



## DEVELOPMENT OF THE REED INDUSTRY GROUP THROUGH TRAINING IN FINANCIAL MANAGEMENT, MANAGEMENT AND SUSTAINABLE ARCHITECTURAL BUILDING DESIGN

Kadek Goldina Puteri DEWI<sup>1</sup>, Ni Made WAHYUNI<sup>2</sup>, Pande Putu Dwi Novigga ARTHA<sup>3</sup>

<sup>1,2,3</sup>Faculty of Economics and Business, Warmadewa University, Indonesia

Corresponding author: Kadek Goldina Puteri Dewi

E-mail: [goldinaputeri@gmail.com](mailto:goldinaputeri@gmail.com)

### Info Artikel:

Received: 2024-05-15

Vol: 3

### Keywords:

Industry, Poverty, SMEs, Sustainability

Revised: 2024-06-15

Number: 1

### Abstrak:

Industry plays a vital role in reducing poverty in developing countries. In Bali, the creative industry has developed rapidly, although initially, it was still small. The alang-alang roofing industry, which focuses on producing and using roofing from alang-alang leaves, is a significant sector in the construction and property development industry. This material is used in traditional buildings and modern, environmentally friendly building designs. A case study of the "Tegal Wangi" thatched roof industry in Lodtunduh Village, Ubud, shows that financial management and risk management are essential for the success of small and medium enterprises (SMEs). Financial education through simple bookkeeping is essential to provide in-depth understanding for business owners and managers. In addition, risks in this industry include competition, changes in customer demand and quality, and fluctuations in raw material prices. Solutions like product diversification and flexible marketing strategies can help manage these risks. Sustainable architectural building design is also a crucial factor. Collaboration between architects and industrial owners can create functional, aesthetic buildings resistant to extreme weather. Using sustainably sourced reeds and following environmentally friendly farming practices are essential steps in maintaining the balance of the ecosystem.

Accepted: 2024-07-15

Page: 31 - 41

## INTRODUCTION

Industry is vital in reducing poverty in developing countries (Bosselmann, 2018). In Bali, the creative industry has been developing for a long time, but previously, this industry was still small. Industrial development in each country is at different stages, but all countries view industry as an essential part of improving the economy. The industrial sector is a sector that can lead other sectors in an economy towards progress. The industrial sector has a vital role because the increasing development of the industrial sector has a significant impact on economic development and growth (Kusumastuti, 2015). The development of the industrial sector has a role in increasing Gross Domestic Product (GDP) and creating job opportunities. Grouping companies' development in the industrial sector can impact efficiency and productivity growth (Anas et al., 2018). The alang-alang roofing industry, which focuses on producing and using thatched roofing as a building material, plays a vital role in the construction and property development industry. The alang-alang roof is a building material made from alang-alang leaves or thatch, usually used as a roof covering.

Thatched roofs are often used in traditional buildings in various world regions but are also increasingly popular in modern building designs as part of sustainable and environmentally friendly architectural trends. The beauty and attractiveness of alang-alang roofs are often used in resorts, villas and tourist structures to provide a natural and exotic feel. Thatched roofs are often chosen because of their natural appearance and provide a unique aesthetic touch to a building. The



This open-access article is distributed under a Creative Commons Attribution (CC-BY-NC) 4.0 license

"Tegal Wangi" thatched roof industry in Lodtunduh Village, Ubud, belongs to Mr. A.A. Gde Rai and is one of the thatched roof industries still active today. This thatched roofing industry has 15 employees requiring an in-depth understanding of their business: business owners, production managers, marketing managers, and human resources managers. As an industry, financial education through simple bookkeeping is very much needed because it is essential to success in running a business (Subur & Hasyim, 2014). Sound financial management will provide a precise profit amount and help business owners make the right decisions. Finance is the basis of company operations that must be managed well.

