The implementation and synergy of Indonesian national food reserves

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Abstract. In aggregate, Indonesia's national food reserves (rice) in early 2021 are adequate, as indicated by the stock to use ratio (SUR) reaching 25.16% above the FAO recommendation of 17–18%, with the end of 2020 rice stock reaching 7.9 million tons from 29.3 million tons rice consumption needs. As mandated by Food Law 18/2012, Indonesia has established a multi-layered mechanism of national food reserves, consist of a central government food reserve, regional government food reserves (provincial, district/city, and village level), and community food reserves. This paper aims to examine the various implementation of Indonesia's national rice reserves along with synergy recommendations to strengthen government, regional governments, and community’s food reserves. The approach used is descriptive qualitative analysis, by exploring information and secondary data across institutions with national and regional coverage. The results of the study show: (1) the need for an increase in Central Government Rice Reserves (CGRR) in the range of 1.5–2 million tons accompanied by strengthening the mechanism to absorb farmers production of unhulled rice/rice to stabilize rice prices especially at the peak harvest time; (2) strengthening the intensity of advocacy and coordination amongst key-stakeholders in provincial and district/city to optimize the implementation of government food reserves area; and (3) strengthening and developing village-based community food barns through cooperation with the Strategic Command for Rice Mill Development (Kostraling) and Village Owned Enterprise (BUM Desa and BUM Desma).

1. Introduction

The agricultural sector occupies a central position in economic development, especially during the COVID-19 pandemic. The Food and Agriculture Organization (FAO) in 2020 stated that there was a potential for a food crisis, due to restrictions on the mobility of citizens and the distribution of goods between countries due to the COVID-19 pandemic. Each country is obliged to guarantee the availability of food in its region coupled with adequate food reserves so that people can live healthy, active and productive lives [1].

The urgency of national food reserves as part of food availability fulfillment is closely related to the efforts to safeguard food vulnerabilities, anticipate supply and price fluctuation, natural/social disasters, and emergency conditions. According to report in 2020, there are still 27.55 million poor people in Indonesia (10.19% of the total population) [2], and based on Food Security and Vulnerability Atlas (FSVA) in 2020 there are still 70 district/city prone to food vulnerability in Indonesia which consist of 66 districts from 416 districts (15.9%) and 4 cities out of a total of 98 cities (4.08%) [3].

In terms of food supply, the production of food commodities tends to be seasonal and the harvest period is not evenly distributed between regions causing the food supply system to obstructed and
triggering price fluctuations. To ensure the availability of food supply steadily across time and areas, it is necessary to manage food reserves, both for the food production center areas, as well as for areas prone to food insecurity [4]. This is inline with the studies involving several countries in southeast asia region, highlighting the basic rationale behind the decision to stockpile food which showed less variation, with priority list mainly for price stabilization and food availability [5].

To achieve food sovereignty and maintain food security, it is necessary to strengthen national food reserves. These efforts have been established by the government of Indonesia through a multi-layered mechanism of national food reserves, consist of the Central Government Food Reserves (CGFR), Regional Government Food Reserves (RGFR), and Community Food Reserves (CFR). However, further policy dan program actions are still needed to strengthen its implementation. In this regard, this paper aims to (a) examine the various implementation of Indonesia's national food reserves; (b) explore synergy recommendations to strengthen the government, regional government, and community food reserves.

2. Materials and methods
This study uses secondary data and information from cross-institutions both national and regional, as follows: Agency for Food Security-Ministry of Agriculture, Ministry of Trade, the National Logistic Agency (Perum BULOG), Statistics Indonesia, and Provincial/District Office for Food Security. Data and information collected through direct and/or virtual interviews with competent stakeholders, particularly those related to the government, regional government, and community food reserves activities. Furthermore, analysis of data and information conducted using a descriptive qualitative analysis approach. This approach is used out to examine implementations and the policy strategy to strengthen the central government, regional governments, and community food reserves.

3. Results and discussion
3.1. Implementations of the government, regional governments, and community food reserves
3.1.1. Implementations of Central Government Food Reserves (CGFR). The existence of Government Food Reserves (GFR) plays a strategic role in ensuring the achievement of food security and sovereignty of a country. The Government of Indonesia determines the type of commodities and the amount of CGFR [1] and rice was set as the main government food reserve commodities which was called Central Government Rice Reserves (CGRR) [6].

In Indonesia, rice is a strategic commodity that could affect the stability of the national economy. Rice also has an important role in food security, economic security, and national political stability. Rice is the main commodity in the dietary pattern of the Indonesian people and nationally, rice consumption in 2020 reached 29.37 million tons [7]. In the Southeast Asian Region, rice is also the main commodity for food reserves [5].

