LIVELIHOOD ASSETS AS A FORM OF ADAPTIVE CAPACITY OF FARMING HOUSEHOLDS TO SCARCITY OF SUBSIDED FERTILIZER IN LABAKKANG, DISTRICT, PANGKEP

a Therresse Nofianti, b Yayuk Yuliati, c Keppi Sukesi, d Mangku Purnomo

ABSTRACT

Objective: This research aims to describe the characteristics of rice farming households and the availability of livelihood assets in the face of a scarcity of subsidized fertilizers.

Method/design/approach: The method used qualitative data collection used a case study approach to 80 farmers through observation and interviews. The descriptive analysis used interactive analysis by Milles and Huberman, and the data was validated by source triangulation.

Results and conclusion: The results showed that the average age of farmers in Labakang District was 51 years old; most were men with low education and had an average number of family members of 5 people. Farming experience of more than 15 years and the average cultivate own paddy fields (60%) with a land area of 1.46 hectares. Farmers take advantage of the availability of natural capital in the form of land, water for farming, and livestock manure to make organic fertilizer. Physical assets such as land, houses, private vehicles, farming equipment, and livestock ownership help minimize rental expenses. Farming experience is very long, but farmers have insufficient knowledge and skills in making organic fertilizer. Financially they can buy non-subsidized fertilizers using other sources of income and their savings. Involvement in farmer groups, kinship among farmers, and participation in extension services also benefit them. Based on this, the availability of livelihood assets benefits the adaptive level of farming households in Labakang District in dealing with the scarcity of subsidized fertilizers.

Keywords: livelihood assets, scarcity, subsidized fertilizer, labakkang.

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a Postgraduate Student Interest in Rural Sociology, Faculty of Agriculture, Brawijaya University, Faculty of Agriculture, Papua University West Papua, Indonesia, East Java, Indonesia, E-mail: nofiantitherresse@gmail.com, Orcid: https://orcid.org/0009-0008-3837-9155
b Professor, Faculty of Agriculture, Brawijaya University East Java, Indonesia, E-mail: yayukyyl@gmail.com, Orcid: https://orcid.org/0000-0002-1899-757X
c Professor Faculty of Agriculture, Brawijaya University East Java, Indonesia, E-mail: keppi_s@yahoo.com, Orcid: https://orcid.org/0000-0003-4761-9428
d Professor, Faculty, Brawijaya University East Java, Indonesia, E-mail: mangku_purnomo@yahoo.com, Orcid: https://orcid.org/0000-0002-9023-1835
MEIOS DE SUBSISTÊNCIA COMO UMA FORMA DE CAPACIDADE ADAPTATIVA DAS FAMÍLIAS AGRÍCOLAS À ESCASSEZ DE FERTILIZANTE SUBSIDIADO EM LABAKKANG, DISTRITO, PANGKEP

RESUMO

Objetivo: Esta pesquisa visa descrever as características das famílias de produtores de arroz e a disponibilidade de meios de subsistência em face da escassez de fertilizantes subsidiados.

Método/concepção/abordagem: O método utilizado para a recolha de dados qualitativos utilizou uma abordagem de estudo de caso para 80 agricultores através de observação e entrevistas. A análise descritiva usou análise interativa de Milles e Huberman, e os dados foram validados por triangulação de fontes.

Resultados e conclusão: Os resultados mostraram que a idade média dos agricultores no distrito de Labakang era de 51 anos; a maioria era composta por homens com baixa escolaridade e tinha um número médio de familiares de 5 pessoas. Experiência agrícola de mais de 15 anos e a média cultivam campos próprios de arroz (60%) com uma área de terra de 1,46 hectares. Os agricultores aproveitam a disponibilidade de capital natural na forma de terra, água para a agricultura e estrume animal para produzir fertilizantes orgânicos. Ativos físicos como terras, casas, veículos particulares, equipamentos agrícolas e propriedade de animais ajudam a minimizar as despesas de aluguel. A experiência agrícola é muito longa, mas os agricultores têm conhecimentos e competências insuficientes na produção de fertilizantes orgânicos. Financeiramente, eles podem comprar fertilizantes não subsidiados usando outras fontes de renda e suas economias. O envolvimento em grupos de agricultores, o parentesco entre agricultores e a participação em serviços de extensão também os beneficiam. Com base nisso, a disponibilidade de meios de subsistência beneficia o nível adaptativo das famílias de agricultores no distrito de Labakang ao lidar com a escassez de fertilizantes subsidiados.

Palavras-chave: meios de subsistência, escassez, fertilizante subsidiado, labakkang.

1 INTRODUCTION

Fertilizer scarcity has become a global issue; in North America, fertilizer shortages are triggering fears of high food prices. In India, urea scarcity is causing farmers to worry about their livelihoods (Qiu et al., 2021). Almost every year in Indonesia, farmers experience difficulties obtaining subsidized fertilizers (Purbayu, 2008), while their dependence on fertilizers is very high. Lack and scarcity of fertilizers are the problems that never impact farming activities and farmers' welfare.