Poor financial management can result in losses and, at the extreme stage, can stop the operation of a company (Kesuma, 2020). Financial Management is generally related to the procurement, allocation, utilization and control of financial resources. Financial management includes planning, organizing, implementing, controlling and evaluating activities (Maulina, 2016). Financial recording is an essential part of financial management. The types of financial reports that generally must be completed by a business are Expenditure Record Book, Income Record Book, Main Cash Book, Stock Book, Goods Inventory Book and Profit and Loss Book (Maryati et al., 2020). Risk is an inseparable part of human life; risk can be interpreted as uncertainty about a situation that will occur in the future, with decisions taken based on various current considerations. In some situations, these risks can destroy an organization. Therefore, they are significant risks to manage. Risk management aims to manage risk so the organization can survive or optimize risk. Companies often deliberately take certain risks because they see the potential profit behind these risks.

In the industrial world, risks will always be encountered due to uncertainty that cannot be predicted in advance, which can cause several losses that the company must accept. Likewise, for small and medium enterprises (SMEs) where the capital background is not very strong, causing risks that result in operational disruption and financial losses and can even lead to bankruptcy. Even though risks are diverse and exist in the industrial world, risks can be detected early to anticipate possible impacts. Competition Risk: Competition in this industry can be high, especially with alternative roofing materials and more modern products. Risk of Changes in Customer Demand: Customer tastes and preferences may change over time, causing changes in demand for alang-alang roofing products. Quality Risk: Controlling the quality of raw materials and production processes to ensure consistency and reliability of the final product. Price Risk: Fluctuations in raw material prices or production costs can affect a company's profitability. This can be overcome with solutions such as product diversification, which involves developing different variations of thatched roofing products or related products to reduce dependence on one product and adapt to changes in market demand. Adopt a Flexible Marketing Strategy: Design a strategy that can be quickly adjusted to accommodate market changes and overcome competition. Risk management is usually called risk management so that these risks do not become a nuisance in industrial activities. Therefore, risk management to reduce and minimize losses is very important for small businesses, considering that the risks faced by small and medium industries are diverse. Architectural building design is also crucial in the industry. Involves planning and implementing architectural concepts that consider the sustainability, functionality, safety and aesthetics of buildings that use thatched roofs. The following are several aspects that are relevant in architectural building design activities.

Architects collaborate with industrial owners to design buildings that meet the functions and needs of that industry. The design must support producing, storing, and distributing goods or services. Architects can play a crucial role in transforming and revitalizing dormant industrial areas into areas that focus on various activities, including housing, retail and public space. The



relationship between architecture and industry creates a physical environment that supports sustainability, efficiency and innovation in the industrial sector. Collaboration between architectural professionals and industry players is essential in creating optimal and sustainable workspaces. The alang-alang roofing industry, which focuses on producing and using thatched roofing as a building material, plays a vital role in the construction and property development industry. The alang-alang roof is a building material made from alang-alang leaves or thatch, usually used as a roof covering. The primary material for making alang-alang roofs is alang-alang leaves or thatch. This plant usually grows in tropical and subtropical areas and has properties that make it suitable as a roofing material, such as strength, lightness, and weather resistance. Like other industries, the thatched roofing industry also faces several problems. To overcome existing problems, the role of financial education, risk management and sustainable architectural building design training also needs to be carried out. The problem is that Alang-alang roof designs need to meet structural standards or take into account certain environmental factors. Unsustainable use of reeds or exploitation of natural resources. The solution is to involve an architect or structural engineer who has experience in alang-alang roof design. It is essential to consider resistance to extreme weather, wind loads, and other environmental factors in design planning, select sustainable sources of reeds, follow environmentally friendly agricultural practices, and consider environmental and ethical aspects in every step of production."

