Utilization Of Biotechnology Of Beef Waste As An Input For Sustainable Agriculture Development In The Sweet Corn Commodity

by Diah Yuniti

International Journal of Disaster Recovery and Business Continuity
Vol.11, No. 3, (2020), pp. 2630–2640

Utilization Of Biotechnology Of Beef Waste As An Input For Sustainable Agriculture Development In The Sweet Corn Commodity

Ni Putu Sukanteri,
Agribusiness Study Program, Faculty of Agriculture, Mahasaraswati University Denpasar

I Gusti Ayu Diah Yuniti ,
Agrotechnology Study Program, Mahasaraswati Denpasar University

I Made Suryana,
Agrotechnology Study Program, Mahasaraswati Denpasar University

Yenny Verawati,
[4]*Economics Study Program, Faculty of Agriculture, Masarawati University Denpasar*

I Ketut Widnyana,
Agrotechnology Study Program, Mahasaraswati Denpasar University

Pande Komang Suparyana
Agribusiness Study Program, Faculty of Agriculture, Mahasaraswati University Denpasar

Correspondent Author's: sukanteri@unmas.ac.id
Orchid ID: 0000-00002-3855-5808

Abstract
Indonesia has the potential to develop agriculture on suboptimal land to increase the productivity of food crops, given that the land area owned by farmers tends to be less than one hectare and has cultivation technology readiness through the application of biotechnology for fermentation of cow dung. in composting as input for farming. The purpose of this study is to do research to see compost technology through the use of agricultural biotechnology in an effort to reduce agricultural input costs and to see the use of compost on sweet corn on sub-optimal land. This research was conducted at the Suka Mandiri Farmers Group, Megati Village, Selemadeg Timur District, Tabanan Regency, Bali Province from January to December 2019. The method used is business analysis to determine the feasibility of a business and evaluate existing business activities. By knowing the factors of production, it can be seen the amount of costs, the amount of benefits, and the amount of income obtained from each rupiah issued (R / C Ratio). The results showed that composting through the use of agricultural biotechnology in an effort to obtain agricultural input costs, namely by fermentation of cow dung with the help of Rumino Bacillus. The use of compost in corn farming in suboptimal land can reduce the production cost of sweet corn farming. Sustainable agricultural development with sweet corn commodity so that it can be used for food production with an income of Rp. 3.038.000, - per harvest with R / C 2.25.

Keywords: *Sustainable Agricultural Development, Cow dung compost, Cultivation facilities*

1. Introduction

Food security in Indonesia is absolutely necessary and must be in an independent condition, so that no one experiences food shortages or does not have food. Food conditions must be strong, terutama food for farmers and farming families. Food security for farming families will be able to create food security for

ISSN: 2005-4289 IJDRBC

the wider community. Food and Agriculture Organization is defined, food security exists when all people, at all times, have physical, social and economic access to sufficiently safe and nutritious food that meets dietary needs and preferences for an active and healthy life. To achieve the goal of food security, these four aspects must be fulfilled simultaneously: 1) Food availability: Quality food in sufficient quantities supplied through domestic production, imports and food aid; 2) Access to Food: by individuals to adequate resources for obtaining food and ensuring a nutritious diet; 3) Utilization: adequate diet, clean water, sanitation and health care are needed for the nutritional welfare of the population. This aspect emphasizes the importance of non-food inputs in food security; 4) Stability: at the national level, households, individuals, there have be access for adequate food of all times and should be losing of risk access due to sudden shocks such as economic or climate crisis (Committee on World Food Security, 2012; El Bilali et al., 2019; Ericksen, 2008; FAO, 2008; Timmer, 2012; United Nations System High-Level Task Force on Global Food Security, 2011).

