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Use of yard land as a source of nutrition and family economy during covid-19 pandemic

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Abstract. The period of the Covid-19 pandemic in Indonesia has not yet fully passed, so various strategies are needed that can minimize fluctuations in household food needs. Continuous optimization of yard land can provide nutritional fulfillment solutions for people both plant and animal and an increase in the PPH score by 11.90-20.46 percent. The description of the government's strategy in agriculture through the Ministry of Agriculture of the Republic of Indonesia, that the system of cultivation of verticulture crops, hydroganic, aquaponics, hydroponics, tabulapot, and shelter houses is very easy for every household in Indonesia to do. People can use empty or derelict yard land integrated by suitable or cultivating livestock/fish to obtain family nutrition and economic resources. This review raises several models of household yard management that have been studied by previous researchers so that the community can imitate or apply directly in the yard.

1. Introduction

The spread of the corona virus is believed to have originated from a wet market in Wuhan, Hubei, China. In the market, live and dead animals are sold. Markets in this condition are very vulnerable to being a medium for transmitting viruses from animals to humans because they do not meet hygiene standards. Especially with the level of activity density in the market, it is very easy to spread the disease from one species to another. Cases of sufferers of Acute Respiratory Distress Syndrome were reported to occur on December 18, 2019. Not waiting for a month, this disease has spread in various provinces, including Thailand, Japan, and South Korea. More than 190 other countries and territories. As of March 29, 2020, there were 634,835 cases and 33,106 deaths worldwide. In Indonesia there have been 1,528 positive cases of COVID-19 and 136 deaths [1].

The World Food and Agriculture Organization (FAO) has reminded countries of the world about the potential world food crisis due to the Covid-19 pandemic. The Covid-19 pandemic has closed the affected business world. Likewise with the education, economy, agriculture, tourism and various other fields of life. The PSBB (Pembatasan Sosial Berskala Besar) policy in order to accelerate the handling of Covid-19 which is stated in Government Regulation Number 21 of 2020, encourages the public to keep their distance, keep activities at home, and reduce activities outside the home if not needed. This emergency condition becomes a serious challenge for the Government to continue striving for the adequacy and stability of domestic food so that it can meet the needs of the community in accordance with the provisions of Law Number 18 of 2012 concerning Food that food security is a condition of



fulfilling food for the State and individuals, reflected by the availability of food that is sufficient in terms of quantity and quality, safe, diverse, nutritious, equitable, and affordable and does not conflict with the religion, belief and culture of the community to achieve a sustainable, healthy, active and productive life [2].

The writing of this review aims to trace the tips or programs of the ministry of agriculture or researchers and extension workers in agriculture, plantations, and livestock before the Covid-19 pandemic in utilizing the yard so that it is economically valuable and profitable for every family with a touch of innovation and technology that can be applied by households affected by the current pandemic.

2. Ministry of agriculture program in food security efforts during the Covid-19 pandemic

[3] explains that families must have the ability to build family resilience and resilience physically, psychologically, mentally, and spiritually so that a harmonious family can be physically and mentally prosperous [3]. In this pandemic era, families are said to be resilient if they can meet this resilience, including (1) Psychological resilience is the family's ability to manage and build positive emotions to create a positive self-concept as well, (2) Economic resilience is shown by the ability to manage family finances and economies. Even in a small amount, the basic needs of food, shelter, and clothing can be fulfilled. Productive activities by utilizing the land around the house help the family's economic resilience, such as growing vegetables and other fast-harvesting crops. Cultivation of fish or chicken is also very supportive of the fulfillment of family nutrition. (3) The social resilience of a family is required to be able to work in synergy with the social environment. During the corona outbreak, people are urged to refrain from doing activities outside the home if not important. However, the community also still has to establish communication and friendship so that there are bonds that help each other and cooperate, (4) Spiritual endurance, which is closely related to the application of religious values in everyday life. Starting from a family, religion has become a strong support and fortress in facing life's problems, especially with the corona outbreak that has rocked various lines of life.

Food security is closely related to social security, economic and political stability, security, or social resilience. Food security is very important because it is also related to improving the quality of human resources. National development can run ideally if supported by productive and strong human resources. In addition to the potential for food insecurity, the problem of consumption level of some Indonesians is still below the recommendation of nutrition fulfillment (proxies with PPH/Harapan Food Pattern). One of the efforts to improve food security and family nutrition is carried out by utilizing the yard with all potentials that support [4].