**Table 1.** Partner Problems Table

No.	Problem	Description
1.	Financial management	Employees and managers in the thatched roofing industry may need more knowledge regarding simple bookkeeping and financial management.
2.	Poor Financial Management	Without good financial management, a company can experience significant financial losses, which can, in extreme cases, stop its operations.
3.	Operational Risk	The risk of competition in this industry is relatively high, especially with alternative roofing materials and more modern products.
4.	Changes in Customer Requests	Customer tastes and preferences may change over time, which may cause fluctuations in demand for thatched roofing products.
5.	Quality Risk	Controlling the quality of raw materials and production processes is a challenge to ensure consistency and reliability of the final product.
6.	Price Fluctuations	Unstable raw material prices or production costs can affect a company's profitability.
7.	Design and Sustainability	Designs That Do Not Meet Structural Standards: Alang-Alang roof designs that do not consider certain environmental factors or structural standards.
8.	Unsustainable Use of Resources	Exploiting reeds without considering sustainability can negatively impact the environment and the sustainability of raw materials.
9.	Collaboration and Innovation	Collaboration with an experienced architect or structural engineer can help with design development and adaptation in product development and innovation.

**Activity Objectives.** Reducing Poverty Through Industrial Development: Strengthening the role of industry, incredibly creative and traditional industries such as the alang-alang roofing industry, in reducing poverty in Bali by increasing employment opportunities and the income of local communities. Increasing Economic Growth and Sustainable Development: Encouraging



economic growth through the development of the industrial sector can increase Gross Domestic Product (GDP) and positively impact sustainable development. Increasing Industrial Efficiency and Productivity: Grouping companies within industrial sectors to improve operational efficiency and productivity growth through best practices and inter-company collaboration. Improved Financial Management and Risk Management: Improve financial management and risk management capabilities in small and medium enterprises (SMEs) to ensure business continuity and reduce the risk of financial loss. Developing Sustainable Architectural Designs: Introducing and implementing sustainable architectural designs in the alang-alang roofing industry to ensure environmental sustainability and meet structural and aesthetic standards.

**Table 2.** Activity Target Table

No.	Activity Targets	Description
1.	Poverty Reduction	Increase the number of job opportunities in the creative and traditional industrial sectors in Bali. - Increase the average income of workers in the thatched roofing industry.
2.	Economic growth	Increase the contribution of the industrial sector to Bali's GDP. - Increase the number of thatched roof industries operating sustainably.
3.	Efficiency and Productivity	Encourage collaboration between companies in the industrial sector to share best practices and increase efficiency. - Increase worker productivity through training and skills development.
4.	Financial Management and Risk Management	Increase understanding and application of simple bookkeeping among small business owners. - Reduce financial risks through implementing effective risk management strategies. - Provide financial management training for business owners and managers.
5.	Sustainable Architectural Design	Adopt architectural design practices that consider environmental sustainability in the alang-alang roof industry. - Involve experienced architects and structural engineers in alang-alang roof construction and renovation projects. - Ensure all buildings using alang-alang roofs comply with strict structural and environmental standards.

## METHODS

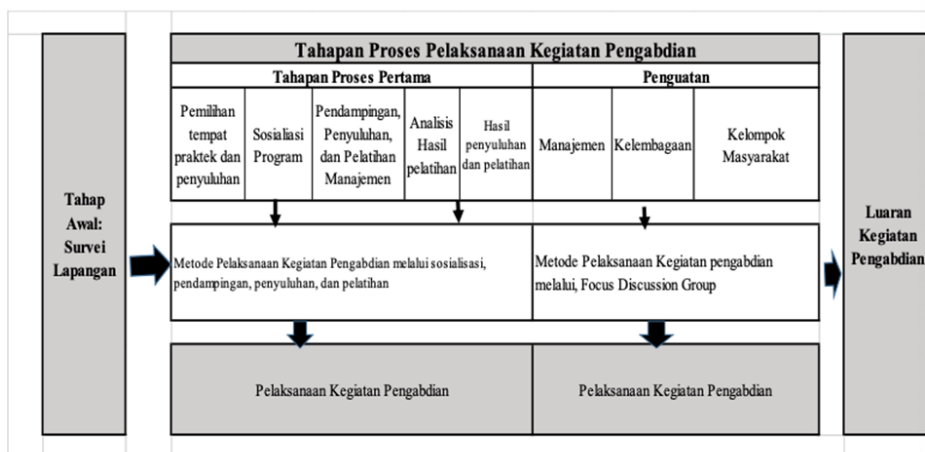
**Implementation Steps/Stages.** Community service is implemented at the "Tegal Wangi" Alang-Alang Roofing Industry located on Jl. A A. Gde Rai, Banjar Silungan, Lodtunduh, Ubud, Gianyar. Implementation of PKM activities will be held in February-December 2024. The implementation method is adjusted to the problems and targeted solutions. The method for this community service activity is in the form of:

