

Community-Based Development Approach for Strengthened Unreinforced Masonry Building with Ferrocement Layers: A Case Study at BSPS Program, Pandeglang Regency, Banten Province

Abstract

The community-based development (CBD) approach emphasizes the active involvement of the community in sustainable empowerment efforts. This approach is implemented in the Bantuan Stimulan Perumahan Swadaya (BSPS) program, which is a national program organized by the Indonesian Ministry of Public Works and Public Housing that aims to improve housing quality for low-income communities (LICs) through the use of ferrocement technology. This study seeks to identify the learning process within the BSPS program and how ferrocement technology can be effectively accepted and applied by LICs. It also highlights the importance of facilitator capacity as a key factor in implementing programs that directly engage with the community. The findings indicate that through the BSPS program, guided by a community empowerment-based development approach, local communities acquire knowledge about livable houses and the skills necessary to apply the ferrocement layer independently. This research aims to provide insights for developing vocational education and training (VET) by emphasizing the potential of CBD approaches to create a practical learning environment and develop technology suited to community conditions. This approach can bridge the gap between VET modules and real-world applications.

***Keywords:** Community-based development, ferrocement layers, vocational education*

1 Introduction

The CBD approach is one of the efforts made to overcome the gap between stakeholders and the community. Development that is planned without involving the community often creates new challenges, as it is not tailored to the community's needs, resulting in ineffective progress. In the CBD approach, the community is no longer viewed as an object of development but as an active participant in the development process. This allows the community to play a crucial role in implementing innovation and mutual learning. Conversely, the Community-Based Development approach is also designed to bridge the gap between school learning and real-life experiences.

The BSPS program exemplifies a collaborative initiative that prioritizes community involvement in the development process. To facilitate this, policymakers designate field facilitators to oversee program implementation. These facilitators undergo comprehensive

training encompassing both technical and non-technical aspects. Technical training focuses on construction standards, while non-technical training emphasizes community empowerment strategies. Facilitators play a crucial role in preparing the community by conveying essential information regarding physical and non-physical program components. This ensures that community members have the knowledge and capacity to participate actively in the program. This research focuses on the BSPS program's implementation of ferrocement technology, a relatively novel concept for many communities. The study will investigate facilitators' specific learning and empowerment processes to enable community members to use ferrocement technology to enhance their housing quality effectively.

Based on research related to the learning process within the BSPS program and how ferrocement technology can be effectively accepted and applied by LICs, these insights help develop VET by emphasizing the potential of CBD approaches to create a practical learning environment and develop technology suited to community conditions. This approach can bridge the gap between VET modules and real-world applications.

2 Frame of Reference

2.1 Community-Based Development and Learning Approach

The CBD strategy prioritizes community involvement and employs empowerment tactics to foster independence, effectiveness, and efficiency in development (Suryatni & Sariwulan 2023).

Community involvement can bridge macro and micro development concepts. Within this framework, development inputs—such as funds, infrastructure, and other resources allocated to the community through development programs—should be regarded as stimuli to motivate and encourage the advancement and acceleration of development activities that impact community social engagement (Hanny et al. 2019).

The steps taken in the CBD approach include preparing facilitators and media, assessing the general situation and conditions, encouraging transparency and appreciation, facilitating discussion of alternatives, developing activity plans, targeting specific groups, identifying needs, uncovering potential, determining action priorities, and carrying out activities (Suryatni & Sariwulan 2023).

The CBD approach can be viewed as a form of informal education applied within the community. Three stages can be used as benchmarks to identify this implementation of learning: the awareness stage, the knowledge transformation stage, and the independence stage. The awareness stage is the initial phase that encourages community involvement in development, achieved through dialogue that persuades, engages, motivates, and opens the community's mind to the importance of development programs.

The knowledge transformation stage is the second phase, grounded in informal learning and consisting of three components: learning materials based on local potential, participatory learning approaches that facilitate community understanding, and flexibility tailored to the community's willingness. Finally, the independence stage relates to achieving community learning outcomes, where independence is associated with increased community initiative and proactive attitudes (Lukman 2021).