Strengthening family food security must be actively supported by the participation of each member of the community, by cooperating with the government that has programs for family economic empowerment and community nutrition improvement programs. Sustainable food house is the concept of land use in the village and in the city. In addition to the purpose of beauty and coolness of the house with a variety of plants, the yard can also be used to improve the family economy, live pharmacies, and maintain ecological stability. One of the priorities of agricultural development is the availability of food at all times. Therefore, every household is expected to be able to optimize their resources. If this is done actively and gotong-royong then the crucial problem of national food security can be overcome [5,6].

The yard is an exclusive home garden that is closely integrated with the human, plant, and animal life. The multipurpose function of the yard with a size that is not so wide can produce food, among others tubers, vegetables, fruits spices, medicinal plants, handicrafts, and even animal foodstuffs from poultry such as meat and eggs, and fish. Some benefits of managing household yards: meeting the needs of family consumption and nutrition, saving expenses, additional family income, forms of household food independence in a region, diversification of food based on local resources, conservation of food crops, horticulture, plantations, as well as animal feed crops, as well as achieving

the welfare of the community so that the community is required to be able to utilize the potentials around them for daily basic living needs [7,8].

[9] explained that the Ministry of Agriculture's strategy in increasing food production so that it continues to produce during the pandemic includes relaxation of people's business credit (KUR) in the agricultural sector and accelerating the assistance of agricultural facilities and infrastructure [9]. The government grants interest payment exemptions and delays in payment of kur principal and will be followed by the provision of periods and additional ceilings. This strategy is considered to benefit farmers in carrying out their farming activities because farmers need capital ranging from planting to harvesting. The Ministry of Agriculture also focuses on aspects of facilities, including the acceleration of irrigation facilities improvement, provision of alsintan, seeds and seeds, fertilizers, animal feed, veterinary medicine, vaccines, and other production facilities needed by farmers. This is very important to do because the availability of alsintan such as tractors helps accelerate the production process compared to when farmers rely only on buffalo power or human power.

The World Health Organization (WHO) declared coronavirus disease 2019 (Covid-19) as a pandemic at who's Geneva office in Switzerland on March 11, 2020. According to WHO, changing the status of Covid-19 into a pandemic does not mean that it directly changes the virus works. However, with this status, countries in the world will be moved to deal with the spread of the virus. In Indonesia itself, this pandemic was determined by the government as a National disaster on April 13, 2020, through the issuance of Presidential Decree No. 12 of 2020 on the Determination of Nonalam Disaster spread of Corona Virus Disease 2019 as a national disaster [10]. In line with who's an appeal that the Covid-19 pandemic is not only a public health crisis but a crisis that will touch every sector of life, then in Indonesia, every citizen must be actively involved in the termination of the spread of this virus. [11] that the corona pandemic (covid-19) has an impact on the continuity of workers' work in Indonesia [11]. It is seen in the job street survey results that more than 50% of respondents lost their jobs or were temporarily laid off from their jobs, while 43% of respondents experienced a reduction in salary to more than 30%, while the results of a survey conducted by the Central Statistics Agency (BPS) of 87,739 respondents revealed that until October only 56.40% of respondents were still working. The remaining 22.74% of respondents were found to be out of work; 18.34% worked but were temporarily housed, and 2.52% had recently been laid off. Respondents experienced a decrease in income by 41.91%.

Based on this fact, it is fitting that every individual can carry out the government's appeal to be able to carry out useful activities and support the family's economy, including by cultivating their own yard, so that each household can maintain food availability during this pandemic. Government policies related to social distancing and physical distancing have become a boring routine for almost everyone. Gardening in the yard itself will dispel boredom and add new knowledge. In addition, the quality of time with family will increase, and it will affect a person's level of happiness. Gardening activities will help control emotions over time. Gardening can provide mental health benefits, improve anxiety, and boredom. Apart from that, gardening can also give you a sense of passion and enthusiasm. It's not just a mental benefit, gardening strengthens bones and muscles under sun exposure which provides vitamin D to the body. Gardening will also burn 330 calories equivalent to running in the field for one hour [12]. [13] reported that the Minister of Agriculture Syahrul Yasin Limpo stated that the current Covid-19 has devastated all sectors of life. Many of the economic activities of the community have stopped, services are hampered, and the most serious occurs in the distribution and marketing system. Therefore, the Ministry of Agriculture introduced the Food Security Movement (GKP) in order to anticipate food shortages during the Covid-19 pandemic and encourage farmers and extension workers to accelerate planting by supporting GKP nationally.

The Ministry of Agriculture through the Agency for Extension and Development of Agricultural Human Resources has formulated 4 ways of acting to achieve food security, among others:

1. Increasing production capacity, by inviting agricultural actors to accelerate rice planting in Planting Season II 2020 covering an area of 6.1 million ha. The development of swampland

in Central Kalimantan Province is 164,598 ha, including an intensification of swampland of 85,456 ha and extensive agricultural land of 79,142 ha.

