

# Human Resource Capacity Development of Soybean Farmers: An Agribusiness Competitiveness Strategy in Prambon District, Sidoarjo Regency

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## ABSTRACT

**Objective:** The soybean production gap in Sidoarjo Regency reaches 18,638 tons (demand of 24,231 tons vs. local production of 5,593 quintals in 2025), indicating structural problems in farmer human resource capacity development. This study aims to analyze the human resource capacity of soybean farmers and formulate capacity development strategies based on Human Capital, Capacity Building, Competency Development, and Community Empowerment theories. **Method:** The research employs a descriptive qualitative approach with a case study design, involving 50 purposively selected soybean farmers in Prambon District. Data were collected through in-depth interviews, structured questionnaires, and field observations, then analyzed using SWOT and thematic analysis. **Results:** Results reveal HR capacity deficits across four competency dimensions: technical cultivation knowledge (65% gap), agricultural technology skills (72% gap), farm managerial capacity (68% gap), and entrepreneurship orientation (70% gap). **Novelty:** A three-pillar HR capacity development strategy is formulated: (1) human capital enhancement through technical training and extension services, (2) capacity building through farmer group empowerment and institutional partnerships, and (3) competency development through managerial mentoring and entrepreneurship training.

## INTRODUCTION

### 1.1. Background

Soybean (*Glycine max* L.) is a national strategic commodity that plays an important role in food security and the economy of Indonesian society. As a major source of plant-based protein, soybeans serve as raw materials for food industries such as tempeh, tofu, soy sauce, and soy milk, which are consumed by the majority of the Indonesian population [1].

However, Indonesia still faces a significant production gap between demand and domestic production capacity. In Sidoarjo Regency, the demand for soybeans reaches 24,231 tons, while local production is only 5,593 Kw in 2025, resulting in a deficit that reflects deep structural problems in the soybean agribusiness system [2]. In Prambon District, soybean production fluctuates sharply from 1,110 Kw (2020) to 2,213 Kw (2025), indicating an unstable production system that requires comprehensive intervention based on human resource management.

From the perspective of Management Science, the issue of soybean production is not merely a technical agricultural problem, but rather a manifestation of the deficit in the human resource (HR) capacity of farmers. Becker in the Human Capital Theory

emphasizes that individual productivity is fundamentally determined by investments in knowledge, skills, and abilities [3]. When soybean farmers experience gaps in technical, managerial, and entrepreneurial competencies, their productivity and agribusiness competitiveness will be systematically hindered.

### **1.2. Problem Formulation**

Based on the background above, the formulation of the research problem is:

1. How is the profile of the human resource capacity of soybean farmers in Prambon District viewed from the dimensions of human capital and competency development?
2. What internal and external factors influence the development of human resource capacity among soybean farmers in Prambon District?
3. How can the strategy for developing the capacity of soybean farmers' human resources be effective based on the theories of Human Capital, Capacity Building, Competency Development, and Community Empowerment?

### **1.3. Research Objectives**

This research aims to:

1. Analyze the capacity profile of soybean farmers' human resources in Prambon District based on the dimensions of human capital and competence;
2. Identify internal (strengths and weaknesses) and external (opportunities and threats) factors that influence the development of farmers' human resource capacity;
3. Formulate an integrated capacity development strategy for soybean farmers' human resources based on management theory.

### **1.4 Human Capital Theory**

The Human Capital Theory developed by Schultz and Becker views humans not merely as factors of production, but as assets that can be developed thru investments in education, training, and experience [4], [3]. In the context of agriculture, farmers' human capital includes technical knowledge of cultivation, farm management skills, and the ability to adapt to technological changes [5]. Investment in farmers' human capital has proven to yield significant returns thru increased productivity, efficient use of inputs, and the ability to adopt technological innovations [6]. In this study, the human capital of soybean farmers is operationalized thru four dimensions: (1) knowledge capital, (2) skill capital, (3) social capital, and (4) psychological capital.

### **1.5 Theory of Capacity Building**

Capacity Building is defined by UNDP as a process in which individuals, organizations, and communities develop, strengthen, create, adapt, and maintain capacity over time. UNDP identifies three levels of capacity building: (1) individual level, (2) organizational/institutional level, and (3) system/environment level.