 Whereas historically, Indonesia has implemented a fertilizer subsidy policy since the 1970s (Hedley & Tabor, 1989), aiming to increase farmer production and productivity, protect farmers from surges in fertilizer prices and ensure fertilizer availability for farmers. Many factors are causing the scarcity of subsidized fertilizers, including problematic distribution of fertilizers, decreased budgets, wasted use of fertilizers, increased land area, farmers' dependence on inorganic fertilizers, and unbalanced fertilization (Kudrati & Kusmiati, 2010; Rahmadi & Santoso, 2016; Sulaiman
Livelihood Assets as a Form of Adaptive Capacity of Farming Households to Scarcity of Subsidized Fertilizer in Labakkang, District, Pangkep (Darwis, 2019). The result is a spike in fertilizer prices above the highest retail price (HET) and seepage of subsidized fertilizers into non-subsidized markets and between regions (Darwis & Supriyati, 2016; Osorio et al., 2011).

Pangkajene and Islands Regency (Pangkep) is one of the Regencies in South Sulawesi Province. The problem of scarcity of subsidized fertilizers is also experienced by farmers in Labakang District, where the amount of fertilizer is insufficient for farming needs, the provision of subsidized fertilizer is not following the planting schedule, and the distribution of fertilizer is unequal. As a result of this, there was a surge in fertilizer prices above the Highest Retail Price (HET), such as the price of Urea fertilizer currently being sold for Rp. 170,000/50kg per sack or Rp.3,400. This situation affected 44 farmer groups in the Labakang Sub-District, comprising 15-20 farmers per group, all members of the Hidayah Association of Farmer Groups (Gapoktan). The farmer groups are formed based on the location of residence, the similarity of commodities, and the village head's decree.

Farmers can adapt to overcome scarcity (Aguilar et al., 2021; Ankrah et al., 2023; Ghazouani et al., 2014). Likewise, with farmers in Labakang District, adaptive skills are needed to deal with fertilizer scarcity by combining available capital assets to survive because limited capital and access often cause difficulties for farmers to overcome problems. Sustainable livelihoods can be achieved through access to multiple sources of livelihoods (natural, economic, human, social, and physical capital) that are combined in pursuing different livelihood strategies (Scoones, 1998).

Farmers' assets are available and owned capital resources such as human, physical, social, financial, and natural capital. They positively and significantly influence livelihood strategies (Illu et al., 2021). Studies on subsidized fertilizer have been carried out by several researchers (Alta et al., 2021; Mather & Jayne, 2018; Setiawan & Fauzi, 2021; Vondolia et al., 2021), but research on how the characteristics and availability of farmer assets in the face of scarcity of subsidized fertilizer not much has been done.

The notion of assets is at the heart of a sustainable livelihoods approach that understands poverty not only as a lack of income but considers the assets that poor people need to maintain an adequate income to live on. Based on these assets, and shaped by contexts of vulnerability and changing structures and processes, the poor are able to make various livelihood strategies, activities, and choices that ultimately determine their livelihoods.
This study aims to describe the characteristics of farmers and the availability of assets used in dealing with this situation. It is hoped that the results of this research can help farmers find solutions to dealing with the scarcity of subsidized fertilizers and serve as input for local governments.

2 THEORETICAL FRAMEWORK

The scarcity of subsidized fertilizers is a condition where it is difficult for farmers as users of subsidized fertilizers to obtain subsidized fertilizers both in terms of quantity and time. This problem resulted in shocks for farmers throughout the region, the number of which is very large. The problem of scarcity and shortage of fertilizers in several regions is caused by many factors and requires serious handling from the government as a policy maker.

Santosa, (2008) explains that the problem of scarcity of fertilizers can be overcome by restructuring market structures, improving the distribution of fertilizers, efficiency in the use of fertilizers, and providing strict penalties for those who violate existing regulations. In (Aditya, 2016) farmers' actions to overcome the scarcity of Urea fertilizer in North Raman District, East Lampung Regency by using organic fertilizers as a substitute for subsidized fertilizers, increasing the effectiveness of fertilizer use (right type, right time, right way and right dosage), implementing technology biological fertilizers, implementing Integrated Plant Processing (PTT), buying subsidized fertilizers before the planting season and participating in supervising the distribution of subsidized fertilizers through Gapoktan associations.

Subsidized fertilizers are fertilizers whose procurement and distribution are regulated by HET and are stipulated at official distributors in Line IV. Subsidized fertilizers are goods under supervision whose procurement and distribution receive subsidies from the government for the needs of farmers in the agricultural sector whose aim is to increase soil fertility and increase plant growth. Line IV is the location of warehouses or retailers in sub-districts and/or villages designated or determined by the distributor. Subsidized fertilizers are intended for the agricultural sector or sectors related to the cultivation of food crops, horticulture, plantations, forage for livestock, and fish and/or shrimp cultivation (Directorate General of the Ministry of Agriculture PSP, 2021).

