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The Impact of Fedtugrow® Downstreaming with SPR Integration in Central Lampung Regency Using SROI

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ABSTRACT

The dissemination of research findings (innovation) in universities would have a social and economic impact on the larger community. IPB developed the depolarized katuk invention (known as Katulac®), which was patented (P00201800110, Jan 5, 2018). IPB collaborated with the Local Government of Central Lampung Regency, PT Great Giant Livestock (GGL), and community farms named Hipermadani (downstreaming of university innovation for the community and farmers) in downstreaming Fedtugrow (innovation in combined livestock feed Katulac® and concentrate) to improve farmer welfare. Katulac®'s downstream innovation is the School for Smallholder Livestock Farming (*Sekolah Peternakan Rakyat*, SPR), an IPB innovation with copyright (EC00201987765, Nov 28, 2019). The Katulac® downstreaming initiative with SPR institutional integration resulted in a social investment of IDR 501,837,278 and a net social benefit of IDR1,488,959,391 for all stakeholders in the *Hipermadani* ecosystem. This program had a Social Return on Investment (SROI) of 2.97, which means that for every IDR 1 invested, it would deliver a social benefit of IDR 2.97, showing the program's success.

Keywords: downstreaming, *Hipermadani*, innovation, Katulac, Social Return on Investment

INTRODUCTION

University research outputs are mostly disseminated through scientific publications at both the national and international levels, with downstream applications accounting for only 4.11% as of 2022 (PDDIKTI 2022). Indeed, the downstreaming of university research breakthroughs has the potential to provide considerable social and economic benefits for society. As a continually producing university for research and innovation, IPB University encourages its academic community to explore downstream implementation of their inventions through internal, external, or Kedaireka Matching Fund schemes. The Kedaireka scheme has emerged as a key strategy for facilitating the dissemination of research and innovation outcomes at IPB and other universities. IPB's major innovation is the depolarized katuk leaf product (Katulac®, also known as Fedtugrow® when blended with GGL concentrate), patented under code P00201800110 (Jan 5, 2018), which is greatly sought after by farmers to increase livestock productivity.

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The depolarized katuk technology reduces the negative effects associated with katuk leaves while maintaining their recognized efficacy in increasing milk and meat production (Tarigan *et al.* 2023). This innovation was merged with another IPB program, *Sekolah Peternakan Rakyat* (the School for Smallholder Livestock Farming, SPR), which bears a copyright (EC00201987765, issued on Nov 28, 2019), and downstreamed in Central Lampung Regency in 2023. Thanks to the Kedaireka Matching Fund. SPR is a participatory educational program for smallholder livestock communities developed by universities in partnership with regional governments (LPPM IPB University 2022). To downstream the depolarized katuk innovation, institutional integration was established among SPR-IPB, the Central Lampung Regency Government, PT Great Giant Livestock (GGL), and local community farmers, resulting in the Hipermadani initiative, a university innovation downstream ecosystem for farmers and communities. This synergy was created to maximize results through collaborative efforts. Both IPB innovations are aimed at the livestock sector, which faces several persistent challenges, including (1) suboptimal productivity and quality outputs, (2) weak institutional structures and farmer mindsets, (3) inconsistent and insufficient supply of quality feed, and (4) farmers who are overburdened and time-constrained when managing their livestock. These concerns have contributed to the fall of the cattle sector GDP by 0.35% between 2019 and 2020 and a further 0.34% in 2021 (Figure 1).

Hipermadani, which encourages collaboration among multiple stakeholders in livestock development, has grown in importance and should be expanded to cover a broader scope of implementation. Hipermadani is based on the principles of shared responsibility and active involvement among four institutional pillars. In this context, IPB University is the pioneer, producing Fedtugrow® to boost livestock productivity. Meanwhile, PT Great Giant Livestock (GGL), which represents the private sector, makes financial contributions through its Corporate Social Responsibility (CSR) program. The local government serves as a coordinator and facilitator, ensuring that farmers under its area actively participate. Finally, the farmers, as the principal beneficiaries, are crucial to optimizing the achievements of this collaborative project (Figure 2). This partnership can only be optimized if all parties agree on a common goal and mission: collective progress.