**Table 3.** Implementation Steps

No.	Process	Objective	Steps
1.	Needs Analysis and Deep Understanding	Determine the specific needs of the thatched roof industry in Lodtunduh Village, Ubud, Bali.	Conduct an initial survey to understand the situation and challenges the alang-alang roofing industry faces. - Collect data on financial conditions, risk management and current architectural design practices.

No.	Process	Objective	Steps
2.	Training and Education Program Planning	Develop training programs that suit industry needs.	Designing a training curriculum that includes financial management, risk management, and sustainable architectural design. - Identifying instructors and resource persons competent in related fields.
3.	Implementation of Training and Workshops	Providing knowledge and skills to employees and industrial management.	Hold regular training sessions and workshops for business owners, managers and employees. - Involve practitioners and experts to provide examples of best practices and relevant case studies.
4.	Implementation and Assistance	Support the application of knowledge that has been learned in daily operations.	Providing direct assistance to business owners and managers in implementing good financial management. - Assisting in risk management and implementing sustainable architectural design.
5.	Evaluation and Monitoring	Assess program effectiveness and make continuous improvements.	Regular evaluations should be conducted to measure the impact of training on increasing efficiency and productivity. - Collect feedback from training participants and make adjustments if necessary.

**Figure 1.** Stages of the Activity Implementation Process



**Table 3.** Partner Participation in PKM Activities

No.	Alang-Alang Roof Industry Partner "Tegal Wangi"	Participation
1.	Financial Management Training	Partners are involved in training to improve their abilities in managing business finances. Training material includes making financial reports, budgeting, cost control, and cash management.

No.	Alang-Alang Roof Industry Partner "Tegal Wangi"	Participation
		Through this training, partners are expected to be able to make better financial decisions and increase the efficiency of using financial resources.
2.	Management Training	Partners receive management training, which includes planning, organizing, implementing and supervising business activities. The focus of the training is on increasing the productivity and operational effectiveness of the reed business. This training aims to provide partners with skills in managing teams, optimizing production processes, and improving product quality.
3.	Sustainable Architectural Building Design	Partners are trained to design sustainable and environmentally friendly buildings, using reeds as the primary material. Training covers sustainable design concepts, environmentally friendly construction techniques, and effective use of reeds. This training aims to increase the added value of reed products and open new, broader market opportunities.

## RESULTS AND DISCUSSION

**Tabel 4.** Keluaran yang Dicapai

No	Luaran	Target Capaian	Indikator Kinerja Utama (IKU) Terkait	Target Capaian IKU
1	Dosen berkegiatan di luar kampus	3	IKU 3: Dosen berkegiatan di luar kampus	3
2	Mahasiswa mendapat pengalaman di luar kampus	3	IKU 2: Mahasiswa mendapat pengalaman diluar kampus	3
3	Masyarakat penerima manfaat langsung	20	IKU 5: Hasil kerja dosen digunakan oleh masyarakat	20
4	Mitra kerjasama	1	IKU 5: Hasil kerja dosen digunakan oleh masyarakat	1
5	Publikasi nasional accepted (artikel jurnal nasional terakreditasi SINTA 4 dan buku ajar ber-ISBN)	1	IKU 5: Hasil kerja dosen digunakan oleh masyarakat	1