Therefore, the Government of Indonesia in 2018 through Coordination Meeting of Economic Ministries (Rakortas Menteri Bidang Perekonomian) has set the minimum stock 1–1.5 million tons of central government rice reserve, known as CGRR, managed by Perum BULOG. This number increased sharply from the previous CGRR allocation in the range of 250 thousand tons per year [8] up to 350 thousand tons per year [9]. Overall, the total supply controlled by Perum BULOG in 2016-2020 was 2.6–4.8 million tons (Figure 1).

The existence of adequate CGRR has proven to be able to maintain the stabilization of national unhulled rice/rice prices at the producer level in 2019–2020 (Figure 1). According to Agency for Food Security (AFS) panel data of food price, during the 2019–2020 period, the price of unhulled rice was stable above the Government Purchase Price (GPP), both for Harvested Unhulled Rice (HUR) and Dried Unhulled Rice (DUR), with a price range of IDR 4,400–4,800 (HUR) and IDR 4,600–5,100 (DUR). Likewise, the price of rice at the rice milling level in the 2019–2020 period was above the GPP in the range of IDR 9,100–9,500. At the peak of the harvest season, namely in March, April, and May, the price of unhulled rice/rice is still above the GPP.
The government intervention in the purchase of domestic production of unhulled rice and rice is a form of protection to maintain the stabilization of food supply and prices, especially during the harvest season where the price of farmers’ unhulled rice tends to fall [10]. The procurement of unhulled rice and
rice by Perum BULOG sourced from domestic farmers will encourage a conducive domestic unhulled rice-rice market system and be able to realize the certainty of product selling prices at the farmer level. On the other hand, it provides incentives for farmers to continue producing [11].

Based on the domestic procurement activities of farmers’ unhulled rice/rice during 2016–2020 (Figure 1), it is known that nationally the highest purchasing of unhulled rice/rice farmers by Perum BULOG was recorded at 2.96 million tons in 2016 (Figure 2). In 2017, procurement by Perum BULOG amounted to 2.05 million tons, a decrease of 24% compared to 2016. The purchasing trend continued to decline in 2019 (0.95 million tons) and 2020 (0.68 million tons) or only 2–3% of annual rice production.

In terms of distribution, the use of Perum BULOG stock for CGRR purposes has increased in the 2016–2020 period (Figure 1), especially to stabilize rice price at the consumer level through the distribution for Market Operations (MO) or Availability of Supply and Price Stabilization (ASPS) (Figure 2). This is in line with the price of medium rice at the consumer level, which is in the range of IDR 10,800–11,100 above the Highest Retail Price (HRP) (Figure 2).

3.1.2 Implementations of Regional Government Food Reserves (RGFR). Since 2010, regional governments have implemented provincial and district/city government food reserves (RGFR) to anticipate food insecurity, emergencies, and food crises. Furthermore, in 2015 the Government enacted Government Regulation No. 17/2015 on Food Security and Nutrition which regulates the mechanism for implementing RGFR.

Until 2020, 31 of the 34 provinces in Indonesia have established RGFR, except for DKI Jakarta, Bali, and North Maluku [12]. The type of commodities that set as food reserves is mostly rice, with the total volume of the RGFR-rice stock volume at the end of 2020 increasing by 13.7% compared to 2019 at the provincial level, although in overall it reached 17.69% (5.2 thousand tons) of ideal requirement (29.41 thousand tons).

Furthermore, the implementation of RGFR-rice at the district/city level as called District/City Government Rice Reserve (DCGRR) at the end of 2020 covered 269 of the 508 districts/cities (47.05%) throughout Indonesia, with a total volume of 8,361 tons. Compared to the end of 2019, there was an addition of 34 districts/cities providing food reserves, from 235 to 269 districts/cities. The amount of district/city government food reserves varies and is highly dependent on the commitment and available
local budget allocations. In 2020, there was an increase in RGFR-rice stock by 8.82% compared to 2019, with the total stock being managed at 8.31% of the ideal requirement (100.5 thousand tons).

The type of commodities and amount of RGFR is determined by the Head of Regional Government (Governor and Regent/Mayor)[12]. The type of RGFR is in the form of certain staple foods that are following the consumption needs of the community and the potential of local resources, which can be mobilized for the needs of dealing with emergencies or food insecurity in the region. Based on the results of a survey of 34 provincial government respondents, it is known that out of a total of 307 regional governments that organize RGFR, all of them allocate food reserves in the form of unhulled rice/rice. Although there is a variation in Bandung District–West Java, apart from DCGRR, there is also allocated frozen fish, as part of synergy program in supporting the elimination of stunting.