This study covered the subdistricts of Way Pangubuan, Terbanggi Besar, and Terusan Nunyai, which were home to farmer groups affiliated with the School for Smallholder Livestock Farming (SPR). The study examined economic, social, and environmental issues. Based on background and contextual analysis, the primary goal of this research was to assess the *Hipermadani* program's economic, social, and environmental impacts using the Social Return on Investment (SROI) framework. The study compared social investment to the advantages generated by all stakeholders, particularly farmers who were direct recipients. It is envisaged that social investment in this initiative will have measurable, positive results across several dimensions of rural development.

METHODS

There is a huge disparity between the volume of university research published in academic journals and the extent to which such research is used and perceived by the public outside the academic community. As a result, it is critical to broaden the downstream application of university research, particularly discoveries that have a direct influence on communities. Among these breakthroughs is katuk depolarization (commercially known as Katulac® or Fedtugrow®), an alternative cattle feed created by IPB University. When combined with institutional empowerment frameworks like SPR, the innovation is intended to have a broader and more effective impact. The downstream program was organized on the

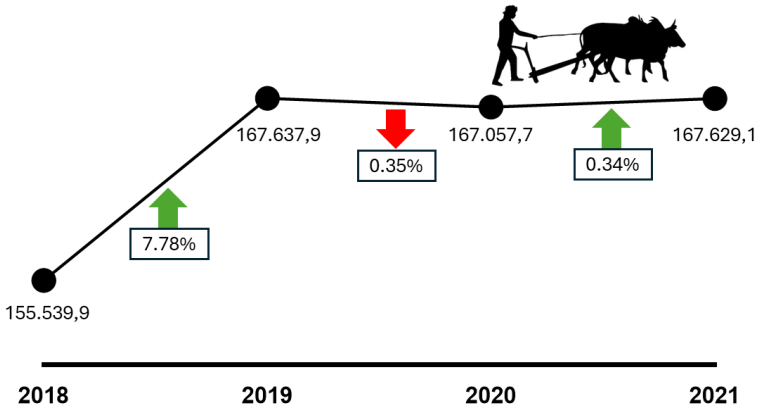

Figure 1 Livestock sector GRDP trends (BPS 2022).

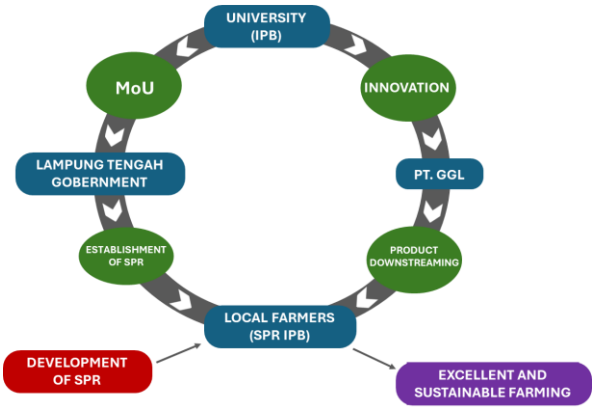

Figure 2 Hipermadani model (Suprayogi 2024).

Hipermadani model, which depicts a tetra-helix partnership between local governments, universities, farmers, and the commercial sector.

Implementing the *Hipermadani* model requires significant investment, necessitating collaboration, including financing. As with any investment, whether social or not, it is critical to quantify the benefits to all parties involved. To accomplish this, qualitative and intangible social benefits are monetized, allowing for a systematic evaluation of the program's impact and return on investment.

In this study, the Social Return on Investment (SROI) technique was used to determine the extent to which social investment generates concrete advantages for stakeholders, notably farmers within the SPR. The research compared the total investment in the program to the social outcomes received in monetary terms. Primary data was collected through in-depth interviews with key stakeholders, including the Central Lampung Regency Livestock Department, PT GGL, IPB University professors, and participating farmers, using open-ended questions. Data collected covered the total value of the social investment, the advantages gained by farmers, the number of training participants, the increase in animal body weight, and other factors. Secondary data were gathered from IPB University reports and other relevant publications.