2. Diversification of local food based on local wisdom focusing on one main commodity.
3. Strengthening food reserves and logistics system by strengthening the provincial government's rice reserves (CBPP), and then strengthening the rice reserves of the district/city government (CBPK).
4. Development of modern agriculture, through the development of *smart farming*, development, and *utilization of screen houses* to increase the production of horticultural commodities outside the growing season, development of farmer *corporations*, and *development of food estates* to increase the production of the main food, namely rice and corn.

Also, the Ministry of Health has a short, medium, and long-term agenda in dealing with the Covid-19 pandemic. Short-term agenda (*SOS/emergency*), Ministry of Agriculture seeks to maintain food price stability and *build buffer stock*. The medium-term agenda is realized by continuing labor-intensive post-Covid-19, diversifying local food, helping food availability in deficit areas, anticipating drought, maintaining the spirit of agricultural work through *saprodi* and *alsintan* assistance, *encouraging family farming*, *helping smooth* food distribution, increasing agricultural exports, strengthening *Kostratani*. While the long-term agenda that is permanent, among others, encourages increased production by 7% per year *and reduced the loss* to 5%.

The Minister of Agriculture has also programmed the provision of assistance in the form of agricultural production facilities that are expected to help enterprising farmers produce, including optimization programs for the utilization of yardland to meet food and household nutrition needs. Head of the Food Security Agency Agung Hendriadi stated that the activities of The Sustainable Food Yard (P2L), not only meet food needs at the household level but can reduce spending and even increase household income. Therefore, households are expected to be able to make the most of their yard, sustainable to increase their availability, accessibility, utilization, and income [14].

The Ministry of Agriculture program before the pandemic that is still very relevant to family food security programs today is the MKRPL program. The objectives of *krpl* development in the general guidelines of the Sustainable Food House Area Model (MKRPL) of the Agricultural R&D Agency (2011) include (1) Meeting the food and nutrition needs of families and communities through optimization of sustainable utilization; (2) Improving the ability of families and communities in the utilization of yardland in urban and rural areas for the cultivation of food crops, fruit, vegetables, and medicinal plants, maintenance of livestock and fish, processing of products and processing household waste into compost; (3) Develop seed sources to maintain the sustainability of yard utilization and preserve local food crops for the future; and (4) Develop productive economic activities of families to improve family welfare and create a clean and healthy green environment independently [15].

Wahyudi *et al.*, (2018) revealed the government's efforts to improve household welfare through the utilization of packaged yards in the Sustainable Food House Area Model (MKRPL) [16]. In January 2011, KRPL was first launched in Pacitan, East Java. *Krpl* understanding is a village-level area/village/RW/RT built-in groups of several sustainable food houses that apply the principles of utilization of yard and space resources well, based on local resources and environmentally friendly to meet the needs of food and nutrition of families, as well as increase family income, both through the efficiency of reduced family spending costs and sales of the abundance of products produced by achieving food security and family welfare based on active participation that integrates between households in the community.

3. Agricultural patterns on household yard land

The main focus in building food security is household and individual-oriented, the time dimension at any time food is available and accessible, a pressure points on access to household and individual food, both physical, economic and social, nutrition fulfillment, as well as the healthy and productive living. By some definitions, the lowest but fundamental level is individual or in this case household

food security. Limited land in urban areas is a challenge in building awareness of food security for households. In fact, at the national level, the challenge of building food security in Indonesia is limited agricultural land. Limited land, especially the conversion of rice fields, can be a threat to food security related to reduced national food production capacity. However, the land conversion is inevitably related to people's need for housing and economic development activities [17,18].

[4] explained that agricultural patterns in the yard are generally mixed (multi commodities). Farmers plant a variety of crops commodities yearly as well as seasons. Similarly, food crops, horticulture, plantations, livestock, and fish. The first step, before planting, farmers should consider the main objective of commodity selection is whether to simply meet the daily food needs, commercial, conservation, and so on. The KRPL Handbook lists several patterns of crops both in the city and in villages with various types of housing [15]. In general, agricultural patterns in large yard areas can use vertical patterns, using polybags, or pots. With the narrower vertical planting pattern yard becomes a rational choice. In English "*verticulture*" is a combination of two syllables, *vertical* and *culture* which means cultivation of plants in a multilevel or clustered way, utilizing space towards the top. Vertical cropping pattern is an agricultural business by utilizing the land as much as possible by utilizing the potential heights so that the plants cultivated per unit area more. This planting pattern serves to save space, fertilizer, and water.