2.2 Bantuan Stimulan Perumahan Swadaya (BSPS) Program

The 2005-2025 Rencana Pembangunan Jangka Panjang Nasional (RPJPN) (National Long Term Development Plan) and the subsequent 2020-2024 Rencana Pembangunan Jangka Menengah Nasional (RPJMN) (National Medium Term Development Plan) prioritize intersectoral development with a focus on establishing a robust and regionally competitive economy driven by a skilled workforce. A key indicator of progress outlined in the 2024 targets is that 70% of households reside in liveable homes, necessitating a concerted effort to improve housing quality, particularly by enhancing residential structures to meet building resilience standards. To effectively implement programs to improve liveable housing, it is crucial to consider the target communities' social, economic, and cultural dimensions. Boen & Jigyasu (2005) emphasize that this alignment is vital for program acceptance, adoption, and long-term sustainability. Recognizing this, the government has implemented the BSPS program to address the housing needs of Low-Income Communities (LICs).

The BSPS program provides financial assistance to support LICs in improving their housing conditions through mutual cooperation, with a key focus on enhancing the structural integrity of unreinforced masonry buildings, a common construction type prone to damage in seismic zones. The stages of implementing the BSPS Program include preparation, planning, implementation, supervision and control, and utilization. Based on these stages, the community is involved in the implementation and utilization phases. The implementation phase is carried out by the technical implementation unit and the aid recipients, consisting of activities such as determining aid recipients, disbursement of aid, distribution of aid, utilization of aid, physical work, and accountability for the aid. Furthermore, the utilization phase is carried out by the aid recipients, involving activities such as the utilization and maintenance of the house and environment by the recipients (Ministry of Public Works and Housing 2018).

2.3 Ferrocement technology in BSPS program

Repairing houses is outlined in the Surat Edaran Dirjen Perumahan Nomor 14 tahun 2022 concerning Technical Guidelines for the Implementation of BSPS Program and Regulation of the Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat Republik Indonesia Nomor 5 Tahun 2021. A shaking table test has been conducted to evaluate the effect of using wire mesh on the walls with regards to wave response. This test was carried out in Japan using materials from Indonesia that have been employed to strengthen houses in West Sumatra. Errors might arise only if there is a discrepancy in materials (Boen 2014).

Ferrocement technology offers several advantages, including a different construction method compared to reinforced concrete; the ability to work with non-specialized craftsmen; ease of maintenance and repair; flexibility in application to accommodate existing houses and local materials; effective distribution of structural loads; good earthquake resistance; fire resistance; excellent durability (with well-constructed structures lasting a long time without maintenance); and economic benefits, as it is 45% cheaper than conventional reinforced concrete. However, its drawbacks include the need for precision in application, and the lack of socialization regarding the formula for calculating the strength of ferrocement structures (Ministry of Public Works and Housing 2021).

Ferrocement technology is well-suited for LICs because the materials are easy to obtain and relatively simple to work with, allowing local builders to undertake the construction without requiring specialized expertise or skills (Boen 2014).

2.4 The CBD Approach in Vocational Education and Training

The CBD approach represents a new paradigm within the vocational education sector. It shifts the perspective of the learning paradigm, enabling students to acquire knowledge without having to look far from their immediate environment, regardless of where or how the learning takes place. The challenges faced by the younger generation in the future will be significantly more complex, necessitating the development of additional skills to prepare students for various challenges. One key aspect of this preparation is the implementation of Community-Based Learning (Kamadi 2015)

The 4-Year Vocational Training for Disadvantaged Young People (VTDYP) is a program designed to address the complexities of working with disadvantaged youth, their families, and communities. This program aims to meet their needs and help them achieve a more decent quality of life in the future. The training focuses on enhancing communication skills, critical thinking, planning, decision-making, and responsibility through diverse life perspectives. A collaborative approach involves various institutions, including government agencies, NGOs, the private sector, and communities, fostering mutual trust, encouraging interdependence, and facilitating shared learning (Berry et al. 2018).