The most basic effort needed to overcome food security is to increase agricultural productivity, especially panga plantsn. The potential to double crop yields is now attracting increasing attention and research. The need to revitalize resource-poor and sustainable yield growth is not questioned. Several conceptual frameworks have been proposed for such progress, such as 'Ecological Intensification' (Cassman, 1999), 'Eternal Revolution' (Swaminathan, 2000), and 'Sustainable Intensification' (Baulcombe et al., 2009). Meanwhile, the key question is how do we achieve this goal in the face of several constraints, including land and water scarcity, environmental degradation and climate change (Fan et al., 2012). Either through agricultural intensification or agricultural extensification by utilizing sub-optimal land as an alternative that must be done immediately.

Food safety remains a top need for improvement and worldwide concern. This is appreciated in the 2030 Agenda for Sustainable Development in the second Sustainable Development Goal. Development Objectives Bsustainability (SDGs), otherwise known as the Global Goals, are a set of goals in a universal agreement to end poverty, protect for all that makes the planet habitable, and ensure that all people have enjoy peace and prosperity, now and in the future. The second goal is zero hunger with the goal of ensuring a sustainable food production system and implementing of resilient agricultural practices that increase productivity and production, which help maintain ecosystems, that strengthen adaptive capacity to climate change, extreme weather, drought, floods and other disasters and which progressively . improve soil and soil quality (Morton et al., 2017). Food security is also a central segment of the transition of events and the ability of the human world view,

Indonesia has the potential to develop agriculture on un-optimal landto increase the productivity of food crops, considering that the area of land owned by farmers tends to be less than one hectare and has cultivation technology readiness through the application of cow dung fermentation biotechnology. in composting as input for farming. Organic agriculture is a sustainable agricultural system that respects and relies on natural ecological systems. The principle excludes the use of synthetic pesticides and fertilizers. Rather, it is based on management practices that maintain soil quality and health. Composting organic residues and using compost in agriculture returns plant nutrients and organic matter to the soil which would otherwise be lost (Erhart & Hartl, 2010). In organic systems, compost can also be a major source of nutrients, especially phosphorus and potassium. When integrated into conventional systems, this can be an important additional resource. In conventional systems, compost helps meet the goal of achieving a more sustainable agricultural system because it reduces the need for inputs outside of agriculture (Mir Seyedbagheri, 2010). The application of compost on agricultural land is one of the efforts to reduce the use of chemical inputs in farm production, and to restore the h elementorganic figs on land for the development of food crops. It is based on production methods that are environmentally friendly, provide adequate income for farmers and are profitable for the social situation. Organic and integrated farming is a system close to this pattern. The environmental benefits of sustainable agriculture are minimizing negative impacts on the environment thanks to ecological requirements and the support of natural elements and the rural environment (Kociszewski, 2018).

Corn is one of themThis is a food commodity that can be developed on suboptimal lands experiencing water crisis. With the hope that farmers will be able to produce food outside the rainy season by using local input in the form of compost that can be applied to land and can reduce production costs.

ISSN: 2005-4289 IJDRBC

Organic material / fertilizer is a biological buffer that functions to improve physical, chemical and biological conditions, so that the soil can provide a balanced amount of nutrients. The most practical improvement in soil fertility is the addition of fertilizer to the soil. However, it is necessary to pay attention to the balance of soil fertility so that fertilization can be given effectively and efficiently. The addition of inorganic fertilizers which only provide ready-to-eat mineral ions will damage the physical fertility of the soil, where the soil becomes hard and dense. Therefore, the application of organic fertilizers will greatly improve soil conditions (I Made Dedik Setyadi et al., 2017). Given that the available maize varieties are able to overcome food substitution and can display their superiority to the fullest. One of the varieties of maize is sweet corn (Zea mays var. Saccharata) (Paeru & Dewi, 2017). Sweet corn is grown for fresh market or for processing (for example, canning). Sweet corn kernels contain a higher concentration of sugar than other corn. Some of the more sugary sweet corn varieties are also called se (sugary Enhanced) and supersweet types depending on the type of genes they contain. Sweet corn consumption has increased rapidly around the world. The consumption of fresh sweet corn is more profitable than other corn derivatives because of its soft seeds, thin shells, high sugar concentration and savory taste. The dough made from dried sweet corn kernels is used for baby food, chips, dough products, pasta and cakes. Sweet corn can be an excellent source of several minerals (Subedi & Ma, 2011).