In the context of agriculture, capacity building is a comprehensive approach that not only focuses on enhancing farmers' technical knowledge but also includes strengthening the institutional capacity of farmer groups, developing partnership networks, and creating a conducive policy environment [7]. The success of capacity

building is determined by the relevance of the program to the needs of farmers, the sustainability of the intervention, and the active participation of the target community.

### **1.6 Competency Development Theory**

Spencer & Spencer define competence as the basic characteristics of an individual that relate to effective performance or superior performance in a job or situation [8]. The Spencer & Spencer competency model includes five types of characteristics: (1) motives, (2) traits, (3) self-concept, (4) knowledge, and (5) skills.

In the context of farmer competency development, four critical dimensions of competency have been identified: (1) technical cultivation competency, (2) managerial farm business competency, (3) entrepreneurial competency, and (4) social institutional competency. The integrated development of these four dimensions of competency is key to enhancing the competitiveness of soybean farmers' agribusiness.

### **1.7 Theory of Community Empowerment**

Rappaport defines empowerment as a process in which individuals and communities gain control over their lives [9]. Zimmerman developed the concept of psychological empowerment, which includes three components [10]: (1) intrapersonal component (self-confidence, self-efficacy), (2) interactional component (knowledge and skills), and (3) behavioral component (active participation).

In the context of farmer empowerment, Prasetyono emphasizes the importance of a social and institutional capital-based approach [11]. Effective empowerment of farmer communities requires: (a) recognition and strengthening of existing community assets, (b) facilitation of collective learning processes, (c) strengthening of social and institutional networks, and (d) creation of an environment that supports local initiatives.

### **1.8 Research Conceptual Framework**

Based on the integration of the four theories above, this research develops a conceptual framework that connects input (the condition of farmers' human resource capacity), process (capacity development strategies), and output (increased agribusiness competitiveness and community empowerment). This framework illustrates that the capacity development of soybean farmers' human resources must be carried out in an integrated manner at three levels: individual farmers, farmer groups, and the agribusiness system.

## **RESEARCH METHOD**

### **2.1 Research Design**

This study uses a descriptive qualitative approach with a case study design. This approach was chosen because it can produce an in-depth understanding of the phenomenon of human resource capacity development among soybean farmers in a specific socio-economic context [12].

### **2.2 Research Location and Time**

The research was conducted in Prambon District, Sidoarjo Regency, East Java, Indonesia. The selection of the location is based on: (1) significant soybean land potential

(20.5 Ha), (2) the presence of organized farmer groups, and (3) representation of soybean development issues in Sidoarjo Regency.

## 2.3 Population and Sample

The research population consists of all active soybean farmers in Prambon District. The research sample comprises 50 soybean farmers selected using purposive sampling techniques with the criteria: (1) actively cultivating soybeans for at least the last 2 years, (2) being part of a farmer group, and (3) willing to participate in the research.

## 2.4 Research Variables

The research variables are operationalized into three main groups as presented in Table 1.

**Table 1.** Operationalization of Research Variables.

| Variable                         | Dimension                  | Indicator                                         |
|----------------------------------|----------------------------|---------------------------------------------------|
| <b>HR Capacity<br/>(V1)</b>      | Human Capital              | Education, experience, information access         |
|                                  | Technical Competence       | Cultivation knowledge, fertilizers, varieties     |
|                                  | Managerial Competence      | Planning, finance, risk management                |
|                                  | Entrepreneurial Competence | Market orientation, innovation, access to capital |
| <b>Internal Factors<br/>(V2)</b> | Strengths                  | Social capital, land, farmer groups               |
|                                  | Weaknesses                 | Competency gap, capital, infrastructure           |
| <b>External Factors<br/>(V3)</b> | Opportunities              | Market demand, technology, programs               |
|                                  | Threats                    | Soybean imports, climate, price fluctuations      |

## 2.5 Data Collection Techniques

Data were collected thru three methods: (1) in-depth interviews with farmers, agricultural extension workers, and policymakers; (2) structured questionnaires measuring the level of human resource capacity of farmers in each dimension of competence; and (3) field observations to verify the actual conditions of land, infrastructure, and cultivation practices.

## 2.6 Data Analysis Techniques

Data is analyzed using: (1) SWAT analysis to identify internal and external factors in the development of human resource capacity, (2) thematic analysis to process qualitative data from in-depth interviews, and (3) gap analysis to measure the gap between actual human resource capacity and the capacity needed.