3 The Implementation of the BSPS Program Related to the Learning Process

The BSPS program aims to enhance the structural quality of unreinforced masonry buildings using ferrocement technology located in Kp. Garawano RT 015 RW 005, Saketi Village, Saketi District, Pandeglang Regency, Banten Province 42273. The BSPS program is executed within the administrative boundaries of villages or sub-districts, districts or cities, as well as provinces targeted by the program. The program's focus is on administrative areas that have data indicating unliveable houses, necessitating BSPS support (Ministry of Public Works and Housing 2022). Its implementation involves several stages that form part of the learning process crucial to the program's success, including:

3.1 Facilitator Training

Within the BSPS program as mentioned in the *Surat Edaran Dirjen Perumahan Nomor 14 tahun 2022 concerning Technical Guidelines for the Implementation of BSPS Program*, facilitators play a crucial role as local empowerment workers, guiding and supporting beneficiaries throughout the self-help house construction process. They are selected based on their understanding of self-help construction, empowerment experience, and ability to ensure quality construction, facilitators are responsible for coordinating with local government, conducting extensive outreach, identifying eligible beneficiaries, and overseeing the physical construction process.

To equip facilitators for these responsibilities, comprehensive training is provided by the Java 1 Housing Provision Implementation Center, with support from the Banten Province Housing Provision Working Unit and relevant authorities. Training encompasses a wide range of topics, including program overview, technical aspects of house construction, community empowerment strategies, reporting procedures, rapid assessment methodologies, and Quality Assurance/Quality Control (QAQC) measures. The training curriculum includes presentations on ferrocement technology, supplemented by videos and hands-on exercises such as completing rapid assessment forms. Facilitators are actively engaged throughout the training process to ensure effective knowledge transfer and skill development.

3.2 Verification

In general, ferrocement technology is easy to apply, but it is not widely known among the public. As a result, few people use ferrocement technology for house construction. Verification through an assessment of non-structural components indicates that the house walls fall into the category of brick walls in good condition. Upon confirmation, it was noted that renovations were carried out approximately one year ago. The assessment revealed that the house was previously a structure on stilts made of wood and bamboo. Structural components were also included in the verification assessment. Based on direct observations in the field, the house lacks structural elements, such as roofs, columns, and beams, according to construction standards.

Based on the training provided, the facilitator can evaluate the house's condition and determine that ferrocement technology can meet the quality standards for earthquake-resistant structures. However, upon confirmation, it was found that the recipients were unaware of information related to ferrocement or the use of woven wire to strengthen their homes. The facilitator then explained the advantages and disadvantages of using ferrocement technology and its potential application based on the house's existing conditions. The facilitator noted that ferrocement technology could be a more effective alternative for homes in these conditions.

3.3 Socialization and Counselling

Based on research on the implementation of socialization activities for the BSPS program, these activities are not conducted formally but occur periodically by facilitators during their assistance and supervision in the field. Through this engagement, the recipient community ultimately understands their responsibilities in executing the program. Socialization activities are initiated to ensure that the recipients are better prepared for their roles, as house construction will become their responsibility in the future. Meanwhile, the facilitator supervises the process, ensuring that development proceeds as planned and that the available funds are used effectively.

The information conveyed to the aid recipients includes the purpose of the BSPS program, which is to enhance the quality of liveable houses (RLH). One of the criteria involves strengthening the building structure to ensure its durability. An explanation of fund usage was also provided to clarify improvement priorities. After this explanation, the recipients recognized that the first step should be to strengthen the house and replace the asbestos roofing material, which poses health risks, with safer alternatives. The facilitator also discussed the use of woven wire to reinforce the house.

According to the research, counselling is used to explain the program's provisions further. During these extension activities, the community gains a better understanding of the program's requirements. The involvement of the village head, village officials, and the head of the RT positively influenced this process, as local leaders were able to provide clear and accessible explanations regarding the facilitator's information to the recipient community. The recipients were informed that local builders from the surrounding community would carry out the construction, and family members could also be recognized as builders, reflecting the learning process involved.

3.4 Identification of Home Improvement Needs

Research indicates that identifying home improvement needs is an activity conducted to determine necessary repairs and serves as a reference for planning related materials and required funding. This activity is carried out by facilitators in collaboration with the recipient community and the head of the RT. Based on the identification results, the recipients chose ferrocement technology for their repair work. The identified repair needs include structural improvements using ferrocement technology, the addition of brick walls in the kitchen area, the installation of window frames, and the replacement of the roof with tile materials.