Through the development of conventional biotechnology in the form of compost fermentation, the implementation of land use needs to pay attention to the variety of local wisdom in such a way that various resources can be used optimally. To increase food crop production, food availability, especially domestic production, is not as good as in 2009 where rice production increased insignificantly, and sugar and soybean production decreased. The crucial issue is how to increase the productivity of the agricultural and rural sectors to increase people's income. The key factor here is increasing investment in the agricultural and rural sectors related to access to economic resources such as land, infrastructure, biotechnology, rural agro-industry, diversification of food consumption, and support of strong political commitment (Nainggolan, 2011). Farming experience that is carried out is a motivation for farmers to switch to using compost in their farming to get increased productivity. From this experience, they are also able to properly assess the integration of agriculture and livestock. The integration of agriculture and livestock provides opportunities for the absence of agricultural waste. Plant waste can be used as animal feed, while livestock waste can be used as fertilizer (Suparyana et al., 2020).

Corn is one of the foods that can be cultivated on sub-optimal land which is produced through organic input, one of which is compost produced from fermentation of cow dung as a vegetable.is one use of biotechnology in the field of input management in an effort to reduce production costs. So it is necessary to do research to see compost technology through the use of agricultural biotechnology in an effort to reduce agricultural input costs and see the use of compost in sweet corn on sub-optimal land. So the title of this study is the Utilization of Cow Manure Fermentation Biotechnology as Input of Sweet Corn Farming in Sub-Optimal Land.

2. Method

2.1. Location and Length of Study

Research This was carried out in Megati Village, Selemadeg Timur Subdistrict, Tabanan Regency, Bali Province from January to December 2019. Megati Village was chosen as the research location because Megati Village is a village where there is a Suka Mandiri farmer group that has wetland and dry land collaborated with cattle farms in the form of colonies in an integrated manner between plants and livestock.

2.2. Participant Selection Method

The research population can be interpreted as total subjects or objects with certain criteria set by researchers to obtain research findings (V Wiratna Sujarweni, 2015). The population in this study were 21 farmers who are members of the Suka Mandiri Farmer Group. The number of samples taken by census where the entire population was sampled in this study were 21 farmers

2.3. Method of Analysis

ISSN: 2005-4289 IJDRBC

The author uses business analysis methods to determine the feasibility of a business and evaluate existing business activities. Which aims to determine the amount of use of production factors. By knowing the factors of production, it can be seen the amount of costs, the amount of benefits, and the amount of income obtained from each rupiah spent (R / C Ratio)

2.3.1. Cost

Total costs represent all costs incurred by the respondent for managing corn cultivation which are calculated in rupiah units. Variable costs are all costs incurred by the respondent farmer for the purchase of seeds, fertilizers and pesticides. Meanwhile, fixed costs are costs incurred by responsive farmers for labor costs, tax payments, equipment purchases. The total cost can be formulated as follows:

$TC = TV + FC$

2.3.2. Benefits

The benefits in this farming are The amount of profit received by respondent farmers from corn farming is the difference between the production value and the total production cost which is calculated in rupiah units. Where PrT is the total production multiplied by the price, while B (production cost) is the total input times the price. The benefits can be formulated as follows (Soekartawi, 2011):

$Kt = PrT - B$

2.3.3. R / C Ratio Ratio

R / C is the ratio between total income and total cost, where R / C shows the amount of income earned from each rupiah spent (Friska ED Panjaitan et al., 2014). With the following conditions: if the R / C ratio <1, it means that the farm has not made a profit; if R / C ratio = 1, it means that the farming is not profitable; and if the R / C ratio> 1, it means that the farming is profitable

3. Results and Analysis

3.1 Making compost through the use of biotechnology agriculture in an effort to reduce agricultural input costs

Current environmental management must be done in an environmentally friendly and sustainable manner. Utilization of natural soil and plant fertility materials from used organic materialstrash is now increasingly valued. Compost is an easy way to replace some of the needs for chemical fertilizers which are increasingly expensive and pollute the environment (Firmansyah, 2010).