# RESULTS AND DISCUSSION

## Results

## 3.1 Profile of Soybean Farmers' Human Resource Capacity

The measurement results of the soybean farmers' human resource capacity in Prambon District show a significant deficit in all four dimensions of competence (Table 2).

**Table 2.** Profile of Soybean Farmers' Human Resource Capacity.

| Capacity Dimension              | Actual (%) | Ideal (%) | Gap (%) |
|---------------------------------|------------|-----------|---------|
| Technical Knowledge             | 35         | 100       | 65      |
| Cultivation & Technology Skills | 28         | 100       | 72      |
| Managerial Capacity             | 32         | 100       | 68      |
| Entrepreneurial Orientation     | 30         | 100       | 70      |
| Group Social Capital            | 75         | 100       | 25      |
| Policy Support                  | 100        | 100       | 0       |
| Technology Adoption Interest    | 100        | 100       | 0       |

Data in Table 2 shows that agricultural technology skills have the largest gap (72%), followed by entrepreneurial orientation (70%), managerial capacity (68%), and technical cultivation knowledge (65%). Conversely, the social capital of farmer groups (25% gap), government policy support (100% positive), and interest in technology adoption (100%) are the main strengths that can serve as the foundation for capacity development strategies.

### 3.2 Internal and External Factor Analysis

#### 3.2.1 Internal Factors (Strengths)

- Organized farmer groups with clear institutional structures
- Availability of adequate soybean land (20.5 Ha)
- Strong government policy support (100% of respondents stated positive)
- High social capital and community cohesion among farmers
- High interest and motivation for adopting new technology (100% of respondents)

#### 3.2.2 Internal Factors (Weaknesses)

- Human resource capacity deficit in all four competency dimensions (gap 65–72%)
- Extremely inadequate agricultural infrastructure (98% of respondents)
- Absence of local soybean processing industry
- High dependence on capital from intermediary traders
- Limited access to formal financial institutions

#### 3.2.3 External Factors (Opportunities)

- High and continuously increasing market demand for soybeans
- Availability of continuously developing soybean cultivation technology
- Government programs for national soybean self-sufficiency
- Partnership opportunities with processing industries and financial institutions

#### 3.2.4 External Factors (Threats)

- Soybean imports suppressing prices and the competitiveness of local farmers
- Climate change increasing the risk of crop failure
- Fluctuations in soybean prices in domestic and international markets
- Competition with other more profitable agricultural commodities

### 3.3 SWAT Strategy Matrix

Based on the analysis of internal and external factors, four strategies are formulated in the SWAT matrix as presented in Table 3.

**Table 3.** SWAT Strategy Matrix for Human Resource Capacity Development.

|          | Strengths (S)                                                                                                                                   | Weaknesses (W)                                                                                                       |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>O</b> | <b>Opportunities for SO Strategy:</b><br>Leverage policy support and farmer groups to accelerate technology adoption and market partnerships.   | <b>WO Strategy:</b><br>Use government programs to address the competency deficit thru massive training.              |
| <b>T</b> | <b>Threat of ST Strategy:</b><br>Strengthen competitiveness thru productivity improvement based on farmer groups and price protection policies. | <b>WT Strategy:</b><br>Diversification of farming and strengthening access to capital to reduce price vulnerability. |

## Discussion

### 4.1 Deficit of Human Resource Capacity in the Perspective of Human Capital Theory

The research findings showing the deficit of human resource capacity among soybean farmers in the four dimensions of competence align with Becker's argument that low investment in human capital will result in suboptimal productivity [3]. The gap in agricultural technology skills reaching 72% indicates that soybean farmers in Prambon District have not received adequate human capital investment in the form of modern agricultural technology training.

Schultz emphasized that the ability of farmers to face disequilibria and unexpected changes in agricultural conditions highly depends on the quality of human capital they possess [5]. The low managerial capacity of farmers (a gap of 68%) explains why soybean production in Prambon District experiences sharp fluctuations that cannot be effectively managed by the farmers.

However, the finding that 100% of farmers show a high interest in adopting new technology is a positive indicator of psychological capital, which is a prerequisite for the success of human capital investment [6]. This strong psychological capital should be utilized as an entry point for human resource capacity building programs.

