

Sustainable Agricultural Environment Through the Organization of Durian Producers in Mindanao, Philippines

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**UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato**



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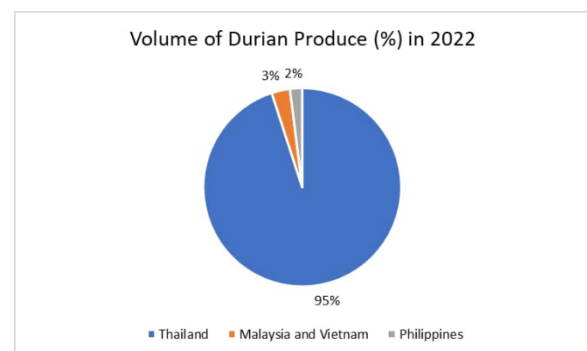
NARRATIVE REPORT

A. BASIC INFORMATION		
1. Title	Sustainable Agricultural Environment Through the Organization of Durian Producers in Mindanao, Philippines	
2. Project Leader Study Leader (Indicate College/Unit)	Mel Chrisel A. Sales/ CA- Project Team Leader	
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3. Lead Unit/College	College of Agriculture	
Collaborating Unit/College		
4. Category	☐ Program ☒ Project ☐ Study	
5. Classification	☒ Research	☒ Development
	☐ Basic ☒ Applied	☐ Pilot Testing ☐ Prototype Development ☐ Tech. Promotion/Commercialization
6. Thematic Area	☒ Crops ☐ Animals ☐ Biotechnology ☐ Engineering & Technology ☐ Social Sciences ☐ Information & Communication ☐ Technology Commercialization ☒ Applied & Natural Sciences ☐ Arts, Education & Philosophy ☐ Health Care & Proper Nutrition	
7. Project Duration	March 2023-March 2026	
8. Project Location	DAVAO CITY	

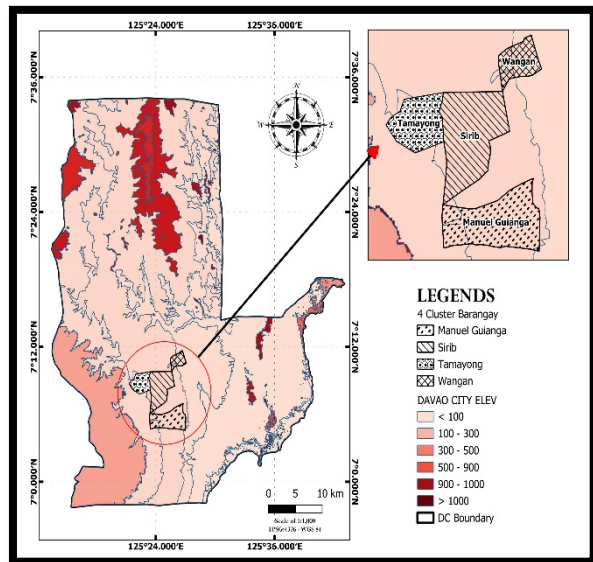
Rationale

In the Philippines, durian farming is a profitable business. In 2022, durian produced in the country amounted to 74.16 thousand metric tons which 81% of the total produce come from the rich soils of region 11 particularly in Davao City with a land cover of over 8,179 hectares planted with 884,567 trees (PSA, 2025). As a seasonal crop, durian has been a main and secondary source of income for small-scale farmers in the rural areas of the region. In the last 3 years from 2022, the farmgate price of the durian has seemingly look no difference with average price of 40.6 pesos per kilo which is relatively low considering the high production cost which is 65% of the total gross revenue.

Despite dramatic challenges in price and expenditure for cultivation in recent years, market accessibility of durian has escalated creating doors of opportunities. As other regions in the country do not have the favorable condition for durian to thrive, Thus Mindanao continuous to expands its advantages as a region with diverse climate and fertile soil producing varieties of fruits making it known as “fruit basket of the Philippines” (Porras, 2024). With that mentioned, durian creating its way on national and global trading which contributes to 2 percent of the total production worldwide (Gamay et al., 2024).



With opportunities prospered, various threats to sustainability will also occurs posting challenges in the prospect of durian industry such as the occurrence of climate change that increases stressors and soil degradation issues. Aside from environmental concern, the lack of support to social aspect will lead to a slow socio-economic progress of small scale farmers.