Composting cow dung is one way to improve and fertilize land and crops horthiculture, especially maize, and prevent the development of pests on agricultural land in less than optimal rice fields. Fermentation can speed up and improve the quality of compost. Nutrient compost levels increase when composting is done.

Pecompost through the use of biotechnology in an effort to produce organic fertilizers. Cow manure is relatively large and is owned by almost all breeders. However, the manufacture of organic fertilizers is still carried out through natural fermentation, which is allowed to be stacked to ferment naturally. Biotechnology currently helps farmers to obtain better quality compost from fermentation using the Rumino Bacillus inoculum which functions as a decomposition and is a biopesticide that protects plants from pathogenic bacteria.

Making compost through the use of conventional biotechnology with materials from cow dung: Manure

1. cows are dried with a moisture content of 40% and evenly distributed, about 1 meter wide and 20 cm thick
2. Then spray evenly with the solution that has been mixed with Rumino Bacillus with a concentration of 5-15 CC / liter
3. Set it back on on with cow dung with the same thickness and width or adjust to the layer underneath.
4. Spray again with the same solution with the same concentration as above.
5. Perform up to 4 to 5 poles at least one meter
6. Shade the poles so that they are not exposed to the sun and rain and let stand for ten days

ISSN: 2005-4289 IJDRBC

7. On day tenth after settling then turn the pile from the lowest position to the highest and vice versa
8. Let it return for the next ten days, and the compost is ready on the twentieth day and ready to be applied to plants.

The composting process has ended if it can be observed if:

1. Odorless cow manure
2. Cow dung is not hot
3. Change color to black resembles soil
4. If squeezed by hand there is no water dripping
5. Tends to be textured crumb.

Benefits of organic waste management to reduce greenhouse gas emissions, menreduce environmental pollution (soil, water, air and biological odors and do not spread disease).

3.2. Utilization of Compost in Corn Farming in Sustainable Corn Agriculture

Cultivation on sub-optimal land is endeavored so that farmers are able to harvest more than once a year, this is due to the availability of water on agricultural land which only relies onthe water from the rainfall causes farmers to only harvest rice once a year

Suboptimal land is land that naturally has low productivity due to internal and external factors. To identify characteristics and potentialIn suboptimal areas in Indonesia, analysis of available land resources in a tabular and spatial database using GIS, and based on the results of field studies. Suboptimal land can be divided into acid dry land (Mulyani & Sarwani, 2013).

To overcome high production costs, especially fertilizer costs, farmers use compost from cow dung that they process themselves. So that the planted corn commodity can be cultivated by integrating crops with livestock.

Impact on sstructure and capacity of microbial tissue (phospholipid unsaturated fat profile [PLFA], bacterial development, infectious development, basal breath, β-glucosidase exercise, proteases and phosphomonoesterases), soil biochemical properties (C absolute, natural carbon breakdown [DOC], N-NH4 +, N-NO3-, PO4, all K) and yields were explored in samples collected from the test soil in the collection, 3 months after expansion of the manure. The coordinated compost system strengthens microbial development, changes the structure of the soil microbial network and expands chemical movements comparable to inorganic cultivation. Bacterial development is mainly influenced by the type of manure system provided, whereas parasite development only reacts to the size of the compost.

Sub-optimal land use will be the foundation of future hopes, can be productive againbali through technological innovation overcomes obstacles in accordance with the characteristics and typology of land. Along with the increasing population and family food needs, the need for land for agricultural development is also increasing. Due to the limited reserves of fertile agricultural land, to meet food needs, one must utilize the suboptimal land owned, by utilizing biotechnology, using livestock waste as compost.

