



Analysis of the Partnership Between Turnip Farmers and PT VAI Company in Purba District

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Abstract: This study aims to analyze the form of partnership implementation between turnip farmers and PT VAI, examine the benefits of this form of partnership for turnip farmers, and analyze turnip farming income. This study was conducted in Purba District, Simalungun Regency. Farmers in Nagori Pematang Purba were designated as sample villages from the population that became research respondents. The sampling technique and population in this study used Purposive Sampling and Snowball techniques. The data analysis method used descriptive analysis of PT VAI's contract with partner farmers, farm income analysis, and R/C Ratio. The results of the study indicate that the form of partnership between PT VAI and turnip farmers in Purba District is a subcontract form. Where farmers and PT VAI have a contract regarding seeds, production prices and product quality. The benefits that are definitely obtained by farmers as partners include being able to help in procuring seeds. Farmers get convenience for seeds because they do not have to do their own seeding, thereby reducing the risk of failure because the seeds are ready to plant. The benefits of marketing guarantees provide a guarantee that the resulting product will be immediately sellable. One hundred percent of turnip farmer respondents answered that they received benefits in marketing convenience. This aligns with the initial rationale and hope for joining, which is that farmers won't have to search for markets to sell their products. Marketing guarantees can also motivate farmers to produce according to PT VAI's criteria so their products are accepted. Radish farming in Pematang Purba Village generates substantial income and is considered viable, as the R/C ratio analysis shows a value of 3.01, meaning that for every Rp 1.00 spent, a return of Rp 3.01 is generated.

Keywords: Farmer; Partnership; PT VAI; Turnips

Introduction

Farmers often face challenges marketing agricultural products, especially those prone to perishables (Wibowo et al., 2025). Uncertainty in market demand or production causes significant fluctuations in agricultural prices. Market and price certainty before farming operations commence will benefit farmers whose products perish quickly (Parmawati et al., 2023).

Horticulture is a promising agricultural subsector in Indonesia (Rusman et al., 2025). It plays a crucial role

in providing income for farmers, trade, and employment (Alfadillah et al., 2024). Nationally, based on the structure of agricultural GDP formation, the horticulture subsector contributes significantly to Gross Domestic Product (GDP) (Nugroho, 2021).

Since 2021, the directorate general of horticulture has launched a new paradigm for pro-farmer horticultural development, including: synergy of activities between directorates within the directorate general of horticulture; development of fruit areas based on the gedor horti concept; assistance for post-harvest

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infrastructure and horticultural processing provided in a single package; all quality seeds for area development prepared by the directorate of horticultural seeds; and development of farmer/corporate agricultural economic institutions (Bhat & Khan, 2025; Kusumiyati, 2024).

Various partnership cases in agribusiness have often been heard about the success of partnership relationships, but also frequently reported on the many failures of these partnerships, making them interesting to study. The failure of partnerships in agribusiness is caused by various weaknesses on the part of the agribusiness actors themselves, as well as weak regulations, mechanisms, and management within the partnership itself. According to Hafsa (1999); Klea & Purwanti (2023), several weaknesses that are obstacles are still found, including the following: the weak position of farmers due to lack of managerial skills, insight, and entrepreneurial skills (McElwee, 2005), farmers' limitations in the fields of capital, technology, information, and market access, lack of awareness of agribusiness companies in supporting weak farmer capital, information about commodity development has not spread among entrepreneurs, partnership business ethics based on the principle of win-win solutions among agribusiness investors in the region have not yet developed in accordance with the world of agribusiness, and farmers' commitment and awareness of quality control are still lacking, resulting in the quality of the commodities produced not being in accordance with market needs.

Vegetable farmers often face challenges marketing their products due to uncertain market demand or abundant production (Dinham, 2003). Having certainty about the market and price before planting vegetables is advantageous for farmers, as vegetables are typically perishable. The implementation of partnership patterns aims to address the challenges of limited capital and technology for smallholder farmers, improve product quality, and address marketing challenges. Considering the potential and challenges of implementing partnership patterns as an innovation in improving smallholder farmer performance, it is important to analyze: the decision-making process of farmers in accepting and rejecting partnership patterns and the factors influencing them; and the benefits of partnership patterns for farmers and their partners, including companies, cooperatives, and wholesalers.