Subsidized fertilizer targets are farmers, gardeners, and ranchers who cultivate a land area of no more than 2 ha per planting season per farming family except for fish
and/or shrimp cultivators with a maximum area of 1 ha. Subsidized fertilizers are not intended for food crops, horticulture, plantation, livestock, or aquaculture companies.

Research on the use of fertilizers, including that conducted by Ricker-Gilbert, et al (2011) on the impact of subsidy programs in Malawi on farmers’ demand for commercial fertilizers shows that although the target of fertilizer subsidies to the rural poor contributes to increased fertilizer use, this program has a negative impact on farmers’ demand for commercial fertilizers. Furthermore (Sari & Aslikannah, 2017) regarding the relationship between social capital and farmer poverty in Aceh shows that fertilizer subsidies for 1 hectare really help farmers with production costs, and contribute to increasing agricultural yields.

Siallagan, Chalil, & Jufri, (2014) regarding the analysis of the efficiency of using subsidized fertilizers in lowland rice plants in Perbaungan District, Serdang Bedagai Regency stated that the average dose of subsidized fertilizer use (Urea, SP 36, ZA, NPK Phoska) is much higher than the recommended dosage, as well as the level of efficiency in using subsidized fertilizers from a technical point of view and inefficient prices, both for cultivating farmers and cultivating farmers.

Rahman & Zhang, (2018) stated that the excessive use of fertilizers is mostly done by young farmers in Bangladesh. Furthermore (Sholeh & Ringgih, 2017) states that the addition of organic and inorganic fertilizers can effectively increase crop yields. Where the productivity of rice plants is greatest, namely by using Urea fertilizer as much as 250 kg/ha + NPK 200 kg/ha + organic 6,000 kg/ha with a yield of 5.72 tons/ha.

Knepper, (2002) stated that there were several factors that significantly increased the use of fertilizers in farming households in Zambia from 1997 to 2000, namely the total planting area, ownership of agricultural assets, and proximity to fertilizer depots. However, the most influential factors are transportation assets and the level of infrastructure in the region. These findings imply the need for direct policy responses from the government to improve infrastructure, especially transportation because infrastructure improvement is one of the most effective methods for increasing the use of fertilizers and household income of farmers in rural areas.

Availability according to KBBI is the readiness of a facility (manpower, goods, capital, budget) to be used or operated within a predetermined time. The availability of farmer assets is a resource or capital used by farmers to survive and overcome problems, which consists of human capital, natural capital, social capital, financial capital, and
physical capital.

According to Green and Haines (2002), there are 7 main assets or main assets in a community. (Quoted in Asset building and community development). namely Assets/Human Capital, Social Assets/Capital, Physical Assets/Capital, Environmental or Natural Assets/Capital, Financial Assets/Capital, Political Assets/Capital, Religious and Cultural Assets/Capital. Ashley and Carney, in Sustainable Livelihoods: Lessons from Early Experience (1999) put forward the principles of sustainable livelihood as follows: that development activities that focus on poverty must: (1) be human/community-centered, responsive and participatory, partnership and sustainable as well as dynamic. There are four key dimensions for sustainability, namely: economic, institutional, social, and environmental sustainability. All of them are important, and there has to be a balance between them.

The livelihood framework identifies 5 (five) main asset categories or types of capital on which livelihoods are built, which are referred to as The Asset Pentagon (Pentagonal Asset). This pentagon was developed to allow information about community assets to be presented visually, which can describe the relationship between these assets (DFID, 1999). The five types of assets or capital identify that everyone needs to make a living using human capital, natural capital, financial capital, physical capital, and human capital.

3 RESEARCH METHODS

The research used a qualitative approach and case study method in paddy rice farming households in Labakang District, Pangkajene Islands Regency, South Sulawesi Province, considering that Labakang District has productive paddy fields where the planting area is 4,084 hectares, the harvested area is 4,082 hectares. The production is 27,818 tons/year (BPS Pangkep, 2019). Most of the village community work as farmers with the primary classification of having fertilizer scarcity and being registered in the RDKK. The research was conducted from May 2022 to August 2022. The informants were determined by snowball sampling of 80 rice farming households.

3.1 DATA COLLECTION TECHNIQUE

In this study, data collection techniques were carried out directly through in-depth interviews, observation, and documentation. Sources of data collected are not only
primary data but also use secondary data. Primary data were obtained through interviews using interview guidelines that had been prepared for farmers who did farming and joined farmer groups (gapoktan).

Data collection techniques are mostly structured and in-depth interviews, observation, and documentation (Sugiono, 2017). Obtaining data in various ways is called triangulation (triangulation). The reason for using triangulation to get detailed data is that no single data collection method is perfectly suitable and can be absolutely perfect. In many qualitative studies, researchers generally use triangulation techniques in the sense of using more than one data collection technique (Semiawan, 2010).

3.1.1 Interview

At least, there are two types of interviews, namely structured interviews and in-depth interviews.