**Tabel 5.** Manfaat yang Diperoleh

No.	Aspek	Deskripsi	Manfaat
1.	Poverty Reduction	Creative industries, including thatched roofing, can reduce poverty by creating jobs and increasing people's income.	Increasing the welfare of local communities. - Reducing poverty levels. - Increasing per capita income.
2.	Economic Improvement	The industrial sector is an essential pillar in the local economy, increasing GDP, creating jobs and driving economic progress.	Faster economic growth. - Increased regional GDP. - More job creation.

No.	Aspek	Deskripsi	Manfaat
3.	Efficiency and Productivity	Grouping companies to increase efficiency and productivity and reduce production costs.	Increased operational efficiency. - Productivity growth. - Reduction in production costs.
4.	Sustainability and Environment	Sustainable use of thatched roofs to support environmentally friendly architecture and conservation of natural resources.	Increased environmental sustainability. - Reduction of carbon footprint. - Conservation of natural resources.
5.	Aesthetics and Tourist Attraction	Thatched roofs provide a natural and exotic feel attractive to the tourism sector, increasing tourism revenues and promoting local culture.	Increased tourist attraction. - Increased income from the tourism sector. - Promotion of local culture through traditional design.
6.	Better Financial Management	Financial education and sound financial management for business stability and growth.	Increased profits. - Better business decisions. - Financial stability of the company.
7.	Effective Risk Management	Risk management strategy to anticipate and overcome risks in small and medium industries.	Reduction of losses. - Increased operational stability. - Ability to survive in the face of risk.
8.	Supportive Architectural Design	Building designs that consider sustainability, functionality and safety, as well as environmental factors.	More efficient and sustainable buildings. - Increased safety and comfort. - Reduced maintenance costs.
9.	Product Diversification	Developing variations of alang-alang roofing products to reduce dependence on one product and adapt to market changes.	Increased revenue. - Increased market share. - Ability to adapt to changes in market demand.
10.	Flexible Marketing Strategy	Design flexible marketing strategies to address market changes and increase engagement with customers.	Increased sales. - Increased number of customers. - Increased engagement with the market.
11.	Increasing Employee Capacity	Training and education to improve employee skills and knowledge.	Increased employee productivity. - Increased operational efficiency. - Improved work quality.
12.	Relationship Development and Collaboration	Encourage collaboration between the thatched roofing industry, experts, and professionals to increase business networks and obtain additional support.	New strategic partnerships. - Increased support from experts and professionals. - Increased access to resources and knowledge.

No.	Aspek	Deskripsi	Manfaat
13.	Increased Awareness of Sustainability	Adopt environmentally friendly agricultural practices to increase sustainability awareness and the company's reputation as a pioneer in environmental practices.	Certification or recognition of environmentally friendly practices. - Increased company reputation. - Increased customer confidence in products.

**Table 6.** Industry Supporting Factors and Follow-up Steps

No.	Supporting factors	Description	Follow-up Steps
1.	Important Role in the Economy	The thatched roofing industry creates jobs and increases community income, supporting local economic growth.	Conduct public campaigns to increase awareness of the economic benefits of the thatched roofing industry. - Conduct training programs to improve job skills.
2.	Wide Market Potential	Thatched roofs have high aesthetic appeal and are used in traditional and modern buildings, increasing demand in the tourism, property and construction sectors.	Conduct regular market research to understand market trends and preferences. - Innovate products and services using thatched roofing.
3.	Support for Sustainability	Environmentally friendly building materials, reducing carbon footprint and supporting sustainable building practices.	Encourage using natural and sustainable raw materials. - Obtain sustainability certification to improve the industry's reputation.
4.	Collaboration with Professionals	Engage architects and engineers to ensure product quality and durability, increasing customer satisfaction.	Building strategic partnerships with architects and engineers to develop innovative designs. - Organizing training on the latest technology and designs.
5.	Finance and Management Education	Good financial education helps manage finances effectively, increasing the company's financial stability.	Provide regular financial and risk management training. - Build an integrated financial reporting system.

