamwork, and foster friendship and solidarity across hamlets. The festival was intended to create a more active, harmonious, and participatory village environment while strengthening young people's involvement in sports and community activities.

The festival adds a relational dimension to the program by bringing residents into a shared public activity. Such events may create opportunities for trust and cooperation, but their contribution to durable collective capacity is not established by the event's occurrence alone. Attendance, diversity of participating hamlets, subsequent involvement in program committees, and continued collaboration would be more informative indicators. Within the present analysis, DunFest is treated as a documented community-engagement activity with plausible, rather than demonstrated, longer-term social benefits.

The source photographs of these supplementary activities are grouped in Figure 4. Their contribution to the manuscript is documentary, while their educational and social effects remain unmeasured.



Figure 4. Photographic record of supplementary activities: (A) drug-prevention education, (B) stunting-prevention education, and (C) Dunggala Festival. Source: supplied manuscript.

Discussion

SMART FAMILY combined a 45-day student-service program with seven core components and three supplementary activities. This breadth presents an interpretive challenge: coordination, household mapping, product demonstrations, health education, and a community festival cannot all be evaluated using the same indicator. The evidence is most informative when each strand is located within an explicit theory of change.

A central finding of the document audit is the uneven maturity of evidence across the program pathway. The supplied materials support an account of mobilization, sessions, practical demonstrations, and local engagement; they provide less complete support for finished information systems, standardized products, and institutionalized follow-up. There is no measurement of change in household diets, food expenditure, income, waste flows, or skills. This asymmetry is not unusual in short community-service reporting, but it matters scientifically because activities and effects answer different questions. A process study can be valuable without an impact estimate, provided the claims remain proportionate to the records.

Initial coordination brought village institutions and community representatives into contact, but meeting descriptions are insufficient to establish who ultimately authorized priorities or committed ongoing resources. Because participation can be uneven, a future record should identify representation, agreed responsibilities, and decisions that can be audited across implementation stages.

The mapping component identified relevant information domains, including food access, home gardens, economy, and sanitation, without providing analysable respondent records. A useful dashboard would therefore require validated variables, agreed denominators, and regular feedback to village decision-makers; digitization alone would not guarantee evidence-informed planning.

Appreciative Inquiry supplied a structured process for identifying local strengths and translating aspirations into proposed activity plans (Cooperrider & Srivastva, 1987). Yet its substantive contribution depends on the participation of less-visible households, documented trade-offs, and whether choices actually influence implementation rather than merely confirming preselected activities.

The integration proposed here is a sequence of accountable decisions rather than simply the co-occurrence of attractive concepts. A mapping exercise becomes useful when it identifies a solvable priority and an accountable recipient. Appreciative Inquiry becomes consequential when aspirations are translated into agreed tasks. Ecoliteracy becomes observable when households repeat practices after

mentoring. Enterprise training becomes an economic outcome only when production is safe, repeatable, and connected with transactions. Each transition creates a potential point of failure, as well as a measurable checkpoint. Figure 1 therefore states a prospective program logic, not a causal model already validated by this case.

An additional interpretive risk is intervention optimism: infrastructure or technological investment does not necessarily improve access in the intended way. A study in an Arctic Indigenous community documented food-price effects associated with road infrastructure and changes in support arrangements (Tiff-Annie et al., 2025). The context cannot be transferred directly to an Indonesian village, but the broader lesson is relevant: changes in enabling conditions require assessment of actual household experience. In SMART FAMILY, practical garden availability, product sales, and household costs must be observed rather than assumed to follow from facilities, advice, or an intended dashboard.

Papaya preparation and corn-cob briquette demonstrations created opportunities for experiential learning consistent with observational approaches to skill acquisition (Bandura, 1986). The crucial next test is reproducibility beyond the workshop, including measured competency, safe production, unit costs, and whether participants independently repeat the procedures.

Ecoliteracy linked gardens, organic residues, composting, and environmental care (Orr, 1992). However, demonstrating ecological techniques is different from confirming their adoption: repeated observations of garden activity and material flows would be needed to evaluate actual resource savings or sustained household practice.

There is also a potential tension between strengths-based facilitation and needs-based data analysis. A participatory dialogue may foreground visible community assets and motivated participants, whereas household surveys may reveal constraints that are less socially prominent, such as limited land, lack of working capital, or restricted time for caregiving. Neither source should automatically override the other. A future implementation should document how mapping results and community preferences were reconciled, including reasons for excluding proposed activities and procedures for hearing underrepresented voices. Without such a record, the apparent coherence of an integrated program may conceal selective participation.

Enterprise instruction connected locally available papaya to processing, packaging, costing, and digital promotion. Product visibility should not be mistaken for sales or profitability. The researchable pathway runs from technical competence to feasible production and then to verified transactions, with household constraints and demand assessed at every stage.

Evaluation and handover were described chiefly as intended processes. While pre-test/post-test measures could assess learning and a dashboard could support planning, neither a tested effect nor an operational transfer is established. Assignment of an accountable steward and systematic monitoring would make these claims verifiable.