1) Structured interview (guided interview) in which the researcher asks the informant several questions using an interview guide that has been prepared beforehand. Primary data collected through this technique consists of (1) Farmer characteristic data including age, gender, education, number of family members, farming experience, length of membership, and status in farmer groups. (2) Data on farming characteristics include land area, fertilizer type, fertilizer price, amount of fertilizer used, source/location of fertilizer collection, farmer participation in groups and preparation of RDKK, and so on.

2) In-depth interviews are a technique of obtaining in-depth information by being directly involved with the life of the informant and are carried out several times. Researchers also conducted virtual interviews, via social media and cell phones. In accordance with the time agreed with the informant. The data collected is in the form of data on the availability of farmer asset ownership in the form of resources or capital used to overcome fertilizer scarcity consisting of human capital, natural capital, financial capital, and physical capital.

3.1.2 Observation

Observation is data collection by making direct observations of research objects to take a close look at the activities being carried out. Observations can be assisted with a checklist, but the most effective is assisted by taking photos and videos at the research
site. Observations in this study were carried out directly on the behavior of farmers in their farming activities. There are several research variables related to this observation, namely related to the internal aspects of farming, supporting institutions, and network linkages (cooperation or partnerships), especially in terms of how to obtain fertilizer, where to take or buy fertilizer, use of fertilizer and the level of farmer participation in preparing the RDKK.

3.1.3 Documentation

Documentation is a way of collecting data and information in the form of documents, archives, written numbers, and pictures that can support research. Most of the data needed is secondary data, which comes from 1) the Central Statistics Agency for Pangkep Regency in the form of data on the general condition of the area, regional maps, population conditions, and others. 2) reports of research institutions and other agencies/agencies related to this research.

3.2 CONCEPT OF OPERATIONAL RESEARCH

The research variables include the characteristics of farmers and the availability of farmer asset ownership in the face of a scarcity of subsidized fertilizers. Farmer characteristics include age, education, gender, number of family members, land area, land tenure patterns, amount of fertilizer use, farming experience, length of membership, and status in farmer groups. Asset availability variables include human, natural, social, financial, and physical capital. Human capital in the form of level of education, employment, skills, and workforce used. Natural capital such as land, water, and other natural resources can be used as fertilizer. Social capital includes the level of trust, social networks, and social norms. Financial capital refers to financial resources that are owned and used to ensure the availability of fertilizer. Includes wages/salaries, savings, and access to credit for fertilizer. Physical capital, including ownership of property, business assets, agricultural production equipment, means of transportation, etc.

3.3 DATA ANALYSIS TECHNIQUE

To facilitate the discussion of research results, qualitative data analysis was used using interactive analysis techniques by Milles and Huberman. There are three flows of activities in Milles and Huberman's interactive analysis, namely: data reduction, data
presentation, and conclusion/verification.

4 RESULTS AND DISCUSSION

4.1 DESCRIPTION OF RESEARCH LOCATION

Pangkajene Islands (Pangkep) Regency is located between 4o.40-8o.00' South Latitude and 110o East Longitude. It is on the west coast of South Sulawesi Province with an area of 1,112.29 km², consisting of 13 Districts and 103 Villages. (BPS Pangkep Regency, 2020). Labakang is one of the sub-districts in Pangkep Regency with an area of 98.46 km², has the most significant number of villages, namely 13 villages, and includes sub-districts with productive paddy fields (BPS Pangkep, 2021). Dispute resolution through mediation at the village level, especially Kahayan Tengah Sub-District, PulangPisau Regency, is inseparable from three legal aspects, positive law, Islamic law, and customary law, these three legal aspects which are then used in resolving cases within the scope of the region. However, in resolving the land dispute itself, the village officials are more dominant in using the customary law approach (Witanto, 2011).

Figure 1. Map of Pangkajene Regency and Islands

Source: https://peta-kota.blogspot.com/2017/03/peta-kabupaten-pangkajene-dan-epuluan.html
In 2021, the population of Labakkang District will reach 52,593 people, consisting of 25,511 males and 27,082 females. Paddy fields in this subdistrict cover an area of 3,675 hectares, consisting of 1,841 hectares of technically irrigated rice fields, 1,352 hectares of semi-technically irrigated rice fields, and 482 hectares of rainfed rice fields. The condition of the number of farmer groups in Labakang District does not differ much from one village to another; for example, the number of rice farmer groups in Taraweang village is 21 groups with an area of 395.60 ha. Whereas in Batara Village, there are 23 farmer groups with a total of 621 members, 547.22 hectares, and an average area of land ownership is 0.88 ha/person. Most of the farmer group members are local people from the Bugis-Makasaar tribe who have been cultivating rice plants for generations. The group is formed based on the location of residence and the similarity of commodities and is legalized based on the village head's decree. The average farmer has joined a farmer group since 2010 and then refers to Minister of Agriculture Regulation Number 10 of 2022 that to obtain subsidized fertilizer, farmers must join a farmer group and be registered in the Agricultural Extension Information System (Simluhtan). If seen from the recapitulation of the RDKK proposals, the number of farmers in the District continues to increase, as evidenced by the fact that in 2022 there were 176 farmers with a planting area of 37,995 ha, which also affected the increase in the number of subsidized fertilizers of the Urea and NPK types.