**Tabel 7.** Tabel Faktor Penghambat Industri dan Langkah Tindak Lanjutnya

No.	Obstacle factor	Description	Follow-up Steps
1.	High Competition	Competition with alternative roofing materials could reduce market share and pressure prices.	Testing and improving the competitive advantage of alang-alang roof products. - Adjusting pricing and marketing strategies.
2.	Changes in Customer Requests	Changing customer tastes and preferences can result in uncertainty in product demand.	Implement flexible systems in manufacturing to accommodate changing market demands. - Collect feedback from customers regularly.



3.	Quality and Durability	Risks related to inconsistent quality of raw materials and production processes can reduce reputation and increase quality control costs.	Improve quality control in the production process. - Adopt stricter manufacturing practices
4.	Raw Material Price Fluctuations	Fluctuations in raw material prices can affect a company's profitability and financial stability.	Build long-term partnerships with suppliers for stable prices and supplies. - Analyze the risk of price fluctuations and manage with risk strategies.
5.	Operational Risk	Operational risks such as production or financial disruptions can disrupt productivity and cause losses.	Create contingency plans to overcome operational disruptions. - Integrate operational risk monitoring and evaluation systems.

With these steps, the thatched roofing industry hopes to optimize its supporting potential and overcome existing obstacles to achieve sustainable growth.

## CONCLUSION

Industry plays a crucial role in reducing poverty and improving developing countries' economies. This sector is believed to lead other sectors towards economic progress by creating jobs and increasing Gross Domestic Product (GDP). In Bali, creative industries, including alang-alang roofing, have developed and played an essential role in the construction and property sectors. Thatched roofs have become popular in modern building design due to their environmentally friendly nature and natural aesthetics.

Financial management is critical to industrial success, especially in small and medium enterprises (SMEs). Poor financial management can cause losses and even bankruptcy. Therefore, financial education and good financial records are the keys to success. Risk is an inseparable part of the industrial world. Effective risk management is necessary to manage uncertainty and optimize profit potential. The main risks in the thatched roofing industry include competition, changes in customer demand, quality of raw materials, and price fluctuations. Architectural building designs involving thatched roofs must consider sustainability, functionality, safety and aesthetics. Collaboration with experienced architects and engineers is essential to ensure the quality and durability of the building.

The thatched roofing industry should develop product variations to reduce dependence on one product type. This diversification can help adapt to changes in market demand and reduce the risk of declining sales. Designing a marketing strategy that can be adapted quickly is critical to dealing with competition and market changes. The use of digital technology and regular market analysis can help in adjusting marketing strategies. Organizing financial education and risk management training for employees and business owners. This will help in better financial management and earlier detection of risks so that losses can be minimized. Involving experienced architects and engineers in the design and production of alang-alang roofs. This will ensure quality, long-lasting products and comply with environmental standards.

Choose sustainable reed sources and follow environmentally friendly farming practices. This is important to maintain industrial sustainability and reduce negative environmental impacts. Carry



out business grouping or clustering to increase efficiency and productivity. This grouping can help share resources, knowledge, and technology between companies in the same industry. By implementing these suggestions, the thatched roof industry in Bali can continue to develop and positively contribute to the economy, environment and community welfare.