The SROI analysis paradigm comprises input, output, and result variables obtained from social investment, as well as evaluative judgment guided by subject matter experts (Purwohedi 2016). To preserve analytical rigor and minimize bias, the study follows the seven SROI principles: (1) involve stakeholders; (2) understand what changes; (3) measure what matters; (4) include only material changes; (5) avoid over-claiming; (6) be transparent about assumptions and limitations; and (7) verify results.

The SROI method comprised six distinct phases, each applying the above principles:

1. Defined the scope and identify key stakeholders. This involved determining which social investment is being evaluated—be it a financial allocation, a system, or an asset—and identifying the stakeholders involved, such as investors, recipients, government agencies, and communities directly impacted by the intervention.
2. Mapped outcomes. Analyzed the changes or effects of the program on stakeholders, including both financial and non-financial impacts, and determined which were material to the analysis.
3. Measured and valued outcomes. Quantified both financial and nonfinancial benefits using conservative financial proxies backed by expert judgment and reputable literature.
4. Established impact. Calculated the present value of the outcomes while adjusting for deadweight (what would have happened anyway), displacement (benefits offsetting other outcomes), attribution (contributions from other actors), and drop-off (decline in benefits over time). The formula used

$$PV = FV / (1 + r)n$$

where:
PV = present value
FV = future value
r = rate of return
n = number of periods

The final impact value was determined after applying the SROI adjustment filters, which include:

1. Deadweight. Deadweight refers to the percentage likelihood that an outcome would have occurred even without the intervention of the program.
2. Displacement. Displacement represents the proportion of outcomes that may have already occurred prior to the program's intervention.
3. Attribution. Attribution indicates the extent to which other parties—apart from the implementing institution (in this case, the Ministry of Research, Technology, and Higher Education)—contributed to the realization of the outcomes.
4. Drop off. Drop-off refers to the annual rate at which the impact of the outcome diminishes over time.
5. Calculate the SROI ratio. Compare the present value of benefits to the total investment using the following formula:

$$SROI = PV \text{ of impact} / \text{Investment Value}$$

where:
SROI refers to the Social Return on Investment ratio
PV of Impact denotes the present value of the outcomes generated
Investment Value refers to the present value of the total social investment made

6. Reporting. Reporting constitutes the final stage of the SROI methodology, wherein the SROI ratio is interpreted into a narrative that elucidates the depth of the investment's impact. This analysis could then be utilized for decision-making purposes, whether for program evaluation or planning subsequent initiatives.

RESULTS AND DISCUSSION

Program Overview

The *Hipermadani* concept was developed as a result of the downstreaming project, which combined research-based feed innovation (Fedtugrow®) with institutional development through the School for Smallholder Livestock Farming (*Sekolah Peternakan Rakyat*, SPR). This concept was piloted from April to September 2023 in three subdistricts of Central Lampung Regency: Way Pangubuan, Terbanggi Besar, and Terusan Nunyai. Farmers enrolled in the

program received scientific knowledge, technical training, and motivational support to develop entrepreneurial skills and foster a livestock agribusiness mindset. The learning modules included Good Farming Practices (GFP), which covered animal health management, reproductive disease prevention and treatment, the use of livestock-related technologies, equipment utilization, feed management, and post-harvest handling. The program's key activities were structured as follows: (1) workshop and socialization sessions; (2) five participatory training modules (Table 1); (3) formal declaration of SPR; and (4) formation of SPR farmer groups.

As a result, three new SPR groups were formally formed in Central Lampung Regency: SPR Jaya Abadi, SPR Berkah Ternak Bersama, and SPR Maju Jaya Bersama. The institutionalization of these groups is expected to improve the Hipermadani model's operationalization, ultimately improving farmer performance in terms of financial, human capital, production, and marketing.

SROI-Based Impact Analysis

The social and economic impacts of the downstreaming program were evaluated using the six-step Social Return on Investment (SROI) methodology.