Crop Performance of Durian in the Environmental Condition of Davao Region

Durian deeply relies on the characteristics of soil and has distinct specific requirements to survive and thrive. This tree prefers to thrive in a deep, well drained, clay loam type soil rich in organic matter (citation). This parameters in soils are significantly valuable since it affects the growth of durian. Nonetheless, Davao region in Mindanao possessed this qualities in soil reason why durian is highly produced and flourishing in this areas. Land management practices of farmers greatly affect the land performance to support the growth and bearing of trees. Fertilization is crucial in every stage of the plant, thus site specific recommendation is needed to

supply the necessary nutrient that is presently deficient in the area (Havlin et al., 2014). Furthermore, durian as tropical fruit tree is relatively affected by climate change as high temperature can accelerate irregular flowering (Atkinson et al., 2013) and irregular rainfall leads to reduction of yield (Feres et al., 2007). Thus, the implementation of regenerative and climate resilient management option in durian production for small-scale farmers is needed to make counter measures in dealing with this kind of environmental constraints.

Land Management Options for Durian Production

A field experiment was conducted to determine the best and feasible land management options for durian production in Tugbok District, Davao City. Result shows that trees applied with organic fertilizer and mulching with the use of available materials in farm such as coconut and durian husks has gain a higher outcome in terms of flowering and volume of yield where a soaring dry weather was observed during this season. Mulching is a practice to retain the soil moisture in the field as efficient supply of water in durian increases the number of inflorescence and flowers (Masri, 1999). Manual pollination was done during blooming stage of flowers possessing significantly different result in terms of numbers of fruit. Hand pollination obtains higher accuracy during the stage of anthesis (Honsho et al. 2007) where large amount of pollens given to the stigma can increase the chance of higher fruit set rate deciding the volume and quality of the yield (Lim and Luders 1998, Indriyani et al. 2012). In summary, durian trees applied with natural and regenerative approach surpassing those trees applied with conventional methods.

Treatment	Average Number of Flower per Tree	Average Number of Yield per Tree	Average Total Weight of Yield per Tree
T1 Control	2,167.8 ab	54 b	129.3 b
T2 Full RR	1,562.8 b	102 ab	254 ab
T3 Org. fert + Soil Conditioner (MP)	1,710 b	51.3 b	157.6 b
T4 lime + Org Fert + Soil conditioner (MP)	2,237.1 ab	63.3 b	135.7 b
T5 lime + Boron + 50% RR	2,097.3 ab	67 b	111.8 b
T6 Lime + Org Fert + Boron + Mulch (MP)	5,207.5 a	150.3 ab	326.3 a
T7 Org fert +Boron + 50 % RR (MP)	2,831.1 ab	93.5 ab	161.5 b
T8 Boron + 50% RR	2,101.4 ab	58.7 b	135.7 b

MP = manual pollination RR = recommended rate of fertilizer (conventional)



Mulch + Org. Fert



Treatment with full RR



Manual/Hand Pollination

Treatment with

Climatic Factors in Correlation with Stages of Durian

A study was conducted to evaluate and find out the performance of every stage of durian with the prevailing weather pattern in the site where it was established in Tugbok District, Davao City. Generally, the season of durian in this region comes only once a year from the flowering to harvesting stage which could take approximately 6 months period. As per climatic requirements, this tropical plant preferably observed to flourish in a weather condition with 24 to 32 degree Celsius supplied with more than 1500(mm) of rainfall annually (Chung, 2017). Despite being favorable to moist environment, it requires a dry spell of 1 to 2 months for flower initiation. Efficient irrigation is needed after blooming to ensure better fruit development. Excessive amount of water supply can cause detrimental effects in yield attributes. In addition, the presence of micro-climate in the area can determine the specific management to be done in every stages of durian ensuring an accurate and efficient application of inputs for plant development.

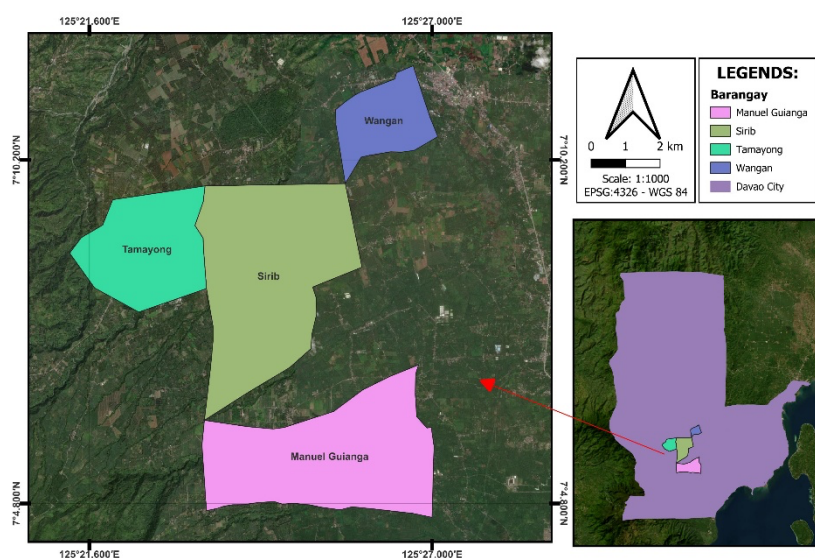
Month	December	January	February	March	April	May	June	July	August	September	October	November	December
Year	2023	2024											
Season	Dry		Rainy	Dry		Rainy						Rainy	
Mean Monthly Rainfall (mm)	43	139	340	25	103	264	122	125	84	64	163	280	215
Mean Monthly Temperature (Degree Celcius)	31	29.4	24.3	34.8	29.8	27.4	29.3	30.6	31.5	32.9	28.8	28.3	29.6
Stage													
	Flushing stage	Flushing stage	Flushing stage	Recovery	Flowering Stage	Flowering Stage	Fruit Setting	Fruit Setting	Fruit Setting	Maturation Stage	Maturation Stage	Preparation	Preparation
	Leaf Growth Stage			Food Collection	Flowering	Blooming	Young Fruit Stage	Fruit Growth Stage	Fruit Growth Stage	Harvesting	Harvesting	Rest Period	Rest Period