## REFERENCE

- Andriati, N. P. I., Prabaningrum, P. A. S., Sudirga, I. G. A. D. S., Noviari, N., Jati, I. K., Sisdyani, E. A., & Kresnandra, A. A. N. A. (2023). Optimizing Community and SME's Potential in Sangketan Village, Tabanan, Bali: A Tax Compliance Perspective. *Akuntansi Dan Humaniora: Jurnal Pengabdian Masyarakat*, 2(3), 102-112. <https://doi.org/10.38142/ahjpm.v2i3.898>
- Anas, A. (2018). Pengembangan sektor industri: Pengelompokan perusahaan untuk efisiensi dan produktivitas.
- Bosselmann, T. (2018). Industri memegang peranan penting untuk mengurangi kemiskinan di negara-negara berkembang.
- Jannah, S., & Kurniati, R. (Tahun). Dampak perubahan iklim terhadap industri atap alang-alang: Perspektif keberlanjutan.
- Jelantik, I. W. (Tahun). Peran industri kreatif dalam pembangunan ekonomi lokal: Kasus Bali.
- Kawisana, P. G. W. P., Wulandari, I. G. A. A., & Sanjaya, I. G. A. M. P. (2023). Pemberdayaan Ekonomi Kelompok Usaha Wanita Tani "Sari Murni" Desa Landih, Dusun Buayang-Bangli. *Akuntansi Dan Humaniora: Jurnal Pengabdian Masyarakat*, 2(2), 42-47.
- Kesuma, W. (2020). Manajemen keuangan: Pengelolaan keuangan yang baik untuk pertumbuhan bisnis.
- Kesuma, W., & Suryadi, I. (Tahun). Analisis keuangan industri atap alang-alang: Studi kasus keuangan operasional.
- Kusumastuti, R. (2015). Peran sektor industri dalam meningkatkan perekonomian: Studi kasus di [lokasi atau negara].
- Maulina, S. (2016). Fungsi manajemen keuangan dalam perencanaan dan pengendalian sumber daya keuangan.
- Maulina, S., & Firmansyah, B. (Tahun). Pengaruh manajemen keuangan terhadap pertumbuhan industri atap alang-alang.
- Maryati, S., & Jannah, S. (2020). Jenis-jenis laporan keuangan yang penting dalam manajemen keuangan usaha.
- Maryati, S., & Suryani, I. (Tahun). Inovasi teknologi dalam produksi atap alang-alang untuk meningkatkan efisiensi dan kualitas.
- Putra, I. G. A. (Tahun). Pemasaran produk atap alang-alang: Strategi dalam menghadapi persaingan pasar global.
- Subur, I., & Hasyim, A. (2014). Pendidikan keuangan dan pembukuan sederhana dalam industri kecil dan menengah.
- Sugiarto, B. (Tahun). Dampak industri atap alang-alang terhadap pariwisata di Bali: Studi kasus desa wisata.
- Suparta, I. W. (Tahun). Peningkatan efisiensi produksi atap alang-alang melalui teknologi dan manajemen operasional.
- Sutama, I. K. A., & Gunarta, I. W. (Tahun). Penerapan manajemen risiko pada industri atap alang-alang.



- Setiyawati, H., Gustri, I., Arwati, A., Imaningsih, E. S., Adistin, Y., Zakiyah, E. F., Nugroho, Y. P., & Saragih, C. P. (2023). PKM Pondok Pesantren Riyadhussholihiiin Rocek Cimanuk-Pandeglang Dalam Penerapan Mesin Pengolahan Sampah. *Akuntansi Dan Humaniora: Jurnal Pengabdian Masyarakat*, 2(3), 89-95.  
<https://www.journalkeberlanjutan.com/index.php/ahjpm/article/view/869>
- Widiantara, I. K. A., & Wijaya, I. N. (Tahun). Pengaruh industri atap alang-alang terhadap sektor konstruksi di Bali.
- Wijaya, I. K. A., & Wardani, I. N. (Tahun). Pendidikan keuangan dan pengelolaan keuangan pada industri atap alang-alang.
- Wirawan, I. G. A. N. (Tahun). Manajemen sumber daya manusia dalam industri atap alang-alang.
- Wirawan, I. G. A. N. (Tahun). Pengembangan desain arsitektur berkelanjutan untuk bangunan dengan atap alang-alang