Sustainability should be assessed at the level of practices and institutions rather than ceremony. Handover of a product prototype or digital dashboard is insufficient if nobody can maintain it, update its contents, or pay for necessary inputs. The village government and its partners would need to designate responsible roles, budget modest recurrent costs, set review dates, and keep accessible records of decisions. For gardens and composting, sustained use should be checked across cultivation cycles; for products, across repeated batches and sales; and for the dashboard, across successful updates and actual planning decisions. Evidence of these repeated actions would substantiate a sustainability claim more convincingly than one-time attendance.

Drug-prevention and stunting-prevention sessions expanded the program's educational scope. Their immediate outputs are session delivery and possible information exposure, not changes in risky behavior, nutritional status, or population health. Each requires a separate, suitably designed outcome assessment rather than a single composite measure of program success.

The inter-hamlet DunFest volleyball event offered an opportunity for social interaction and youth engagement. Its contribution to collective capacity would become more persuasive if subsequent participation in community decisions or shared projects were documented, rather than inferred from a well-attended public gathering.

Across components, SMART FAMILY is best understood as an integrated implementation hypothesis. Mapping may guide choices, Appreciative Inquiry may support ownership, training may

SMART FAMILY in Dunggala Village: Integrating Household Mapping, Appreciative Inquiry, and Ecoliteracy in a Participatory Food-Security Program, Muhammad Rezky Priesta Payu, Haris Danial, Nonny Basalama

develop skills, and village stewardship may prolong benefits. These proposed links are analytically coherent, but delivery documentation cannot establish their effect on food security or income.

The methodological contribution of this paper is primarily one of reporting discipline. By connecting program components to observable process markers and separating those markers from desired outcomes, the case converts a broad service narrative into a set of testable propositions. A future prospective study could compare household indicators before and after the program, document implementation fidelity, and consider an appropriate comparator if causal attribution is the objective. Mixed-method follow-up could clarify why particular households adopt or reject practices, while technical and economic records could test product feasibility. Until those data exist, the value of SMART FAMILY should be communicated as promising program design and documented early delivery, not verified population-level effectiveness.

Continuation will depend on the village government, PKK, farmer groups, BUMDes, Posyandu volunteers, and youth groups taking specific responsibilities. Follow-up should track repeat production, sustained home gardens and waste management, reliable household-data updating, and the use of information in decisions. These are more discriminating measures than the count of activities completed.

The program could move toward an evaluable design by adopting the minimum indicator set in Table 2. Each domain requires its own denominator, timing, and validated data source; pooling unrelated activities into a single success percentage would conceal important differences.

Table 2. Proposed measurement plan for a subsequent SMART FAMILY evaluation

Domain	Minimum indicator	Collection schedule	Interpretive safeguard
Food security and gardens	Dietary diversity and active gardens per targeted household	Baseline; program end; 3–6-month follow-up	Requires verified household respondents and consistent definitions
Household economics	Product batches, sales, variable costs and net margin (IDR)	Each batch or month; 3–6-month follow-up	Sales and margins cannot be inferred from training attendance
Knowledge and skills	Paired scores and observed task proficiency	Before training; after training; follow-up	Use matched participant IDs, instrument reliability and attendance records
Ecoliteracy practice	Households adopting sorting/composting; garden yield or waste mass	Monthly follow-up	Report denominators and independent verification of adoption
Data governance	Share of required fields complete; number of verified dashboard updates	At handover and monthly	Record access rules, audit trail and named data steward
Institutional continuity	Actions completed against roadmap; partner meeting and budget records	End of program; quarterly	Differentiate assigned responsibilities from work actually completed
Social and health education	Session reach, comprehension, service referral or continued engagement	Session end and suitable follow-up	Avoid attributing health or behavioral outcomes without valid instruments

Note. Status refers only to evidence available in the supplied program manuscript; intended outputs are not treated as completed outcomes.

CONCLUSION

The SMART FAMILY initiative in Dunggala Village offers a practical example of how household-oriented data collection, Appreciative Inquiry, ecoliteracy, entrepreneurship orientation, and cross-sector participation can be organized in one community-service program. The available manuscript documents a reported 45-day implementation by 15 students, a principal target group of 30 households, seven core strands, three supplementary activities, and practical demonstrations involving local resources. The distinctive analytical contribution of this article is to reconstruct the program's pathway from information gathering and participatory prioritization to practice and institutional stewardship, while separating reported events from intended deliverables and effects requiring measurement. The existing record supports an account of implementation but cannot establish improved food security, knowledge, income, product profitability, or environmental performance. Stronger claims will require accessible household datasets, appropriate pre- and post-intervention measures, repeat technical and economic observations, and post-program follow-up. Sustainability will additionally depend on a responsible village data steward, clear partner roles, and documented continuation of household practices. These recommendations provide a realistic foundation for advancing SMART FAMILY from a promising integrated initiative to an intervention whose outcomes can be rigorously tested.

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