The operationalization of RGFR implementation is mandated by food security agencies at provincial and district/city levels [1,13]. The implementation of the RGFR can be carried out independently or in collaboration with state owned enterprise called Badan Usaha Milik Negara (BUMN) and/or regional owned enterprise called Badan Usaha Milik Daerah (BUMD) in the food sector. From the results of a survey involving 146 respondents of the provincial and district/city offices for food security respondents, it is known that of a total of 113 provincial and district/city offices for food security that have allocated RGFR, as many as 66% cooperates with Perum BULOG, 27% are managed independently, and 6% in cooperation with .

3.1.3. Implementations of Community Food Barns (CFB). The importance of community food reserves (CFR) in food security underlines the initiation of government policies to strengthen CFR. The policy program to strengthen CFR which implemented by the Agency Food Security of the Ministry of Agriculture, followed by actions program coordinated by food security agencies at provincial and district/city level for more than a decade has become a concrete manifestation of the mandate of the Food Law No. 18/2012, especially Article 33, which states that the Government and Regional Governments facilitate the development of Community Food Barns (CFB) suitable with local wisdom.

The policy actions taken by the central government to establish community food reserves are mainly through the facilitation of the physical development of community food barns with the provisions of supporting facilities, and also the facilitation of initial food stock [14]. Physically, CFB is a storage place for farmers’ production combined with the facilitation of unhulled/rice processing tools/machines that are needed to increase added value and ensure the sustainability of food barn stock management. The existence of the food barn communities as a model of farmer’s empowerment in managing food stock to achieve food security have an effective role in bringing food access closer to its members [14].

Until 2021, the Agency for Food Security Ministry of Agriculture has facilitated the construction of CFB through the Special Allocation Fund for Physical Development of the Agricultural Sector called Dana Alokasi Khusus Fisik Pembangunan Bidang Pertanian (DAK Fisik) as many as 4,373 units at 388 districts/cities in 33 provinces. The support of the local government at the province and district level of the development of the food barn was indicated by facilitating the construction of 1,335 food barns through the regional government budget. Therefore, the accumulation of the physical development of community food barns has reached 5,708 CFB.

The CFB were built in the food commodity production center and in areas prone to food insecurity. The concept of CFB development in central production areas is directed to optimize the production potential to increase added value for farmers and maintain the availability of food stock in the village aside the peak harvest season, while in areas prone to food insecurity, it is aimed at ensuring food accessibility for the farmers and community at village level.

The total stock of CFB at the end of 2020 was reported to be 6,332 ton of rice equivalent. Compared with the total allocation of Government Assistance called Bantuan Pemerintah (Banper) from the State Budget for filling community food barn stocks for a decade (2010–2020) which reached IDR 170 billion, then at least the stock managed by the community at around 17 thousand tons of rice equivalent.

Several challenges in the management of barns as the results of the field assessment outlined in the 2016 CFB Directory, it is seen that from the institutional aspect, there is still a lack of regeneration
(change) of management since its establishment. Meanwhile, from the aspect of business development, CFB's capital only relies on government funding assistance, and minimal other sources of capital, both internally from members themselves, and from outside parties. On the other hand, there are obstacles or limitations of groups in reporting regularly managed stocks.

The existence of community food barn groups needs to be intensified increasingly, not only by the central government but also with local and village governments. Following up on this, the Ministry of Agriculture together with the Ministry of Villages and Development of Disadvantaged Regions took a strategic step by initiating the strengthening of Village-based Community Food Barns called Lumbung Pangan Masyarakat Desa (LPMDes).

3.2. Synergy to Strengthen Government Food Reserves (CGFR), Regional Government Food Reserves (RGFR), and Community Food Barns (CFB)

3.2.1. Synergy to Strengthen Central Government Food Reserves (CGFR). As an archipelagic country with a population that continues to increase, Indonesia needs sufficient food availability and can be easily accessed by people throughout the region. In aggregate, Indonesia's national food reserves (rice) at the beginning of 2021 were adequate, indicated by the stock utilization ratio (SUR) reaching 25.16% above the FAO recommendation of 17–18%, with the stock at the end of 2020 reached 7.9 million tons of rice, with consumption needs of 29.3 million tons of rice.

The increase of Indonesia's population reached 272 million people in 2021 usually followed by the increasing demand for rice compared to 2018, especially with the current pandemic covid19 situation. Therefore, the increased amount of food reserve deemed necessary to covers the increase in demand. Based on the calculation of the national rice consumption needs of 29.37 million tons [15] and referring to the calculation of the stock to use ratio (SUR as a national food reserve with a recommendation of 17–18% (FAO) and 20% (ASEAN Food Security Information System or AFSIS) with details for the need for government food reserves of 5–6% and 7% SUR, respectively. The government's rice reserves in 2021 are estimated to be in the range of 1.5–2 million tons.