The use of processed organic fertilizers from fermented cows meris an alternative to reduce farming costs. Especially for farmers in rural areas who are far from being touched by using modern agricultural machines and equipment.

Rice farming is cultivated organically through the use of compost and biourin from livestock manure, but the availability of water that only relies on rainwater is the biggest obstacle in agricultural production, so it is necessary to plan agricultural commodity cropping patterns on rainfed rice fields. (Ni Putu Sukanteri et al., 2019). The use of organic fertilizers as an advantage for farmers is to reduce agricultural costs, increase soil nutrients and create sustainable agriculture, because it can be accepted and implemented by farmers easily, economically benefits farmers and ecologically creates safety for the environment because it does not contain chemical elements and returns soil nutrients. .

3.3. Sustainable Sweet Corn Farming with Organic Input

Sweet corn was chosen because it is easier to cultivate, does not require a lot of water and the harvest time is faster than other maize. Selection of sweet corn commodities for rural farmers is one of the new commodities for farmers, especially in Megati Village, East Selemadeg District, Tabanan Regency.

ISSN: 2005-4289 IJDRBC

Sweet corn farming is grown as a food substitution which is expected to increase farmers' income in rural areas. The tendency of rural farmers to keep using family laborwith the aim of reducing agricultural costs. In addition to labor, farmers take advantage of fertilizer fermentation which is processed using simple biotechnology that produces compost. So that farmers do not buy more fertilizers from outside, from the creation of this fertilizer, farmers in rural Megati Village are able to get higher income.

Natural C, complete N, and accessible P increased by 60%, 68%, and 225%, respectively, over controls with the utilization of 144 Mg ha-1 manure (dry weight) during the study. 3 years, but low fertilization rate (31 Mg ha-1) did not affect C or N. soil (Evanylo et al., 2008)

Figure 1 Media for planting sweet corn with organic fertilizers

In the planting of sweet corn in Megati Village, Selemadeg Timur District, Tabanan Regency, there is an increase in nutrients up to 17 times compared to without organic fertilizer. The results showed that the C element of soil was 1.82%, N was 0.22% and P available in the soil was only 47.01 pph. After conducting laboratory tests on soil periodically given organic fertilizers within one year, it shows that there is a change in the elements C, N, and P in the soil to C by 17.19%, element N by 1.15% and available P 587.58 pph . The results of the use of organic fertilizers have increased changes in the soil used as a growing medium for sweet corn farming in Megati Village, Bali.

ISSN: 2005-4289 IJDRBC

Figure 2. Conventional planting of sweet corn seeds

Sweet corn planting is done manually only on the canopy of the land, as an alternative to reduce sweet corn farming costs. Use labor in the family.

Figure 3. Sweet corn plants grown in sub-optimal land using organic fertilizer as media.

ISSN: 2005-4289 IJDRBC

Figure 4. Growth of sweet corn
Figure 5. Sweet corn ready for harvest.

Sweet corn is harvested when the corn is young, at the age of 3 months sweet corn is harvested in the form of a cob and green skin, sweet corn can bear fruit with two cobs. Before planting sweet corn and without organic fertilizers, only one ear of corn was planted. Even the results of planting the first sweet corn in Megati Village provided success for farmers in increasing crop yields.

3.4. Productivity of Sweet Corn Sweet Corn

As a new commodity recommended by the Mitra Desa Community Service Team in Megati Village, Bali. Become an agricultural technology by introducing new commodities to farmers in the management of agricultural land in rainfed rice fields. Productivity of sweet corn produced by farmers, in Megati Village, Bali. The efficiency that is extended to the distribution yield while limiting the potential disadvantage of N in the non-developing season has significant consequences for viable agroecosystems and food security (Van Eerd, 2018).