PT. VAI (Vindia Agro Industri) operates in Purba District and specializes in canning vegetables. Farmers in the district have partnered with PT. VAI for radish farming. Therefore, research is needed to analyze the partnership between radish farmers and PT. VAI in Purba District.

Method

Data and Data Sources

The data used in this study consisted of primary and secondary data, both qualitative and quantitative (Kendall et al., 2022). Primary data were obtained through direct field observation, direct interviews, and questionnaires administered to respondents (Issa & Madukwe, 2023). Interviews were conducted with turnip farmers, Field Extension Officers (PPL), a turnip canning company, and relevant institutions such as the Purba District Agriculture Office.

Secondary data were obtained from written company information and relevant literature such as books, agricultural magazines, the internet, the Simalungun Regency Agriculture Office, the Central Statistics Agency, the USI library, and other institutions that could assist in data collection.

Data and Information Collection Methods

The data and information collected in this study consisted of primary data as the main data and secondary data as supporting data (Martauli & Sarah Gracia, 2021; Qudrotuloh et al., 2022). Respondents were selected using purposive sampling. The population of vegetable farmers partnering with PT. Vindia Agro Industri is 50 turnip farmers. Fifteen turnip farmers were selected as respondents in this study. Primary data were obtained through interviews and questionnaires with both the company and the farmers. The company selected individuals deemed most knowledgeable about the technical aspects of partnership implementation. The farmers selected were radish farmers participating in the partnership program with Agro Farm, whose harvest was in January. Secondary data was obtained from company records and reports, as well as various reports related to the partnership topic.

Data Analysis Method

The data and information obtained from the research were collected and processed for further analysis. Qualitative data processing was performed by describing the partnership implementation, while quantitative data processing was performed using Excel. Quantitative analysis was performed using farm income calculations and the R/C ratio to determine whether there were significant differences between the average incomes of partner farmers..

Result and Discussion

Respondent Characteristics

Age, education, experience, land area, number of dependents, media consumption, contact with extension workers, decision-making skills, economic access, access to credit, production, and opinions will influence farmers' abilities (Hidayat et al., 2023).

The characteristics of the farmer respondents in this study included several criteria, namely age, gender, education, number of dependents, and farming experience. Respondent farmers ranged in age from 40 to 60 years, with the largest number of farmers aged 41 to 49, representing 53.33%, at 16. This age group, with experience and energy, still has the potential to improve skills and gain knowledge in managing new technologies to advance radish farming (Hidayat et al., 2023). The age of the respondent farmers is considered to be within the productive age group (15-64 years) (Afni & Arianti, 2025), indicating that they already have a good understanding of the radish farming they are currently running. Regarding the gender of the farmers who responded to this study, the majority of respondents were male, with 30 respondents representing 100.00% of the respondents, while the female respondents were 0.00% of the respondents. The role of men in farming is essential, and some farms require men in farm management (Mulyaningsih et al., 2018).

Of the farmers in this study, those with a high school or vocational high school education were the largest, with 22 respondents, representing 60.00% of the total respondents. Educational attainment also influences farmers' ability to manage their farms. At the research site, residents with a Diploma 3 (D3) or higher preferred to seek employment as civil servants (ASN) and work outside the area rather than farming. This is because it has become a life goal instilled in most families who can afford to send family members to college to improve their family's financial well-being.

The number of family members of the farmer respondents in this study was 76.67% of the total respondents. The average number of family members supported by a farmer was 2-7.

Regarding the farming experience of the farmer respondents in this study, 9 (30.00%) had farming experience of less than 2 years. The highest number of radish farming experience was between 2 and 3 years, with 11 (36.67%). Farming experience influences a farmer's ability to manage a farm (Alhasany & Fatimah, 2022). Land is one of the most important production factors in farming activities (Giller et al., 2021). In the context of this study, the respondents' land area was measured in rante units. The following describes the

characteristics of respondents based on land area. Based on the data above, it can be seen that the average land area of the respondents in this study was 19.83 rante, or 0.79 ha.