To increase public food access and maintain food supply and prices, it is necessary to develop strategic steps to support food as follows: (1) work synergistically in the preparation and implementation of food reserve policies and (2) increase the provision of CGFR at least 1.5–2 million tons through optimizing the uptake of farmers' rice production.

3.2.2 Synergy for strengthening Regional Government Food Reserves (RGFR). One of the determinant factors of the implementation of RGFR was related to the regulation in Government Regulation No. 17/2015 concerning Food and Nutrition Security, especially in article 22 which states that the implementation of RGFR is stipulated through a Regional Regulation called Peraturan daerah (Perda). This is considered one of the factors that become the main concern in accelerating the achievement of targets because it requires adequate budget allocations, time constraints, and intensive discussion with regional legislative assembly called Dewan Perwakilan Rakyat Daerah (DPRD).

However, the acceleration efforts that could be carried out by the regions are through: a) the determination of regional heads (governor/regent/mayor regulations) which are then scheduled in parallel with the preparation of regional regulation, or b) advocating and coordinating with legislative to include the agenda for drafting regulations related to the implementation of RGFR in regional legislative programs.

With the problems faced, the provincial and district/city governments, in this case, the food security agency in the province and district/city need to increase food support through series of meeting to conduct advocacy, socialization, coordination, synchronization, and evaluation of RGFR by involving related parties, including legislative which handles agriculture/food security issues and the Regional Secretariat so that it can accelerate the implementation of RGFR through the preparation of regional regulations and the allocation of regional government budget called Anggaran Pemerintah Belanja Daerah (APBD) for food reserves.
3.2.3 Synergy for strengthening Community Food Barns (CFB). The CFB has long existed and is rooted in the community, but in its developments, there are various challenges so that a new strategy is needed to maintain its sustainability. In line with the current dynamics, especially with the conditions of the COVID-19 pandemic, the urgency of the existence of food barns is fundamental. The existence of food barns plays an important role in ensuring access to food for the community with an indication of the availability of food stocks for the community, especially in rural areas continuously. Increasing the scale of LPMDes management through the expansion of partners and governance is the key to success.

LPMDes activities lead to the empowerment of community food barns from group-based to village-based. LPMDes will not only be managed by farmers group association called Gabungan Kelompok Tani (Gapoktan) but can become one of the BUM Desa business units (at the village level), and also BUM Desma (at the regional level). In its management, there are innovations in the form of involvement of village officials for control and synergized with the role of BUM Desa/BUM Desma as rural economic business institutions [16].

As strategic as community food barns are in providing food for rural communities, the development and strengthening effort of CFB in each village, in collaboration with the Strategic Command for Rice Mill Development called Komando Strategi Penggilingan Padi (Kostraling) located in each subdistrict, is becoming increasingly strategic. Kostraling has adequate support for post-harvest processing facilities and infrastructure so that it can support food barn activities.

Strengthening and developing village-based food barns is considered as a strategic approach to anticipate the risk of food insecurity in the community. To achieve the target of becoming a sustainable CFB, there are several strategic steps as follows: (1) grow and strengthen village-based community food barns as independent and sustainable village economic institutions; (2) establish a cooperative business partnership between CFB and Kostraling; (3) increase the management's capacity in managing food reserves; and (4) increase the allocation of regional funds, both provincial government budget and district/city government budget to strengthen the assistance, guidance and the modality of initial food stock of food barns as well as village fund support in optimizing the capital accumulation for the management of food reserves.

4. Conclusions
To improve people's food access and maintain food supply and price stability, the Government of Indonesia has established multi-layered national food reserves, comprised of the central, regional, and up to community levels. The current performance of the national food reserves includes 1) the amount of government rice reserves is set in the range of 1−1.5 million tons; 2) regional government rice reserves have been allocated to 31 provinces and 269 districts/cities; and 3) the potential of community food reserves that are managed through the Community Food Barn institution as many as 5,708 CFB.

To strengthen the national food reserves, it is necessary to formulate strategic steps to strengthen food reserves in stages, including government, regional, and community food reserves, especially community food barns. Operational steps to strengthen CGRR can be done by increasing the stock in the range of 1.5−2 million tons through the procurement of unhulled rice/rice in the country by optimizing the absorption of unhulled rice-rice farmers, especially during the harvest season. Furthermore, as an effort to strengthen RGFR, the agency of food security in provinces and district/city needs to maintain consistency in advocacy, socialization, and coordination with stakeholders in the region.

Strengthening and developing CFB can be done through (a) strengthening CFB as an independent and sustainable village economic institution, (b) mapping the availability and needs of food in each subdistrict and village, (c) developing cooperation between CFB and Kostraling, (d) improve the ability to manage food reserves, and (e) increase the allocation of regional government budget funds for replenishing food reserves and fostering groups of barns as well as budget support for village funds to optimize the stock of food barns.
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