1. Defining Scope and Identifying Key Stakeholders. This review sought to assess the economic, social, and environmental consequences of a university-led downstreaming program. The generated data was used to measure program performance, cost-efficiency, and scalability. Furthermore, the findings helped to inform strategic decisions about whether to continue or expand similar initiatives.

Table 1 Summary of participatory training modules in the Hipermadani program

Session	Topics
Participative learning 1	Philosophy of SPR 2023 Kedaireka Innovation Program Collaboration, solidarity, motivation, and *esprit de corps*
Participative learning 2	SPR IPB organizational model Livestock health management
Participative learning 3	Technology adoption in livestock farming Infrastructure and equipment in livestock farming Reproductive disease control
Participative learning 4	Animal feeding strategies and post-harvest handling Institutional and socio-economic strengthening
Participative learning 5	Legal and administrative frameworks for business partnerships. Collective enterprise development (SPR-SASPRI), and the importance of certification

Table 2 Stakeholder roles and expected impacts in the Hipermadani program

Stakeholder	Role	Expected impact
IPB University	Acts as the primary innovator and initiator; provides technical mentoring and program design	Increased research utilization and community service outputs, greater engagement of faculty in real-world innovation application, and enhanced institutional visibility and downstreaming metrics
Local farmers (SPR members)	Serve as the main implementers; adopt Good Farming Practices, Fedtugrow® feed, and collective business models	Improved technical knowledge and farming practices, increased productivity and livestock weight gain, greater income stability and reduced input costs
Faculty mentors (IPB lecturers)	Deliver training sessions and monitor technical implementation in the field	Expanded academic contribution to rural development, enhanced professional experience in applied extension services
Students (IPB)	Conduct field data collection and assist implementation as part of academic practicum or thesis research	Strengthened communication, facilitation, and research skills, reduced research cost through access to live field data
IPB alumni practitioners	Provide implementation support; mentor farmers and bridge knowledge to practice	Access to paid facilitation opportunities, improved mentoring and communication experience, expanded professional networks
Local government (Central Lampung Regency)	Facilitates local coordination; mobilizes farmer participation and local resources	Strengthened public service performance in agricultural development, institutional innovation in multi-stakeholder governance

Stakeholders were individuals or institutions who were directly or indirectly involved in the program or affected by its results. Their roles and expected benefits are described in Table 2.

2. Mapping Outcomes. Following stakeholder identification, the expected and actual outcomes were plotted. Both direct and indirect impacts—financial and non-financial—were tracked throughout the program's implementation to create a thorough outcome map for the SROI calculation.
3. Measuring and Valuing Outcomes. Stakeholder interviews provided input data, which was then evaluated using supporting material such as program budgets and internal reports (Table 3). The entire input value included expenses for training sessions, SPR institutional creation, and raw material procurement (Fedtugrow®/Katulac®). Each social consequence was monetized with financial proxies obtained from market benchmarks or trustworthy sources. For example, farmer skill development was assessed using comparable training expenses from authorized institutions such as https://transform-mpi.com/pelatihan-motivasi-karyawan/. Similarly, the effects on research efficiency and faculty community participation were examined using operational cost reductions and institutional benefit proxies (Table 4).
4. Establishing Impact. During this phase, each outcome was monetized using appropriate financial proxies that reflect the market value or comparable cost of achieving similar results through other means. The assumptions underlying these estimates were based on current market prices or benchmarking from reliable training providers and industry norms. To guarantee that only the fraction of the impact directly due to the program is examined, a netting method was used using the four SROI adjustment filters (Table 4).