Centralize Movement of Transformation – A key to Sustainable Development of Durian Farmers in Mindanao

Aside from environmental challenges, the social status of every small-scale farmers limits their full potential for a progressive venture. Limited resources and lacks of access for farm modernization are some of the primary factors. In addition, farmers always are prone to face economic distress due to inadequate financial capital (Oakeshott, 2018). The establishment of agricultural cooperative offers a structural platform especially for small-scale farmers to unite and achieved common interest. Organizing into cooperatives bids relative advantages through collective effort in the course of networking and improving market access alleviating socio-economic challenges. Moreover, strengthening the cooperative will boost the farmers resiliency and integrity that will transform their livelihoods and increases economic stability in durian production.

With four Barangays as area of coverage one in Tugbok and three in Calinan District of Davao city, at least 80 small scale-farmers were initially organized in the first year of the project in 2023. With At least 70% of this farmers are cultivating durian for more than 20 years in a small-scale basis. Despite their profound experiences in farming their capacity to put up more resources for production cost and market access is limited in which they share common difficulties.

To address the structural challenges faced by individual durian farmers the project initiated to organize farmers and providing them technical and technological support in both production and organizational component until the establishment of agricultural cooperative.



Empowering and Organizational Strengthening of Small-Scale Durian Farmers

Over the course of training sessions, participants strengthened their organizational and operational capacities in key areas such as financial management, development of operational manuals, and a clear understanding of the roles and responsibilities of cooperatives. These trainings contributed to the accumulation of social capital within the community and promoted sustainable rural development. In particular, advanced training and practical exercises for emerging cooperative leaders played a vital role in building internal leadership, promoting mutual support among members, and reinforcing effective cooperative governance. These efforts helped cultivate a strong sense of solidarity, ownership, and accountability among participants. As a result, the farmers were able to autonomously establish a cooperative, demonstrating enhanced organizational capabilities and readiness to engage in collective action. The capacity building program not only empowered individual farmers but also contributed to the long-term resilience and competitiveness of the local agricultural economy.



Department of Trade and Industry
Cooperative Development Authority
Regional Office 10

Pre-Registration Seminar (PRS)
Certificate of Completion
is hereby issued to
Davao Mt. Apo Farmers Agriculture Cooperative (DAMAFAC)
(Name of Proposed Cooperative)
November 9-10, 2023 at Lagick District, Davao City & August 14, 2024 via Zoom
(Date of Seminar and Venue)

PRs No. DVO-24-089-1

The following cooperators have attended the PRS:

1. Alano, Noel M.	26. Carandang, Conrado M.
2. Alao, Al Hania D.	27. Cari, Roper A.
3. Alano, Agripino M.	28. Carin, Lella M.
4. Alano, Sabel A.	29. Carin, Myca H.
5. Agot, Jaime P.	30. Caruso, Gervacio C.
6. Agot, Joel E.	31. Caparico, Armando M.
7. Agot, Lorette L.	32. Caruso, Roger B.
8. Agot, Samuel E.	33. Dagatan, Luciano A.
9. Aguilar, Ricardo B. Sr.	34. Dela Cruz, Edna M.
10. Aguirre, Juliana R.	35. Dela Cruz, Jose S. Jr.
11. Aila, Daniel K.	36. Diaz, Paulo B.
12. Aila, Inigo A.	37. Dier, Francis L. Jr.
13. Alcarde, Tereza T.	38. Diaz, Rodel T.
14. Alcarde, Riza P.	39. Dula, Loren
15. Ardo, Carmela P.	40. Eder, Armando R.
16. Avila, Luis L.	41. Estrova, Shirley P.
17. Ayo, Alan J.	42. Eder, Shirley P.
18. Ayo, Amy C.	43. Eder, Patricia E.
19. Auterico, Rosalinda B.	44. Eder, Jheral A.
20. Ayo, Genaro P. Sr.	45. Eder, Dominador B.
21. Bala, Modesta P.	46. Eder, Marcos O.
22. Bala, Nancy A.	47. Eder, Indira M.
23. Basan, Noel O. Sr.	48. Eder, Luz R.
24. Basan, Ruel L.	49. Eder, Joseph E.
25. Buanavente, Ronda P.	50. Eder, Loida Z.