4.2 CHARACTERISTICS OF INFORMANTS

Based on the research results, the average age of farmers is 51 years, the most extensive age range is 40-60 years, the youngest is 30, and the oldest is 78. This means that most of the farmers are of productive age. However, 18 informants were over 60 years of age and generally did not take any level of education (did not go to school). Most of the informants were male (85%), and the others (15%) were female because men were seen as having more complete access to agricultural inputs than women. As revealed by Islam et al. (2023), female-headed households have limited access to agricultural inputs and extension services compared to male-headed households, leading to crop yield gaps, poorer livelihoods, and food insecurity the greater. Because the lower use of fertilizer by women will limit crop yields, besides that Doss (2010) states women make essential contributions to agricultural and rural enterprises throughout the developing world. However, a great deal of diversity in women's roles and excessive generalization weaken
the relevance of policy and planning. Doan & Truong, (2023) mentions when women leave the family to join the labor market, household chores that were previously done by women such as harvesting, fertilizing, weeding, raising livestock, etc., then the work will be given to other family members.

When viewed from the level of education, the average farmer has low education; 75% of the informants did not even reach junior high school, even though education is one of the socio-economic indicators that tend to affect farmers’ adaptability substantially (Simotwo et al., 2018). This is because educated farmers tend to accept new technologies and interventions more quickly than those with non-formal education who rely only on experience (Denyirah et al., 2017). Better-educated farmers tend to have higher social capital and can accept the risk of replacing traditional technologies with new ones (Zheng et al., 2022). However, Ayisi et al. (2022) mention that educated farmers without income are also less innovative. Furthermore, based on the number of family members, the average farmer has five family members in one house, and most are in the medium category (4-6 people). Many family members affect household spending and the use of labor. This can be seen from the involvement of family members in farming when planting, fertilizing, and harvesting. Furthermore, based on experience, it is known that the average informant has more than 15 years of farming experience. This experience is long enough so that they have experience using fertilizers, where they understand the types and doses of fertilizers that are suitable for their rice plants, where the types of subsidized fertilizers commonly used by farmers in Labakkang District are Urea and Poska/NPK. This is in line with Ugwuja et al. (2011), which states that farmers who have a successful experience using certain types of fertilizers will tend to use these types of fertilizers for production in the following period.

Based on the findings in the field, very few informants carried out a mixed cropping pattern of rice and pulses. Overall, rice is a superior commodity planted by farmers with a planting frequency of two seasons in one year. The average land area owned is 1.46 hectares, and the smallest land area is 0.17 hectares. The maximum area is 4 hectares with a pattern of controlling one’s paddy fields (60%), owning one’s own and renting fields belonging to other people (15%), only as cultivators with a profit-sharing system of 13.75% and 11.25% of other informants cultivating rice fields by way of a pawn contract. This means there is a combination of land tenure status where farmers manage their paddy fields and lease other people’s paddy fields. Similar to the status of
the land on the island of Java, Sjaf et al. (2022) suggest that there are three statuses of farmers in Cikawang village, Dramaga District, Bogor Regency, West Java Province, namely cultivators, owners, and cultivators of their land, and owners who cultivate the land—at the same time, cultivating other people’s land.

| Table 1. Characteristics of Lowland Rice Farmers in Labakankang District |
|-----------------------------------------------|----------------|----------------|
| Characteristics                          | Category       | Number of people | Percentage (%) |
| Farmer                                    |                |                 |                |
| Age                                       | <40 Year       | 17              | 21.25          |
|                                           | 40-50 Year     | 23              | 28.75          |
|                                           | 51-60 Year     | 22              | 27.5           |
|                                           | >60 Year       | 18              | 22.5           |
| Gender                                    | Man            | 68              | 85             |
|                                           | Woman          | 12              | 15             |
| Formal education                          | No/Never attended school | 21 | 26.25 |
|                                           | Elementary school | 39 | 48.75 |
|                                           | First High School | 16 | 20    |
|                                           | Senior High School | 4  | 5     |
|                                           | Bachelor       | 0               | 0              |
| Number of family members                  | A small family (≤4 people) | 28 | 36    |
|                                           | Medium family (5-6 people) | 38 | 47.5  |
|                                           | Big family (≥7 people) | 14 | 17.5  |
| Farming experience                        | < 10 Year      | 19              | 23.75          |
|                                           | 10 – 15 Year   | 7               | 8.75           |
|                                           | > 15 Year      | 54              | 67.5           |
| Land tenure status                        | One’s own      | 48              | 60             |
|                                           | Own and rent   | 12              | 15             |
|                                           | Cultivators    | 11              | 13.75          |
|                                           | Lease (lease contract) | 9  | 11.25 |
| Land area                                 | Narrow (<0.5) Ha | 7  | 8.75  |
|                                           | Currently (0.5-2) Ha | 65 | 81.25 |
|                                           | Wide (>2) Ha   | 8               | 10             |
| Side job                                  | Fisherman      | 7               | 8.75           |
|                                           | Breeder        | 13              | 16.25          |
|                                           | Businessman    | 15              | 18.75          |
|                                           | Etc            | 45              | 56.25          |