3.5 Appointment and Training of Local Builder

Based on the research, the facilitator confirmed the commitment of the builders to work within the agreed timeframe for the assistance recipients. The recipient community explained that the selected builders were experienced in construction, particularly in transforming stilt houses into masonry structures. These builders have acquired their skills through extensive

hands-on experience in the field. The builders' construction knowledge has also been gained from their practical work experience.

After selecting the builders, the facilitator and District Coordinator conducted training on construction techniques for both the builders and the aid recipients using an on-the-job training method. This approach enables the builders to perform physical work in accordance with the established construction standards and technical plans. Observations indicate that the training on construction techniques and house quality occurred directly at the repair site. Participants included experts, District Coordinators, facilitators, neighborhood heads, builders, and aid recipients. The training was delivered by experts alongside technical facilitators, following guidelines from the pocketbook on ferrocement technology, design, and planning.

The technical training involved hands-on practice with ferrocement technology in the development process. This practical training and detailed explanations facilitated the builders' and aid recipients' understanding of critical aspects, such as the spacing of umbrella nails, the size of the woven wire used, and the installation of braided wire. Both builders and beneficiaries gained insights into the principles of using ferrocement technology to enhance the strength of the house. Following the training, the craftsmen and aid recipients took the initiative to engage in independent discussions to reinforce what they had practiced.

3.6 Home Repair or Construction Work

Based on the research conducted, repair work or house construction activities involve builders, the recipient community, the neighborhood heads, the surrounding community, and facilitators. In repairing or constructing the recipient community's houses, they are directly coordinating with the facilitator and builder to ensure that the work aligns with the design and planning. The recipient community also participates in the labor as a form of self-help.

Neighborhood heads, as community leaders, have played an active role in the implementation of the program to enhance the quality of residential structures, assisting the aid recipients in fulfilling their responsibilities. Additionally, neighborhood heads have encouraged the surrounding community to support the recipients in their repair or construction efforts. Facilitators need to conduct more intensive supervision throughout the implementation, as precision is essential for the effective application of ferrocement technology.

3.7 Occupancy and Maintenance

Assistance recipients must inhabit and maintain their houses. Based on field observations, the recipients received guidance from the facilitators regarding the maintenance of the repaired houses. The facilitators explained repairs that can be made in the event of damage to the cement components. Additionally, the obligation to inhabit the house has been communicated since the beginning of the verification process.

The learning process in the BSPS Program demonstrates that the CBD approach is implemented effectively, leading to increased public awareness and knowledge transformation, allowing the community to apply ferrocement technology actively. The application of ferrocement technology has been well accepted by the community, supported by its alignment with their needs, ease of implementation, and training related to construction techniques. Facilitators have effectively fulfilled their role as a link between the program and the community, bolstered by their training.

The application of a CBD approach in implementing the BSPS program, utilizing ferrocement technology, demonstrates that the BSPS Program prioritizes learning that is directly aligned with the community's needs. In vocational education, this development creates opportunities for students to learn through hands-on practice. Students can gain an understanding of the use of technology, including ferrocement technology, as it applies to construction under local conditions and community needs.

Development can be achieved by enhancing practical skills required in the field, which can involve collaboration, both directly and indirectly, with various stakeholders, including the government, the community, and other interested parties. This development aligns with the vocational curriculum that engages industry and local communities, effectively bridging education and the workforce.

4 Conclusion

The BSPS program effectively highlights the significance of community engagement in achieving sustainable development outcomes. Beneficiaries' active involvement across all stages, especially in selecting construction materials, fosters empowerment and a sense of ownership within communities. Facilitators are pivotal in guiding and supporting beneficiaries, leveraging their expertise in construction techniques and understanding community dynamics for successful program implementation.

- **Community Empowerment:** Beneficiaries' active participation in decision-making, especially in choosing construction materials, promotes a sense of ownership and empowerment.
- **Role of Facilitators:** Facilitators, as key intermediaries, provide essential guidance and support throughout the process, drawing from their expertise in construction techniques and understanding of community dynamics.
- **Improvement in Housing Quality:** The program enhances the physical quality of housing and the social and economic well-being of the beneficiaries.
- **Skill Acquisition:** Beneficiaries acquire new skills and knowledge, enabling them to address future housing challenges with greater autonomy.
- **Extended Benefits to Surrounding Communities:** Future counselling activities should be accessible to surrounding communities, not just aid recipients, expanding the program's benefits beyond the immediate recipient community. This will increase

awareness of livable house criteria and the application of ferrocement technology for better structural integrity.