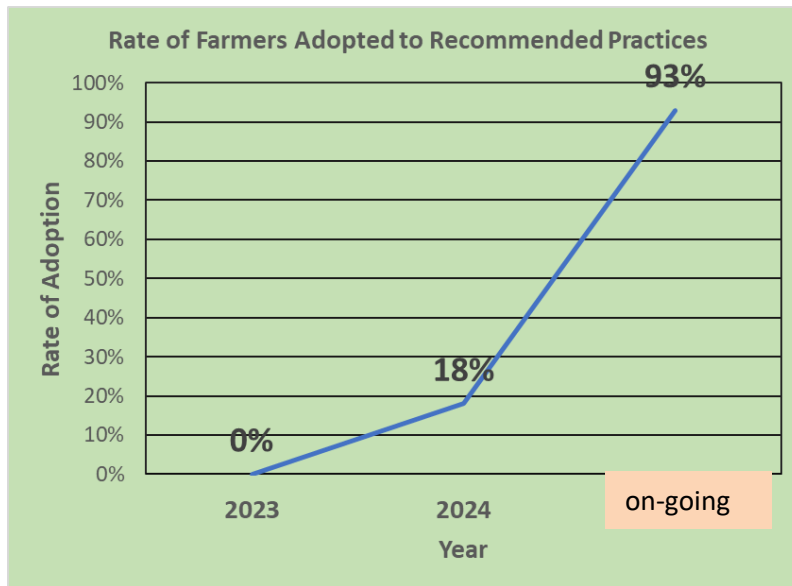
Cooperative Research & Information Training Section

Capacity Building Program – A Guide for Sustainable Production of Durian for Small-Scale Farmers

With nearly a span of 1 year, farmers has given basic and technical education through farmers field school which covers the matter in sustainable soil management, pest and disease control, climate change and marketing setting a holistic approach to the entire training program for durian production with the assistance from the partnered academe. The dynamics of the capacity building was designed not only to share theoretical discussion but to engage farmers through field observation and hands-on experiment since results from the land management experiment conducted such as the use of natural farm waste as alternative supply of inputs was interpreted and integrated with the subjects of each training. Hence, making those outcomes as a cite-specific recommendations which helps farmers to decide in what land management practices they will replicate to their durian system. Aside from acquiring scientific and technical knowledge the capacity building aims to encourage farmers to be committed as an advocate of sustainable agriculture and set influence to others.

The main purpose of technical training for small-scale farmers is to achieve uniformity of quality produced durian. With technical skills and knowledge they obtain, it will deliberately help them to design standard procedures in the future which is pivotal in the name of their business and as cooperative. For the mean time the on-going trials, experimental research and adoption of recommended technologies backed with scientific studies that they're putting up will reflect on the manual of operation and eventually able to establish the internal quality control system manifesting the increase and sustainable production.





Conclusion and Recommendation

Identifying the roots of all the gaps that contributing challenges in durian farming is necessary. Durian carries an overwhelming prospect with mouthful of opportunities yet possessing varieties of challenges both ecological and economical. Scientific base diagnosis and collaborative effort of the society, together finding the necessary approaches in overcoming environmental and socio-economics constraints in producing the optimum productivity of durian.

The outcome of the experimental study showcases the effectiveness of using natural and regenerative farm inputs such as mulching and organic fertilizer that are commonly available in the farm which gives higher amount of durian yield surpassing the conventional approach. Moreover, it surprisingly obtains resilience to climate change effects most especially in dry season. The study also provided initial patterns of climatic event in the pace of durian seasonality which is significant in studying more on the morphological attributes of the plant and the meteorological arrangement that affects it.

Accurate interpretation of these outcomes to the farmers will serve as their baseline of land management practices. Thus, continuous knowledge sharing through capacity building is needed. In addition, with the concept of collective effort through cooperative, it empowers the small-scale farmers uplifting their status and helps in upscaling those regenerative land management options to other individual and in the community. Through this approach, the desire to bring sustainability will be achieved.

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