### 4.2 Capacity Building Strategies for Improving Farmers' Competence

Referring to the UNDP multilevel capacity building framework, the capacity development strategy for soybean farmers' human resources must operate simultaneously at three levels:

**Individual Level:** Technical training in soybean cultivation, farm management training, and entrepreneurship training tailored to the specific needs of farmers. Research by Triastono et al. shows that appropriate technology dissemination methods can significantly increase the adoption of innovations [13].

**Institutional Level:** Strengthening the capacity of farmer groups as agribusiness organizational units, developing partnerships with microfinance institutions, and

building a local soybean processing industry. Saragih et al. proved that institutional capacity development significantly enhances the social entrepreneurship of farmer groups [7].

**System Level:** Advocacy for proportional soybean import restrictions, agricultural infrastructure development, and the creation of a conducive agribusiness ecosystem [14].

#### **4.3 Competency Development as a Lever for Agribusiness Competitiveness**

The Spencer & Spencer competency model provides a comprehensive framework for designing soybean farmer competency development programs [8]. Based on the findings of the gap analysis, the priorities for competency development are as follows:

**First Priority:** Technological Competence (72% gap): Training programs on the use of superior varieties, modern irrigation systems, and precision-based fertilization technology. Research by Van den Berg & Lestari shows that farmer experiments facilitated in a structured manner are effective in improving technological competence [15].

**Second Priority:** Entrepreneurial Competence (70% gap): Market analysis training, development of processed soybean products, and access to business financing. Rante proved that the development of entrepreneurial orientation among soybean farmers significantly contributes to the economic empowerment of the people [16].

**Third Priority:** Managerial Competence (68% gap): Assistance in farm management, simple financial recording, and agricultural risk management. Prasetyo et al. found that farmers' attitudes and participation in soybean agribusiness training programs are positively correlated with improvements in managerial competence [17].

#### **4.4 Model Integration of Community Empowerment in Human Resource Capacity Development**

The integration of Community Empowerment theory (Rappaport; Zimmerman) into the strategy for developing the human resource capacity of soybean farmers results in a community-based empowerment model centered on three strategic pillars [9], [10]:

**Pillar 1:** Enhancement of Human Capital: Technical training programs, sustainable agricultural extension, and farmer field schools to improve farmers' knowledge and skills. This approach is in line with the findings of Utami et al., which prove that farmers participating in the Farmer Field School have higher farm incomes [18].

**Pillar 2:** Strengthening Institutional Capacity Building: Development of farmer groups as centers for learning and business, partnerships with microfinance institutions, and the establishment of community-based soybean processing industries. Prastikawati shows that the one-stop learning innovation has proven effective in strengthening community-based food security [19].

**Pillar 3:** Development of the Agri-business Ecosystem: Advocacy for policies protecting local soybean prices, development of agricultural infrastructure, and facilitation of fair market access. Wardana et al. proved that seed production groups supported by networks and capacity building are effective in disseminating modern varieties [20].

## CONCLUSION

**Fundamental Finding :** This research shows that the human resource capacity of soybean farmers in Prambon District still experiences a significant deficit in four dimensions of competence, namely agricultural technology skills with a gap of 72%, entrepreneurial orientation 70%, managerial capacity 68%, and technical cultivation knowledge 65%, which are the main factors contributing to the low productivity and instability of soybean production. The results of the SWAT analysis show that farmers possess strengths such as strong social capital within farmer groups, positive government policy support, and high motivation to adopt technology. However, they still face weaknesses in terms of limited competence, infrastructure, and access to capital.

**Implication :** Therefore, the strategy for developing human resource capacity needs to be carried out in an integrated manner thru the enhancement of human capital via technical training and extension services, strengthening the institutional capacity building of farmer groups, and developing a conducive agribusiness ecosystem. The local government needs to allocate a special budget for a structured and sustainable soybean farmer training program, the Agriculture Office needs to intensify extension services based on the Farmer Field School with a focus on modern cultivation technology and farm management, farmer groups need to be strengthened as agribusiness units capable of collectively accessing markets, capital, and technology. **Limitation :** This study is limited to soybean farmers in Prambon District and uses a descriptive qualitative case study approach, which may restrict the generalizability of the findings to other regions. In addition, the study does not quantitatively measure the direct impact of human resource capacity development on soybean productivity and farmer income. **Future Research :** Further quantitative research needs to be conducted to measure the impact of the human resource capacity development program on the increase in productivity and income of soybean farmers.

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