Source: Primary data processed, 2022

Farming is not the only job informants do because, on average (45%) have a side job (livelihood diversification) to make ends meet both as breeders, farmers, entrepreneurs, and so forth. This was done because the income obtained from farming activities was not sufficient for their needs, especially coupled with the situation of subsidized fertilizer scarcity, which caused an increase in fertilizer prices where the price of Urea fertilizer currently ranges from 130,000-160,000/sack, while the price of NPK/Poska fertilizer is 130,000-175,000/bag sacks, much different from the highest retail prices (HET) set by the government, namely Urea 112,500/sack and 115,000/sack. Livelihood diversification is a strategy that aims not only to increase income but also to
increase the capacity to withstand shocks and create greater housing resilience (Asfaw et al., 2017). Moreover, it generally occurs in the context of diminishing farm sizes, low agricultural yields, and urbanization without industrialization (Alobo Loison, 2015).

4.3 FARMERS LIVELIHOOD ASSETS IN FACING SUBSIDIZED FERTILIZER SCARCITY

Availability of farmers’ assets as a source of strength to assist them in dealing with the problem of scarcity of subsidized fertilizers. According to the SLA (Sustainable Livelihoods Approach) framework, livelihood assets are in the form of human capital, natural capital, physical capital, social capital, and financial capital. Farmers can survive the fertilizer scarcity, especially at the beginning of the first planting season (MT1), by using the availability of these livelihood assets. The more assets owned, the less vulnerable to the problem of subsidized fertilizer scarcity.

1) Natural Capital

Natural capital is a natural resource farm households use to make a living and can be consumed directly for their daily needs (Azzahra et al., 2021). Based on the research results, the informants used the existing soil and irrigation canals in this area because they support paddy fields and plantations. The soil is plain, has a sandy loam texture, delicate and rough, and has a soil acidity level between 5.5 - 6.5. Most of it is self-owned land that comes from inheritance.

Figure 2. Condition of land and irrigation canals in Labakang District

Source: Personal collection, 2022

The findings in the field showed that the rice varieties most commonly planted by the informants were the Cisantana or Sintanur varieties which could produce up to 6 tonnes of grain weight per hectare. Susiyanti et al. (2020) stated that Cisantana includes local rice with extra long grains >7 mm and long grains at 6.0-6.99 mm besides Ciherang, Sidrap. Rahmad et al. (2022) stated that the Cisantana variety has good plant growth and
high production potential for dry-harvested unhusked rice (GKP), which is 27.85 tons per hectare. The average dose of Urea fertilizer was 150-600 kg or 3-4 sacks (1 sack of 150 kg) and NPK/Poska fertilizer 1-2 sacks (50 kg) depending on the area of land owned by the informants. In its management, the average farmer only cultivates rice and very rarely cultivates other than rice because this type of soil is only suitable for planting rice. There are various types of rice fields in this area; there are 1,841 hectares of technical irrigated rice fields, 1,352 hectares of semi-technical irrigated rice fields, and 482 hectares of rainfed rice fields total area of paddy fields reaches 3,675 hectares. Livestock ownership also becomes one of the farmer’s assets in Labakang District, where they can use livestock manure as manure in their farming activities. Livestock manure is a valuable source of organic matter and nutrients used to amend and fertilize agricultural land and as biofuel (Sommer et al., 2013 in Zhang et al., 2022). The amount of livestock manure is vast in countries with high livestock density (Liu et al., 2018 in Zhang et al., 2022). For informants, livestock is an asset that can be used to meet daily needs and as a form of survival because it can be sold to supplement household income. The average livestock owned by farmers in Labakang District is 10-15 chickens and 3-15 cows, but there are also other types of livestock, such as ducks and goats. Using livestock manure is very helpful for informants when there is a shortage of subsidized fertilizer, especially for those who have livestock and know that manure can increase soil nutrients and maintain soil fertility.

Figure 3. Fertilizer and yield of Cisantana rice variety

Source: Personal collection, 2022
As revealed by Abdalla et al. (2022); Cai et al. (2019), manure contributes 39% of crop yields because manure affects yields by increasing soil nutrients, SOC, and pH. Manure application can also increase soil C elements when combined with mineral fertilizers. The application of livestock manure by informants was carried out. Namely, it was spread by hand one week before tilling the land in the morning. The stocked manure is still raw without a specific formulation due to defective equipment and an understanding of processing fertilizer. However, not all paddy fields can receive the same treatment due to the limited number of livestock. Zhang et al. (2022) stated that in China, increasing the replacement of N fertilizer with manure required technical services, financial support, and machine services for cereal farmers, while commercial crop farmers prioritized field demonstrations and fertilizer application machines.