In planting this verticulture planting pattern, technically it can be done as follows:

1. Planting media can use a mixture of soil, fertilizer and sand/husk with a ratio of 1:1:1 placed on the tubs of plants (paralon, bamboo, pots) arranged in a layer to the top.
2. Plants suitable for shady conditions are placed at the very bottom and who prefer the heat put on top.

The utilization of less fertile yard land can be prepared by *tabulapot*, namely planting fruit or flower crops in pots. In this *tabulapot* it is worth noting several things, among others: (1) Planting media must be able to support plants, can provide good nutrients, water and aeration (the same as vertical planting patterns), (2) Pots are not good, will produce poor air system so that it is less guiding for the development of roots.

[9] explained that verticulture techniques can be done using various containers (planting media) such as paralon pipes, used bottles, pots, polybags, or other containers depending on creativity [19]. Basically, verticulture farming techniques are not much different from conventional farming, just how to put/arrange the plants are different. Examples of yard land use patterns by type in South Sumatra are presented in table 1.

Table 1. Pattern of land use by type in South Sumatra.

| Type | Pattern |
|------|---|
| I | Combination of highland vegetable crops, fruits, and native chicken. |
| II | Cultivation of fruit crops and native chickens. The planting pattern is aligned with the land contour line. |
| III | Integrated cultivation between lowland vegetable crops, fruits, and native chicken. |
| IV | Cultivation activities are distinguished between the dry season and the rainy season. Seasonal vegetables are grown in the dry season, while the fruits grown are limited to the type that is tolerant to periodic puddles. |
| V | The planting pattern is divided into 2 parts. The first part is managed to meet its own food needs which are designed similarly to type III yards and other sections are managed for commercial purposes. |

| | |
|----|---|
| VI | Integrated cultivation between freshwater fish, native chicken, and horticultural crops, namely by making fish ponds, chicken coop on ponds, and plants cultivated on pond embankments. |
|----|---|

Source: Lakitan, 2005 (processed) in [4].

The arrangement of the yard by paying attention to aesthetic elements will form a beautiful and comfortable environment, so that it becomes an attraction for others to replicate it. The design of plant arrangement is carried out jointly by the community as needed and the land available. Based on land area and utilization, the yard can be classified into 3 parts (table 2).

Table 2. Land arrangement based on land area and utilization.

| Strata | Aquaculture Techniques | Commodities |
|--|---|---|
| 1 (narrow category) Yard area < 100 m ² or no yard (home terrace only) | Allocation of polybag/verticulture pots, barrel ponds | <ul style="list-style-type: none"> ✓ Vegetables (chili, eggplant, tomato, mustard, kenikir, spinach, kale) ✓ Toga (laos, ginger, kencur, betel) ✓ Aquaculture freshwater fish (catfish, tilapia, and others) |
| 2 (medium category) Yard area 100 – 300 m ² | Allocation of polybag/verticulture pots, bedengan/sorjan on the border of the yard, chicken coop ren system and tarpaulin fish pond | <ul style="list-style-type: none"> ✓ Vegetables (chili, eggplant, tomatoes, mustard, kenikir, spinach, kale, etc.) ✓ Toga (laos, ginger, kencur, betel) ✓ Tubers such as sweet potatoes, cassava, taro, mbote, arrowroot, and others that have market share and substitution of carbohydrate sources. ✓ Buras chicken cattle ✓ Freshwater fish cultivation (catfish, tilapia, and carp) |
| 3 (broad category) Yard area > 300 m ² | Allocation of polybag/verticulture pots, bewith/sorjan on the boundary of the yard, expanse, chicken coop ren system, goat coop and tarpaulin pond/soil | <ul style="list-style-type: none"> ✓ Vegetables (chili, eggplant, tomatoes, mustard, kenikir, spinach, kale, etc.) ✓ Toga (laos, ginger, kencur, betel) ✓ Tubers (sweet potatoes, cassava, taro, mbote, arrowroot and others that have market share and substitution of carbohydrate sources) ✓ Native chicken ✓ Aquaculture freshwater fish (catfish, tilapia, gurame) ✓ Fruits (pineapple, banana, sweet orange, mango seeded, papaya, mustard, and others) ✓ Fodder plants (leguminosae), live fences |

Source : [20].

Crop cultivation activities also need to pay attention to the crop rotation system. Crop rotation is to plant crops in turn on land, with the aim of increasing crop production, utilizing vacant lands, enriching the variety of plants so that the planted is not only that, improving soil fertility, and reducing the risk of crop failure.