Radish Farmer Partnership with PT VAI

The commodity produced by the partner farmers in Nagori Pematang Purba, Purba District, is frozen radish. PT VAI's factory produces downstream agricultural products. The primary source of raw materials comes from farmers surrounding the company.

PT VAI's partnership system is a contract system. The subcontracting model is a partnership between a partner company and a group of partners who produce components needed by the partner company as part of their production. The advantage of the subcontracting model is that it is characterized by a mutual agreement on volume, price, quality, and time. This is conducive to the development of technological expertise, capital, skills, and productivity, as well as guaranteed product marketing within the partner group. Products produced by partners must meet the quality standards set by the company, which are stated in the vegetable acceptance document found in the PT Sayuran Siap Saji receiving department. If the farmer's product does not meet the established quality standards, it is then sold to the local market at a lower price than PT Sayuran Siap Saji.

Radish Farming Analysis

Production Costs

Production costs are the sacrifices farmers must make to acquire production inputs that will be used in managing their farms to produce output. Production costs for this study consist of fixed and variable costs over a single growing season. The following is a breakdown of the Radish farming model.

Fixed Costs

Fixed costs are costs incurred by farmers for production inputs and are used repeatedly. The fixed cost component in Radish farming is depreciation of equipment (hoes, forks, wheelbarrows, and sprayers), which is IDR 147,750.00/season/farm or IDR 187,025.00/season/ha. Variable costs are costs incurred during a single production period. The total fixed costs incurred by farmers per season are IDR 147,750.00/season/year-old, consisting of depreciation costs for hoeing equipment (IDR 8,500.00/year-old), forking (IDR 8,000.00/year-old), spraying equipment (IDR 56,250.00/year-old), and wheelbarrows (IDR 75,000.00/year-old).

Variable Costs

The variable costs incurred in radish farming include seeds, fertilizers, pesticides, and labor. The

following describes the variable cost components incurred by farmers:

Seeds

Farmers use radish seeds provided by PT. VAI in packets. The average seed usage is 20.67 packets/year-old, or 26.50 packets/hectare. Each packet of radish seeds is equivalent to 10 grams. Therefore, the average seed usage is 206.7 grams/year-old, or 265 grams/hectare. The price of radish seeds per pack is Rp 150,000.00/pack, so the seed cost is Rp 3,100,000/UT or Rp 3,974,358.97/hectare. In the research area, radish farmers can plant radishes up to four times a year. The average radish lifespan is 65 days. Before planting, farmers in the research area first cultivate the land.

Fertilizer

Farmers use compost to improve nutrient levels after tilling the land. The average compost application is 63.17 sacks per hectare, or 79.96 sacks per hectare. This compost application results in a cost of Rp 437,666.67 per hectare, or Rp 554,008.44 per hectare. The first chemical fertilization is applied after the plants are 7 days old (Yunaning et al., 2022), and subsequent applications are applied after 20 days. The chemical fertilizers used are Cantik (71.33 kg/hectare or 90.30 kg/hectare), TSP (50 kg/hectare or 63.29 kg/hectare), and Patent Kali Granules (63.17 kg/hectare or 79.96 kg/hectare). The total cost of chemical fertilizer and compost is Rp 2,232,167.00 per hectare, or Rp 2,825,527.00 per hectare.

Pesticides

Radish farming requires pesticides to eradicate pests, diseases, and weeds (Khan et al., 2023; Pandey et al., 2022). The types of pests and weeds found in the research location were caterpillars and aphids. Control measures were carried out by spraying several types of pesticides, including Ricard, Antracol, Prevatum, and Alika, applied in the morning. The total cost incurred by farmers for pesticide purchases was IDR 2,124,000.00/farm or IDR 2,688,608.00/hectare.