In farming management, farmers in Labakang District still maintain their local wisdom in utilizing existing resources inherited from generation to generation. The Bugis-Makassar tribe community mainly carries out this local wisdom through the Mappalili Tradition. Mappalili is interpreted as guarding something that will disturb or destroy it. In line with Rosada et al. (2022), the people in Labakang District have high perceptions and motivation to carry out the Mappalili tradition. This tradition is carried out before planting rice and as a form of expression of gratitude. In this ritual, some heirlooms are cleaned once a year in the form of a rice field plow. Mapalili includes communal local wisdom, which is carried out together.

Based on information from informants, this activity was attended by villagers, government officials, and traditional leaders in Labakang District. The traditional stakeholders prepared for the heirlooms to be used at the activity location. Then, the residents walked from the traditional house to Galung Assurajang (rice fields) as a marker.
of time to go down to the fields. Then return to the traditional house with rice stored in sacks and confiscated by the residents. This is believed to provide blessings and satisfactory results from planting rice to harvest (Adhani, 2020; Khaedir, 2018; Rosada et al., 2022). The findings reveal that the optimal use of natural capital can help informants deal with the scarcity of subsidized fertilizers.

2) Human Capital

Based on the research results, the average farmer in Labakang District has a low level of education, so they have less motivation to adopt innovations. However, on average, they have quite a long farming experience of over 15 years. This experience is one of the assets because the more farming experience, a farmer can overcome various farming problems obtained from his ancestors (inheritance). However, from the organization's membership, they have only joined farmer groups since 2010.

Furthermore, it was found that informants who attended much training had better adaptive abilities in dealing with the scarcity of subsidized fertilizers. The informants were enthusiastic enough to participate in the counseling and training activities held by the Agricultural Extension Center, the Pangkep Regency agricultural service, and the village government. Their liveliness can be seen from the number of their attendance at each meeting or outreach and training activities related to farmer groups. Among them were counseling and training on organic fertilizer production, which took place at the house of the farmer group chairman using the farmer group's self-help budget and under the responsibility of Field Agricultural Extension (PPL) and farmer group leaders.

![Figure 5. Training on making compost in Labakang District](source: Personal collection, 2022)

Furthermore, skills are one of the assets that farmers must have, describing the ability to do something well. Eze and Adeyemi (2012) explain skills by describing people's habits of doing something. People who do not have skills can be of no use to
themselves and society. This implies that farmers who lack skills in organic formulations may not be able to incorporate them, let alone utilize them to improve soil fertility and sustainable crop production. The findings in the field, although farmers use livestock manure as fertilizer, they do not have the skills to make organic fertilizer formulations (compost), and the skills to make organic fertilizers with the correct formulations are still low. This is due to a lack of knowledge, application practices, motivation, and tools to make the fertilizer. Even though these skills are critical, Amonjenu & Asogwa (2016) state that crops farmers in Benue state need ten skills items in formulating manure, eight skills items in preparing green manure, and 21 skills items in composting to increase soil fertility and crop production. Sustainable. Therefore, to encourage lowland rice farmers into organic fertilizer production, they must improve their skills in formulating organic fertilizers to increase soil fertility and sustainable crop production.

3) Financial Capital

Based on the findings, the financial sources used by informants to buy subsidized fertilizer when there was a surge in fertilizer prices came from farming income, savings, and side job income. 65% of informants who have savings use some of their savings to buy fertilizer; some borrow from relatives with fertilizer stock. This means informants who have savings can always buy fertilizer even though prices continue to increase, compared to farmers who do not save. It is scarce to buy from outside the capital city of Makassar, apart from a lack of information also because of the high shipping costs. Duarte et al., (2023) mention the need for family farm managers to manage finances more efficiently and, in many cases, improvements in financial management practices are needed.

Farmers with a land area of one hectare have savings from rice sales, while small farmers with a land area of fewer than 0.5 hectares choose to sell livestock and use their side job income to buy non-subsidized fertilizers. This proves that the ownership of savings and side jobs is a form of farmer resistance to the scarcity of subsidized fertilizers. So that the financial assets owned by rich and poor farmers affect the availability of physical resources used in farming activities, including fertilizers; capital collected from savings can be used to carry out activities that can generate various incomes in minimizing the negative impact of the scarcity of subsidized fertilizers. In line with Panman et al. (2022), Azad & Pritchard (2022) argued that financial capital provides opportunities for households to increase adaptive capacity. Having savings also helps
individuals better adapt to shocks, including floods. Farmers can then easily buy fertilizers and pesticides.