   The deadweight was set at 0% on the grounds that the initiative was entirely driven by IPB University and would not have occurred without the program's involvement. Similarly, displacement was set to 0% because the program did not replace or destroy any existing positive activity but rather improved the current ecology. The attribution rate was found to be 46%, reflecting the proportion of impact due to external contributions, largely from PT GGL through its CSR engagement and the Central Lampung Regency Government.
5. Calculating the SROI Ratio. This phase sought to measure the program's overall effectiveness by

Table 3 Total program investment by input category

Input category	Amount (IDR)
Workshops and socialization	30,984,868
Training: SPR philosophy, collaboration, motivation	22.240.061
Training: Livestock health management	16,087,174
Training: Livestock technology and agribusiness	13,022,712
Training: Livestock business management	23,360,032
Training: Collective enterprise development	21,767,908
SPR declaration event	41,874,523
SPR group formation	31,500,000
Provision of Fedtugrow® (Katulac®) raw materials	301,000,000
Total investment	501,837,278

Table 4 Monetized outcomes and adjusted social impact

Outcome/Social benefit	Amount (IDR)
Improved stakeholder coordination efficiency	30,984,868
Increased motivation and collaboration skills among 40 farmers (IDR 7,500,000 × 40)	300,000,000
Enhanced livestock health management skills (IDR 3,000,000 × 40)	120,000,000
Improved agribusiness management competencies (IDR 3,000,000 × 40)	120,000,000
Increased farmer income from higher livestock weight gain (142.2 kg × 60 cattle × IDR 50,000/kg)	426,600,000
Feed cost savings	301,000,000
Cost efficiency in SPR declaration and group formation	73.374.523
Increased income for 4 facilitators (IDR 3,500,000 × 4 × 3 months)	42,000,000
Increased community engagement by 21 lecturers (IDR 1,500,000 × 21)	31,500,000
Sinta 2 Academic publication output (3 publications × IDR 800,000)	2.400.000
Industry practitioners teaching on campus (4 × IDR 900,000)	3.600.000
Cost efficiency for student research (16 students: lodging and food)	37,500,000
Total Outcome	1.488.959.391
Deadweight (percentage of outcome likely to occur without program intervention)	0
Displacement (percentage of positive activities replaced or lost due to the program)	0
Attribution (percentage of outcome attributable to other contributors besides the institution)	0.46
Drop off	0
Fixed Impact	1.488.959.391

Table 5 Summary of investment and social benefit in the SROI calculation

Component	Amount (IDR)
Total investment	501.837.278
Total social benefit	1.488.959.391
SROI ratio	2.97

comparing the total social benefit generated to the entire investment made. Because the investment and its subsequent results occurred during the same fiscal year, no discount was used in the valuation procedure. The analysis revealed that the overall investment of IDR 501,837,278 resulted in a confirmed social benefit of IDR 1,488,959,391 (Table 5). The SROI ratio of 2.97 means that for every IDR 1 invested, the program returned IDR 2.97 in social value. This ratio suggests that the program was successful in delivering a high-impact, cost-effective intervention with benefits that surpassed the investment. The findings support the Fedtugrow® downstreaming program and SPR integration as a scalable strategy for sustainable rural development.

These findings are consistent with other social initiatives. For example, Posdaya Baramulyo's development program had an SROI ratio of 3.70, which means that every IDR 1 invested generated IDR 3.70 in social benefits (Santoso *et al*. 2018). Similarly, PT PLN NP UP Pacitan's fly ash and bottom ash use program yielded an SROI of 2.40, suggesting that each IDR 1 of social investment resulted in IDR 2.40 in measurable social value (Viana *et al*. 2024).

6. Reporting, Utilization, and Embedding of Results. The final stage of the Social Return on Investment (SROI) paradigm was to communicate the results and translate them into strategic value for all stakeholders. The reporting process is more than just a formality; it is essential for ensuring that the findings are used to improve program design, inform future policy, and support institutional decision-making.

CONCLUSION

Fedtugrow®'s downstreaming program, which was integrated into the SPR institutional framework in Central Lampung Regency, cost IDR 501,837,278 in total. This figure included all implementation-related expenses. After accounting for deadweight, displacement, attribution, and drop-off factors, the calculated overall impact value was IDR 1,488,959,391. The resulting SROI score of 2.97 clearly illustrates the program's success, with social benefits that well outweigh the initial cost. This confirms the program's ability to generate meaningful and measurable social value.

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