ISSN: 2005-4289 IJDRBC

As a new product, petani obtained satisfactory results with a productivity of 3 tons / ha. These initial results were obtained by utilizing organic inputs (compost) and family labor. Sweet corn is a plant that can be used as a substitute for rice in creating food security for farmer families, so that farmers can produce more than once a year outside the rainy season.

3.5. Sweet Corn Sweet Corn Agribusiness

is one of the biotechnology products in agriculture that can be developed in almost all regions. The genetic diversity of germplasm is needed as a basic ingredient in breeding programs to produce superior varieties. Corn plants are not native to Indonesia, which can form a large genetic diversity so that they are able to adapt on different environments. Therefore, the maize plant has wide adaptations, growing in tropical and subtropical areas. Cross-pollinating plants that provide freedom of gene recombination and reconstruction between genotypes, will then produce new recombinants that can adapt to various environments. Some of these new recombinants become more adaptive in new environments through a long-term acclimation process (Budiarti, 2007).

Superior varieties of sweet corn are cultivated because they have a shorter harvest life so that farmers are able to produce in less optimal land conditions, the use of new varieties by farmers.the desired farmers include high yield potential, better adaptability to suboptimal environments. conditions, resistant to major pests and diseases, shorter life span. Sweet corn is harvested at the age of the plant 3 months after harvest, sweet corn is harvested on the young fruit, so it is good for reprocessing.

The average total income per hectare of sweet corn farming is Rp. 19,020,500, - with a total cost of Rp. 10,566,696, - and profit or net profit of Rp. 8,453,804, - and R / C 1.8. The average total income of rice-corn rotation per hectare farming is Rp. 34,608,500, - with a total cost of Rp. 17,186,696, - resulting in a profit or net profit of Rp. 17,421,904, - with R / C 2.01 (Nuryanti & Kasim, 2017). One hectare of planting sweet corn in Megati Village provides an income of Rp. 5,000,000, - with a total cost of Rp. 1,962,000, -. So that the income is Rp. 3.038.000, - per harvest with R / C 2.25. Cultivation of sweet corn in sub-optimal areas experiencing water constraints is suitable for cultivation. And provide an income of Rp. 3,038,000, - per hectare.

When compared with the results of Nuryanti's research (Nuryanti & Kasim, 2017) it is stated that R / C is 2.01. Then the R / C Ratio produced by farmers in Megati Village, but in terms of income earned by farmers in Megati is still relatively low. This is because the land in Megati Village is still in the process of recovering from the use of inorganic inputs to the agricultural system with organic inputs that have been carried out for one year since 2019.

4. Conclusion

The discussion of this research can be as follows:

1. Composting through utilization of agricultural biotechnology in an effort to reduce agricultural input costs, namely by fermentation of cow dung with the help of Rumino Bacillus.
2. The use of compost in corn farming on sub-optimal land can reduce the production costs of sweet corn farming.
3. Sustainable agricultural development with sweet corn commodity so that it can be used for produce food, income obtained as muchRp. 3.038.000, - per harvest with R / C 2.25.

REFERENCES

1. Baulcombe, D., Crute, I., Davies, B., Dunwell, J., Gale, M., Jones, J., Pretty, J., Sutherland, W., & Toulmin, C. (2009). Reaping the benefits: science and the sustainable intensification of global agriculture (Techset Composition Limited (ed.)). Royal Society. https://royalsociety.org/-/media/Royal_Society_Content/policy/publications/2009/4294967719.pdf
2. Budiarti, SG (2007). Corn Germplasm as a Source of Genes in Breeding Programs. Germplasm Bulletin, 13 (1), 10. https://doi.org/10.21082/blpn.v13n1.2007.p1-10
3. Cassman, KG (1999). Ecological intensification of cereal production systems: Yield potential, soil