4) Physical Capital

Infrastructure components include transportation, shelter, safe buildings; adequate water supply and sanitation; energy, and information access (DFID, 1999). The availability of good agricultural infrastructure can facilitate agricultural activities in the village. (Zeleke et al., 2023) They stated that households with better infrastructure and technology have high adaptive capacity. Based on the findings, most of the rice fields owned by farmers in Labakkang District are their land and cultivated by themselves, so they do not incur land rental costs in their management. This includes physical assets owned by farmers whose average land area are 1.46 hectares. The size of the land area affects the use of fertilizers and production because the more significant the land, the greater the use of fertilizers and the higher the income but the costs incurred to buy fertilizer, seeds, and other costs.

Rice planting in Labakang District is still done traditionally by hand; no one has yet used technology such as a transplanter. Likewise, when fertilizing, fertilizer is given by spreading it by hand. Based on information from informants, 1 hectare of rice field requires around 150 kg of Urea fertilizer, which is then spread for two to three days. The frequency of fertilizer application is carried out two times, namely when the plants are 20 HST & 45 HST. Furthermore, other activities have used machines obtained from grant assistance to farmer groups, purchased themselves, and some have borrowed from other farmers. Tools are usually used together, such as rice threshing machines at harvest time, because at that time, the farmers work together to harvest rice. However, most informants did not have the tools to make organic fertilizer and used livestock manure without processing it. The livestock manure is spread before the land is processed. The remaining straw is not used as fertilizer because most of it is sold and used as animal feed.
Next, the facilities and infrastructure commonly used by farmers in their farming activities include roads, irrigation canals, and markets. The distance between paddy fields and farmer's houses varies; some are close, and some are far away, so in their activities, many farmers use vehicles such as motorbikes to get to the location of the fields. Meanwhile, farmers are not far from the market and subsidized fertilizer kiosks because they are located in the center of Labakkang District. Judging from the condition of the houses and vehicles, most of the informants had their own houses in the form of wooden stilts, so most of them stored subsidized fertilizers under their houses. Motorcycles are the vehicle most farmers own, as much as 92%, and the remaining 32% own cars/trucks.

5) Social Capital

Social capital in farming is needed to support the continuity of farming (Arsal et al., 2020; Bao et al., 2018; Yokoyama & Ali, 2009), not only between farmers, farmer groups, and extension workers but also between other institutions. Generally, social capital has three components or elements: trust, social networks, and norms. The findings in the field show that informants take advantage of the social environment through participation in farmer and religious groups. Farmers receive assistance with seeds, seeds, fertilizers, and production facilities through farmer groups. Farmer groups are intermediaries between farmers and extension workers, agricultural services, and fertilizer kiosks. They were also involved in preparing the Group Needs Definitive Plan (RDKK), training on making fertilizer, and working together to prepare the tools, materials, workforce, and places needed. In line with (Arifin et al., 2022; Raya, 2016) that training apart from creating independence for farmers in meeting fertilizer needs is also a vehicle for fostering and reinforcing the social capital of the Mulyasari community in the form of a culture of cooperation that has long been established. In addition, members can easily access information through regular meetings at local institutions. Nearly 80%
of farmers attended extension activities held by agricultural extension workers. Ankrah et al. (2023) stated that information capital significantly affects the application of organic fertilizers. The social relations between farmers in the group are very good, close, and harmonious. Hence, conflicts rarely occur, as expressed by the head of the farmer group in Batara Village, Labakkang District.

“There are no written rules within farmer groups. However, there has never been a conflict because all decisions are always consulted together, so everything is based on mutual agreements and decisions. The distribution of subsidized fertilizers is based on the RDKK that has been made and approved.”

This is because some farmers still kinship with each other and have been doing farming activities for a long time. The kinship that was formed made them even closer, and they helped each other cultivate the land, including providing information on subsidized fertilizers, lending fertilizers, and processing manure.

5 CONCLUSION AND RECOMMENDATIONS

This study found that the average age of lowland rice farmers in Labakang District was 51 years old; most were male (85%). On average, 75% of the informants had low education, did not even reach junior high school, and the average number of family members was five people. The informants had farming experience of more than 15 years; the average land area was 1.46 hectares, the pattern of land tenure was their own (60%); their own and all informants had side jobs. Farmers utilize natural capital from available land, water, and livestock ownership to make organic fertilizer. Physical assets such as private land and houses, vehicles, and livestock ownership can help farmers in situations of fertilizer scarcity. Farmers also take advantage of their social environment by establishing good kinship relations between farmers and enthusiastically participating in farming counseling so that it can help them deal with the scarcity of subsidized fertilizers. Based on this, the availability of livelihood assets used by farmers in Labakang District greatly influences the adaptive level of farmer households in dealing with the scarcity of subsidized fertilizers.
RECOMMENDATIONS

This study recommends that farmers utilize human capital to enhance all other livelihood capital; they must improve their skills in formulating organic fertilizers to increase soil fertility and sustainable rice production. Besides that, agricultural extension workers need to continuously provide training and assist them with organic fertilizers, as well as need assistance in procuring technological tools to make organic fertilizers.

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CONFLICT OF INTEREST

The authors declare that there was no financial competition, and personal interests influenced the research presented here.
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