Labor

Labor is divided into two categories: family labor and non-family labor (Bhandari & Bhandari, 2022). Labor is a crucial factor in farming because it supports the sustainability of the farming business (Wohlenberg et al., 2022). In this study, labor was categorized into male and female labor. The wage for male labor is IDR 100,000.00/day, while for female labor, it is IDR 100,000.00/day. This study included several farming activities, including land preparation, planting, maintenance, fertilization, pest and disease control, and harvesting. Average labor usage is shown in Table 1. Total labor costs were Rp 4,466,667.00/unit or Rp 5,654,008.00/hectare.

Table 1. Number of workers in turnip farming

| Type of activity | Number of HOK/UT | Number of HOK/ha |
|------------------|------------------|------------------|
| Land preparation | 10 | 12 |
| Planting | 7 | 9 |
| Maintenance | 7 | 9 |
| Fertilization | 5 | 7 |
| Spraying | 4 | 5 |
| Harvesting | 12 | 15 |
| Total | 45 | 57 |

Total Costs

After obtaining the total fixed and variable costs, these costs are added together to determine the average production costs for radish farming, as shown in Table 2.

Based on the table above, the total cost of radish farming per season is IDR 12,070,583.00/UT or IDR 15,279,219.00/ha. The largest cost component incurred by farmers is wages, amounting to IDR 4,466,667.00/UT or IDR 5,654,008.00/ha.

Table 2. Total Farming Costs per Season

| Types of costs | Value (Rp/UT) | Value (Rp/Ha) |
|----------------|---------------|---------------|
| Fixed costs | | |
| Depreciation | 147.750 | 187.025 |
| Equipment | | |
| Variable costs | 3.100.000 | 3.924.051 |
| Seeds | 2.232.167 | 2.825.527 |
| Fertilizer | 2.124.000 | 2.688.608 |
| Pesticides | 4.466.667 | 5.654.008 |
| Labor | | |
| Total | 12.070.583 | 15.279.219 |

Turnip Farming Revenue and Income

Turnip farming revenue is obtained by multiplying total production by the price of turnips received by farmers. Meanwhile, turnip farming income is obtained by dividing the revenue by the total costs incurred during the farming process. Total revenue is obtained by multiplying production by the price per fruit.

Conclusion

The partnership between PT VAI and turnip farmers in the Purba subdistrict is a subcontracting agreement. Farmers and PT VAI have a contract regarding seeds, production prices, and product quality. The benefits that farmers as partners receive include assistance in seed procurement. Farmers gain access to seeds because they do not have to do their own seeding, thus reducing the risk of failure because the seeds are ready to plant. The benefit of marketing guarantees provides assurance that the resulting product will be immediately sellable. One hundred percent of the turnip farmers respondents answered that they benefited from

marketing ease. This is in line with the initial reason and hope for joining, namely that farmers do not have to find a market to sell their products. Marketing guarantees can also motivate farmers to produce according to PT VAI's criteria so that their products are accepted. Turnip farming in Nagori Pematang Purba has a large income and is a viable business to develop because the results of the R/C ratio analysis are 3.01, meaning that for every Rp 1.00 spent, a return of Rp 3.01 is generated..

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Author Contributions

All authors contributed to the writing of this article. Each author made significant contributions including data collection, analysis, and drafting of the article; R. J., R. A., M., D. All authors were involved in providing new ideas, input, and complementary words to complete this article.

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Conflict of Interest

The authors have declared that there is no conflict of interest regarding the publication of this paper. This statement ensures transparency and integrity of the publication process, confirming that the findings are presented impartially and without external influence.