Table 3. Crop rotation system.

| Months | Land 1 | Land 2 | Land 3 | Land 4 | Land 5 |
|------------------|--------------|--------------------------|----------------------|--------------------------|------------|
| January-March | Eggplant | Green Mustard Spinach | Tomato | Sweet potato leaves | Cucumber |
| April-June | Sweet Potato | Chili | Long beans | Pare | Tomato |
| July-September | Pare | Onion | Eggplant | Green mustard Spinach | Long beans |
| October-December | Gambas | Sweet potato | Scallions Spinach | Eggplant | Chili |

Source : [20]

Cultivation of plants in the yard also pays attention to the harvest period of crops so that vegetables produced in the garden/yard can be available on an ongoing basis. The harvest period of some vegetable commodities is presented in table 4.

Table 4. Harvesting some vegetable commodities.

| Plant | English name | Harvest period of seeds |
|-------------------------|------------------------|-------------------------|
| Daun bawang/bawang prei | Weish onion | 75 days |
| Bayam | Amaranth | 40-52 days |
| Brokoli | Broccoli | 100-150 days |
| Cabe | Hot pepper | 60-95 days |
| Kacang panjang | Yard-long Beans | 110-125 days |
| Kangkung | Kangkong/Water Spinach | 30 days |
| Kubis/kol | Cabbage | 80-180 days |
| Kembang kol | Cauliflower | 85-130 days |
| Selada | Lettuce | 65-90 days |
| Mentimun | Cucumber | 55-65 days |
| Pakchoy | Pakchoy | 50-80 days |
| Seledri | Celery | 120-150 days |
| Terong | Eggplant | 100-150 days |
| Tomat | Tomato | 80-140 days |
| Basil | Basil | 54-64 days |
| Daun ketumbar | Cilantro | 100 days |
| Mint | Mint | 95-113 days |
| Kuai | Chives | 75-90 days |
| Melon | Melon | 65-90 days |
| Paprika | Sweet pepper | 60-95 days |

Source : [20]

[21] explained that crop rotation is related to soil fertility and disease-causing pathogen populations on the planting land. This happens because of the disconnection of the pathogen's life cycle due to the

change of host plants with other types of plants. The rotation pattern of K-D-B-U (Bean-Leaf-Fruit-Tuber) can be explained as follows:

3.1. Nuts

Plants of legumes or legumes have the advantage of roots being able to fix nitrogen elements from the wild. Nitrogen is one of the macro elements with a large enough portion of the needs for each plant. The former land of peanut plants will be fertile if any plants are planted thereafter.

3.2. Leaves

Plant commodities that will be harvested with leaves and used as vegetables include spinach, kale, caisim, cabbage, mustard greens, and others. Leaf and stem growth is more synonymous with vegetative growth which requires a lot of nitrogen. Planting vegetables after legumes will show a rapid growth response.

3.3. Fruits

Fruit plants have different characteristics when they enter the sexual phase. Therefore, fruits do not need nitrogen element too much. If the excess nitrogen element will actually cause fruit plants to bear fruit too late or fail to bear fruit. At the time of flowering, fruit plants require more phosphate elements, and when fruiting, fruit plants require more potassium. Types of fruit plants that can be planted after vegetables are melon, watermelon, cucumber, and others.

3.4. Tubers

Root crops (yams, cassava, potatoes, jicama, taro) are the greediest types of plants to absorb nutrients. Soil planted with tuber type plants will immediately experience a decrease in nutrient content so that it is less fertile. Therefore, root crops should be planted last and then planted with nuts to restore soil fertility. Sweet potatoes are good for cultivation because of their easy and effective cultivation. Still according to [21] that although crop rotation is very effective, it still pays attention to the typical lowland and upland plants, dry and rainy planting seasons, use of fertilizers, and superior seeds.

4. Conclusion

The Covid-19 pandemic, which is still occurring today and is a National Nonalam disaster, has caused much loss of lives and losses in various sectors of life. Therefore, every citizen is obliged to actively cooperate with various parties and support government programs in the context of fulfilling nutrition and strengthening food security. Maximum management of yardland can not only fulfill nutrition and increase the PPH rate, but it is beneficial for increasing income and family welfare, both affected and unaffected by the pandemic. Routine and optimal management of yardland is also beneficial for mental health and physical strength. Government programs in optimal utilization of yards such as MKRPL are still very feasible. Cultivating crops in the yard will have a positive impact if you pay attention to the rules and patterns of agriculture and crop rotation. Thus, it is hoped that during the Covid-19 pandemic, residents of the community, apart from being physically and mentally healthy, will increase their knowledge and increase family income.

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