ISSN: 2005-4289 IJDRBC

quality, and precision farming. Proceedings of the National Academy of Sciences of the United States of America, 96 (11), 5952–5959. https://doi.org/10.1073/pnas.96.11.5952
4. World Food Security Committee. (2012). Related to the terms: Food Security, Nutrition Security, Food Security and Nutrition, Food Security and Nutrition. Related to the terms: Food Security, Nutrition Security, Food Security and Nutrition, Food Security and Nutrition. http://www.fao.org/3/MD776E/MD776E.pdf
5. Conceição, P., Levine, S., Lipton, M., & Warren-Rodríguez, A. (2016). Towards a food-safe future: Ensuring food security for sustainable human development in Sub-Saharan Africa. Food Policy, 60, 1–9. https://doi.org/10.1016/j.foodpol
6. . 2016.02.003 El Bilali, H., Callenius, C., Strassner, C., & Probst, L. (2019). Food security and nutrition and a sustainable transition in food systems. Food and Energy Security, 8 (2). https://doi.org/10.1002/fes3.154
7. Erhart, E., & Hartl, W. (2010). Use of Compost in Organic Farming. In Genetic Engineering, Biofertilization, Soil Quality and Organic Agriculture (Vol. 4, pp. 311–345). Springer, Dordrecht. https://doi.org/10.1007/978-90-481-8741-6_11
8. Ericksen, PJ (2008). Conceptualization of food systems for global environmental change research. Global Environmental Change, 18 (1), 234–245. https://doi.org/10.1016/j.gloenvcha.2007.09.002
9. Fan, M., Shen, J., Yuan, L., Jiang, R., Chen, X., Davies, WJ, & Zhang, F. (2012). Increase crop productivity and efficient use of resources to ensure food safety and environmental quality in China. Journal of Experimental Botany, 63 (1), 13-24. https://doi.org/10.1093/jxb/err248
10. FAO. (2008). Introduction to Basic Concepts of Food Security. http://www.fao.org/docrep/013/al936e/al936e00.pdf
11. Firmansyah, MA (2010). Compost Making Techniques. At the Center for Agricultural Technology Studies (BPTP-Balitbangtan) Central Kalimantan. http://kalteng.litbang.pertanian.go.id/ind/images/data/teknik-kompos.pdf
12. Friska ED Panjaitan, Satia Negara Lubis, & Hasman Hasyim. (2014). ANALYSIS OF CORN BUSINESS PRODUCTION AND INCOME EFFICIENCY (Case Study: Kuala Village, Tigabinanga District, Karo Regency). SOCIAL ECONOMIC JOURNAL OF AGRICULTURE AND AGRICULTURE, 3 (3). https://jurnal.usu.ac.id/index.php/ceress/article/view/8126
13. I Made Dedik Setyadi, I Nengah Artha, & Gusti Ngurah Alit Susanta Wirya. (2017). The Effectiveness of Trichoderma Sp. Against the Growth of Chili (Capsicum Annum L.). Journal of Tropical Agroecotechnology (Journal of Tropical Agroecotechnology), 6 (1), 21-30. https://ojs.unud.ac.id/index.php/JAT/article/view/26474/16806
14. Kociszewski, K. (2018). Sustainable agricultural development: theoretical aspects and implications. Economic and Environmental Studies (E&ES), 18 (3), 1119–1134. https://doi.org/10.25167/ees.2018.47.5
15. Lazcano, C., Gómez-Brandón, M., Revilla, P., & Domínguez, J. (2013). Short-term effects of organic and inorganic fertilizers on the structure and function of soil microbial communities: Field study with sweet corn. Biology and Soil Fertility, 49 (6), 723–733. https://doi.org/10.1007/s00374-012-0761-7
16. Mir Seyedbagheri. (2010). Compost: Production, Quality, and Use in Commercial Farming. https://www.researchgate.net/publication/263260549_Compost_Production_Quality_and_Use_in_Commercial_Agriculture
17. Morton, S., Pencheon, D., & Squires, N. (2017). Sustainable Development Goals (SDGs), and their implementation. British Medical Bulletin, 124 (1), 81–90. https://doi.org/10.1093/bmb/ldx031
18. Mulyani, A., & Sarwani, M. (2013). Characteristics and potential of sub-optimal land for agricultural development in Indonesia. Characteristics and Potential of Sub-Optimal Land for Agricultural Development in Indonesia, 7 (1), 47–55. https://doi.org/10.2018/jsdl.v7i1.6429
19. Nainggolan, K. (2011). Global Food Issues and Their Impact on National Food Security. FOOD JOURNAL, 20 (1), 1–13. https://doi.org/10.33964/JP.V20I1.11
20. Ni Putu Sukanteri, Pande komang suparyana, I Made Suryana, & I Made Dedy Setyawan. (2019).