References

Afni, N., & Arianti, D. (2025). Tingkat Produktivitas Usahatani Padi Sawah di Wilayah Kerja Penyuluh Pertanian (WKPP) Kecamatan Trimurjo Kabupaten Lampung Tengah. *JALOW: Journal of Agribusiness and Local Wisdom*, 6(2), 1-7. Retrieved from <https://mail.online-journal.unja.ac.id/JALOW/article/view/41177>

Alfadillah, R., Putra, F., Dhea, L. A., & others. (2024). Analysis of Agropolitan Area Development in Tinggimoncong Sub-District, Gowa District, South Sulawesi. *Jurnal Penelitian Pendidikan IPA*, 10(6), 3261-3273. <https://doi.org/10.29303/jppipa.v10i6.6152>

Alhasany, P. F., & Fatimah, S. (2022). Komunikasi Risiko Usahatani Kentang di Luar Daerah Sentra Produksi (Studi Kasus Kelompok Tani Palintang Jaya Desa Cipanjalu Kecamatan Cilengkrang Kabupaten Bandung). *Agrikultura*, 33(2), 147-160. <https://doi.org/10.24198/agrikultura.v33i2.39132>

Bhandari, P. B., & Bhandari, M. P. (2022). Family Labor, Gender and Labor-saving Farm Technology Use Among Smallholder Farmers in Terms of Transformation. In *Inequality--the unbeatable challenge* (pp. 225-261). River Publishers. <https://doi.org/10.1201/978100338543-10>

Bhat, M. N., & Khan, M. A. (2025). Agricultural sustainability and foreign agricultural investment in BRICS: cointegration and causality insights. *Management of Environmental Quality: An International Journal*. <https://doi.org/10.1108/MEQ-12-2024-0552>

Dinham, B. (2003). Growing vegetables in developing countries for local urban populations and export markets: problems confronting small-scale producers. *Pest Management Science*, 59(5), 575-582. <https://doi.org/10.1002/ps.654>

Giller, K. E., Delaune, T., Silva, J. V., Descheemaeker, K., Van De Ven, G., Schut, A. G. T., Van Wijk, M., Hammond, J., Hochman, Z., Taulya, G., & others. (2021). The future of farming: Who will produce our food? *Food Security*, 13(5), 1073-1099. <https://doi.org/10.1007/s12571-021-01184-6>

Hafsa, M. J. (1999). *Kemitraan usaha: konsepsi dan strategi*. Jakarta Timur: Pustaka Sinar Harapan.

Hidayat, S., Sulaiman, A. I., & Sari, L. K. (2023). Peran Kelompok Tani Dalam Penerapan Program Padi IP 400 di Kabupaten Cilacap. *Jurnal Ekonomi Pertanian Dan Agribisnis*, 7(2), 705-720. <https://doi.org/10.21776/ub.jepa.2023.007.02.25>

Issa, F., & Madukwe, M. C. (2023). Methods of Data Collection in Agricultural Extension Research. *Madukwe MC. A Guide to Research in Agricultural Extension*, 3, 55-75. Retrieved from <https://shorturl.asia/Q2wE5>

Kendall, H., Clark, B., Li, W., Jin, S., Jones, G. D., Chen, J., Taylor, J., Li, Z., & Frewer, L. J. (2022). Precision agriculture technology adoption: A qualitative study of small-scale commercial "family farms" located in the North China Plain. *Precision Agriculture*, 23(1), 319-351. <https://doi.org/10.1007/s11119-021-09839-2>

Khan, B. A., Nadeem, M. A., Nawaz, H., Amin, M. M., Abbasi, G. H., Nadeem, M., Ali, M., Ameen, M., Javaid, M. M., Maqbool, R., & others. (2023). Pesticides: impacts on agriculture productivity, environment, and management strategies. In *Emerging contaminants and plants: Interactions, adaptations and remediation technologies* (pp. 109-971

134). Springer. https://doi.org/10.1007/978-3-031-22269-6_5

Klea, K., & Purwanti, S. (2023). Pola Kemitraan Kelompok Tani Dan Koperasi Dalam Pemasaran Tandan Buah Segar (TBS) di Kecamatan Muara Wahau Kabupaten Kutai Timur. *Ejournal Pemerintahan Integratif*, 10(2), 172–182. Retrieved from [https://ejournal.pin.or.id/site/wp-content/uploads/2023/07/pin_kavita_\(07-25-23-09-30-56\).pdf](https://ejournal.pin.or.id/site/wp-content/uploads/2023/07/pin_kavita_(07-25-23-09-30-56).pdf)

Kusumiyati, S. P. (2024). *Sistem Hortikultura: Desain Pascapanen dan Pengendalian Kualitas Berkelaanjutan*. Jakarta: Gramedia Pustaka Utama.