- **Vocational Education Collaboration:** Collaborating with vocational education institutions can turn the BSPS program into a real-world learning ground, providing practical experience that informs more relevant and effective vocational training. This partnership prepares students for modern workforce challenges.

These results underscore the program’s potential to drive both physical improvements in housing and broader socio-economic benefits while fostering an educational environment that can equip future generations with the skills to address similar challenges.

References

- Berry, G., Sovann, S., & Leng, M. (2018). Good Practices in TVET for disadvantaged young people in rural Cambodia. In: TVET@ Asia, 11, 1-19.
- Boen, T. & Jigyasu, R. (2005). Cultural Considerations for Post Disaster Reconstruction Post-Tsunami Challenges. Online: <http://adpc.net/irc06/2005/4-6/TBindo1.pdf> (retrieved: 17.02.2025).
- Boen, T. (2014). Challenges and Potentials of Retrofitting Masonry Non-Engineered Construction in Indonesia.
- Hanny, P., Franklin, P., & Lakat., R. (2019). Pemberdayaan Masyarakat dalam Kesiap Siagaan Mengantisipasi Ancaman Bencana Alam di Desa Kali dan Kali Selatan Minahasa. In: Media Matrasain, 16, 1, 25-39.
- Kamadi, W. (2015). Community-Based Learning in Vocational Education and Training: Making Schools Closer to The Real World. The 3rd UPI International Conference on Technical and Vocational Education and Training. Amsterdam: Atlantis Press, 217-222
- Lukman, A. I. (2021). Pemberdayaan Masyarakat melalui Pendidikan Nonformal di PKBM Tiara Dezzy Samarinda. In: DIKLUS: Jurnal Pendidikan Luar Sekolah, 5, 2, 180–190.
- Ministry of Public Works and Housing (2018). Regulation of the Minister of Public Works and Housing (Kementerian PUPR) Number 07 of 2018 concerning Self-Help Housing Stimulant Assistance. Jakarta: Government of Indonesia.
- Ministry of Public Works and Housing (2021). Pocket Book on the Application of Ferrocement Technology in BSPS. Jakarta: Ministry of Public Works and Housing, Directorate General of Housing, Directorate of Self-Help Housing.
- Ministry of Public Works and Housing (2022). Circular Letter of the Minister of Public Works and Housing (Kementerian PUPR) Number 14 of 2022 concerning Technical Guidelines for the Implementation of the Self-Help Housing Assistance Program. Jakarta: Government of Indonesia.

Suryatni, M. & Sariwulan, T. (2023). Peningkatan Kualitas Sumber Daya Manusia Melalui Pemberdayaan Masyarakat. Bandung: Widiana Bhakti Persada Bandung.

TVET@asia The Online Journal for Technical and Vocational Education and Training in Asia

CITATION:

Hanifah, L., Krisnanto, E., & Gaputra, A. (2025). Community-Based Development Approach for Strengthened Unreinforced Masonry Building with Ferrocement Layers: A Case Study at BSPS Program, Pandeglang Regency, Banten Province. In: TVET@Asia, issue 24, 1-11. Online: <https://tvvet-online.asia/uncategorized/community-based-development-approach-for-strengthened-unreinforced-masonry-building-with-ferrocement-layers-a-case-study-at-bsps-program-pandeglang-regency-banten-province/> (retrieved 28.02.2025).

This document is published under a Creative Commons Attribution-NonCommercial-NoDerivs3.0 License



Author(s) Profile



Laila Hanifah

Universitas Pendidikan Indonesia

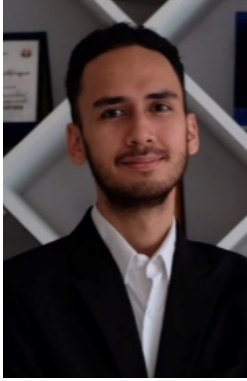
E-mail: lailaghinah@gmail.com



Erna Krisnanto

Universitas Pendidikan Indonesia

E-mail: ernakrisnanto2020@gmail.com



Agara Gaputra

Universitas Pendidikan Indonesia

E-mail: agara.gaputra@upi.edu