ISSN: 2005-4289 IJDRBC

LINEAR PROGRAMMING MODEL IN EFFORTS TO ALLOCATE LOCAL RESOURCES TO ACHIEVE OPTIMAL INTEGRATED FARMING RESULTS. INTERNATIONAL JOURNAL OF SUSTAINABILITY, EDUCATION, AND GLOBAL CREATIVE ECONOMIC (IJSEGCE), 2 (3), 211–217. https://doi.org/10.1234/ijsegce.v2i3.109

21. Nuryanti, DM, & Kasim, NN (2017). ANALYSIS OF BUSINESS REVENUE ON ROTATION PATTERN OF SWEET RICE-CORN PLANT IN MULYASARI VILLAGE, SUKAMAJU DISTRICT. Journal of TABARO Agriculture Science, 1 (2), 95–104. https://doi.org/10.35914/TABARO.V1I2.27
22. Paeru, RH, & Dewi, TQ (2017). Practical Guide to Cultivating Corn. Self-Help Spreader.
23. Soekartawi. (2011). Farming Science and Research for Smallholder Development. UI Press.
24. Subedi, KK, & Ma, BL (2011). Corn Crop Production: Growth, Fertilization and Yield. In AT Danforth (Ed.), In: Corn Crop Production Growth, Fertilization and Yield (pp. 1–85). Nova Science Publishers, Inc. https://doi.org/10.13140/2.1.3515.9040
25. Suparyana, PK, FR, AFU, & Ariati, PEP (2020). Motivation Of Dryland Utilization On Integrated Farming In East Lombok. SOCA: Social Journal, Agricultural Economics, 14 (2), 361. https://doi.org/10.24843/SOCA.2020.v14.i02.p14
26. Swaminathan, MS (2000). An evergreen revolution. Biologist. https://doi.org/10.1142/9789814282116_0024
27. Timmer, CP (2012). Behavioral dimensions of food security. In B. and MGFSW Prabhu Pingali (Ed.), Proceedings of the National Academy of Sciences of the United States of America (Vol. 109, Issue 31, pp. 12315–12320). National Academy of Sciences. https://doi.org/10.1073/pnas.0913213107
28. United Nations System High Level Task Force on Global Food Security. (2011). Food and nutrition security: Comprehensive framework for action. Summary of the Updated Comprehensive Framework for Action (UCFA), 1–25. http://reliefweb.int/sites/reliefweb.int/files/resources/Full_Report_1887.pdf
29. V Wiratna Sujarweni. (2015). Economic business research methodology. New Library. https://opac.perpusnas.go.id/DetailOpac.aspx?id=1072785
30. Van Eerd, LL (2018). Nitrogen dynamics and yields of fresh beans and sweet corn with different cover crops and planting dates. Nutrient Cycling in Agroecosystems, 111 (1), 33–46. https://doi.org/10.1007/s10705-018-9914-x

ISSN: 2005-4289 IJDRBC

Utilization Of Biotechnology Of Beef Waste As An Input For Sustainable Agriculture Development In The Sweet Corn Commodity

ORIGINALITY REPORT

16%	10%	10%	11%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

3%

★ Submitted to University of Southern Queensland

Student Paper

Exclude quotes	Off	Exclude matches	Off
Exclude bibliography	On		