Martauli, E. D., & Sarah Gracia. (2021). Analisis Komoditas Unggulan Sektor Pertanian Dataran Tinggi Sumatera Utara. *Agrifor: Jurnal Ilmu Pertanian Dan Kehutanan*, 20(1), 123–138. <https://doi.org/10.31293/agrifor.v20i1.5055>

McElwee, G. (2005). Developing entrepreneurial skills of farmers. *A Literature Review of Entrepreneurship in Agriculture*. Available on the ESoF--Website: Retrieved from http://www.Esofarmers.Org/Documents/ESoFliteraturereview_000.Pdf.

Mulyaningsih, A., Hubeis, A. V. S., Sadono, D., & Susanto, D. (2018). Partisipasi petani pada usahatani padi, jagung, dan kedelai perspektif gender. *Jurnal Penyuluhan*, 14(1), 145–158. <https://doi.org/10.25015/penyuluhan.v14i1.18546>

Nugroho, A. D. (2021). Does Covid-19 have effects on the Indonesian horticultural subsector? *Bulgarian Journal of Agricultural Science*, 27(5). Retrieved from <https://www.agrojournal.org/27/05-06.pdf>

Pandey, P., Waghunde, R., & Srivastava, J. N. (2022). Important Diseases of Radish (*Raphanus sativus L.*) and Their Management. In *Diseases of Horticultural Crops: Diagnosis and Management* (pp. 397–414). Apple Academic Press. <https://doi.org/10.1201/9781003160427-14>

Parmawati, R., Yanti, I., Hakim, L., Gunawan, F. K., Rahmawati, N. O., & Muhammad, F. (2023). Sustainable Agriculture Model Development to Control Agricultural Land Conversion in Kemiren Tourism Village, Banyuwangi Regency. *Jurnal Penelitian Pendidikan IPA*, 9(SpecialIssue), 494–499. <https://doi.org/10.29303/JPPIPA.V9ISPECIALIS SUE.6700>

Qudrotulloh, H. M., Sumarsih, E., Nuryaman, H., Mutiarasari, N. R., & Hardiyanto, T. (2022). Persepsi petani muda terhadap wirausaha di sektor pertanian (kasus pada petani muda di desa tenjonagara, kecamatan cigelontang, kabupaten tasikmalaya). *AGRITEKH (Jurnal Agribisnis Dan Teknologi Pangan)*, 2(2), 124–135. <https://doi.org/10.32627/agritekh.v2i2.426>

Rusman, M. A. A., Akbar, Jumiati, Nadir, Rumallang, A., & Saleh, M. I. (2025). *Agribisnis Tanaman Perkebunan dan Hortikultura Berkelanjutan*. Sumatera Barat: CV. Azka Pustaka.

Wibowo, F. A., Isaskar, R., & others. (2025). The Effect of Implementing Good Agriculture Practices and Climate Change Adaptation Strategies on Shallot Production in an Effort to Improve Farmer Welfare. *Jurnal Penelitian Pendidikan IPA*, 11(2), 483–492. <https://doi.org/10.29303/jppipa.v11i2.7654>

Wohlenberg, J., Hoeltz, M., Schaefer, J. L., Nara, E. O. B., Benitez, G. B., & Schneider, R. C. S. (2022). Sustainability in agriculture: Analysing the environmental and social aspects of the family farmers' economy. *Journal of Sustainability Science and Management*, 17(8), 247–257. Retrieved from <https://shorturl.asia/v8eWw>

Yunaning, S., Junaidi, J., & Probojati, R. T. (2022). Pengaruh Pemberian Dosis Pupuk Kandang Kambing dan Pupuk Urea Terhadap Pertumbuhan dan Hasil Tanaman Jagung Manis (*Zea mays var. saccharata Sturt.*). *JINTAN: Jurnal Ilmiah Pertanian Nasional*, 2(1), 71–85. Retrieved from <https://shorturl.asia/3gHwk>