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darmabakti@utu.ac.id

Food Security and Independence Strategy Through Enhancing the Knowledge and Skills of Group-Based Cattle Farmers in the Cattle Farming Business

Izwar[1], Jekki Irawan[2], Mahrizal[3]
[1]Master of Agricultural Science Program, Faculty of Agriculture,
Universitas Teuku Umar
Email: izwar@utu.ac.id
[2] Department of Agrotechnology, Faculty of Agriculture,
Universitas Teuku Umar
Email: jekki.irawan@utu.ac.id
[3] Department of Development Economics, Faculty of Economics and Business,
Universitas Teuku Umar
Email: mahrizal@utu.ac.id

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Abstract

Sumber Rezeki Group is a cattle farming group that has been established since 2021, located in Rambong Payong Village, Aceh Jaya. Despite the livestock system being a community-based one, all group members benefit from the income generated from the sale of cattle, which is managed collectively. The purpose of this service is to improve the knowledge and skills of livestock groups in managing the livestock system so that it is effective and well-coordinated. The method of implementing this service is carried out with several stages of implementation, including 1). Socialization, 2). Training, 3). Application of technology, and 4). mentoring. 5) The evaluation and program objectives, which are based on the program evaluation results, are inextricably linked to the indicators of each problem solution. This includes the evaluation of the pre-test and post-test results, as well as the analysis of the observation sheet from the six main indicators, specifically a) fermentation/concentrate formulation. b). Prevention and control of disease. c). Utilization of livestock manure. d) Independent HPT production using the Silvopastora Agroforestry system; e) Bookkeeping and financial management. e). The marketing system, market analysis, and promotion obtained an average increase in knowledge and skills of members of the source of livelihood group of 80%, in addition to the increase in profits obtained by the partner group from the selling price of Rp. 1,200,000, - increased to Rp. 2,000,000, - per livestock within 7 months.

Keywords: Cattle Farm; Source of Fortune Group; Rambong Payong; Aceh Jaya

Abstrak

Kelompok Sumber Rezeki merupakan kelompok tani sapi yang berdiri sejak tahun 2021, berlokasi di Gampong Rambong Payong, Aceh Jaya. Meskipun sistem peternakan berbasis masyarakat, namun seluruh anggota kelompok mendapatkan keuntungan dari hasil penjualan sapi yang dikelola secara kolektif. Tujuan pengabdian ini adalah untuk meningkatkan pengetahuan dan keterampilan kelompok tani dalam mengelola sistem peternakan agar efektif dan terkoordinasi dengan baik. Metode pelaksanaan pengabdian ini dilakukan dengan beberapa tahapan pelaksanaan, antara lain 1). Sosialisasi, 2). Pelatihan, 3). Penerapan teknologi, dan 4). Pendampingan. 5) Evaluasi dan tujuan program yang berlandaskan pada hasil evaluasi program tidak dapat dilepaskan dari indikator-indikator pemecahan masalah. Hal ini meliputi evaluasi hasil pre-test dan post-test,

serta analisis lembar observasi dari enam indikator utama, yaitu a) formulasi fermentasi/konsentrat. b). Pencegahan dan pengendalian penyakit. c). Pemanfaatan kotoran ternak. d) Produksi HPT mandiri dengan sistem Agroforestri Silvopastora; e) Pembukuan dan pengelolaan keuangan. e). Sistem pemasaran, analisis pasar, dan promosi memperoleh peningkatan rata-rata pengetahuan dan keterampilan anggota kelompok sumber mata pencaharian sebesar 80%, selain itu peningkatan keuntungan yang diperoleh kelompok mitra dari harga jual Rp. 1.200.000,- meningkat menjadi Rp. 2.000.000,- per ekor dalam waktu 7 bulan.

Kata Kunci: *Peternakan Lembu; Kelompok Sumber Rezeki; Rambong Payong; Aceh Jaya*

1. INTRODUCTION

The Rambong Payong Village community, which is part of the Sumber Rezeki cattle farming group, is a partner group involved in this community service activity. The selection of partners was based on 2 observations by the Proposing Team, whose qualifications according to the proposing team met the requirements according to the 2024 Community Service and Research Guidelines.

Figure 1. Sometimes and Livestock of Partner Group

The Sumber Rezeki cattle farming business group is considered worthy of being a partner in the PKM program. The brief profile of the Sumber Rezeki Group is located in Rambong Payong Village, Aceh Jaya Regency, +- 1 km from the national road. This group was established in 2021. It is an economically productive livestock group, and has a productive character and a strong desire to become an entrepreneur in the field of cattle fattening with a membership of ten (10) people. So far, the partner group has only been able to sell 2 heads/year with a fattening period of 24 months.

Animal fattening is one of the most profitable businesses with great benefits for farmers, so that it also has an impact on increasing income

and reducing poverty levels in a country or region, for example, Bangladesh is a lowland country with a dense population of more than 150 million people, of which nearly 75% live in rural areas and the rural poverty rate is 25.6%, of which 12.4% are among the extreme (Hodson, 2006).

The problem of poverty levels in Bangladesh is greatly helped by the potential of livestock activities of people living in extreme areas, especially during the Eid al-Adha holiday, Muslims always hold Qurban (slaughtering livestock). These animals include cows, goats, camels and sheep slaughtered every year to mark the celebration. Bangladeshi Muslims celebrate Eid al-Adha every year. Approximately 1.8 million cattle are sacrificed in 2 or 3 days at this event every year (Sujan, 2011).

In addition to Bangladesh, the potential for community livestock activities is also found in the African region. The largest livestock population in Africa in 2020 was found in Ethiopia, where there were more than 63 million cattle, more than 31 million sheep, 33 million goats, and 61 million poultry (CSA, 2022). Livestock contributes approximately 16.5% of national GDP and 35.6% of agricultural GDP and currently provides a livelihood for 80% of the population living in rural areas (Belete, 2022).

The livestock potential in the two countries above is not much different from Indonesia, even exceeding other areas in terms of livestock needs, this is because the largest population of Indonesia is Muslim, Indonesia's Muslim population ranks first in the world, so that it has a positive impact on the need for livestock, especially cows, goats, etc.

Food Security and Independence Strategy

The growth of the world's population followed by increasing needs also adds greater pressure on land than before. Occupying up to 30% of the earth's surface, livestock zones are one of the main drivers of land consumption changes worldwide (Anita et al, 2013). Through activities such as grazing, livestock feed creation, and waste disposal, they help shape local and global landscapes and become one of the most significant contributors to the degradation of a zone (Dickson-Hoyle & Reenberg, 2009). The main case is not about whether livestock zones use the most land in the world, but how the land and livestock are managed. According to (Anita et al, (2013). Mixed farming systems with livestock systems, where more than 10 percent of the dry matter feed given to animals comes from by-products or single products exceeding 10 percent of the

total production value comes from non-livestock livestock activities. This system can be found in temperate zones such as Europe and America, as well as in sub-humid zones in Africa and Latin America. In South and East Asia, mixed irrigation systems are the most common systems used.

In addition, globally, more than 80 percent of milk, beef, and almost half of pork and a quarter of chicken are produced through mixed farming systems. (Erb et al. 2012) Rapid human population growth coinciding with increasing urbanization, income, and lifestyle is expected to increase consumption of animal products by 70% by 2050 (FAO, 2023). In 2022, Indonesia wants to develop the livestock sector to 54,793 thousand livestock from ruminant commodities (cows, buffaloes, goats, sheep) (Directorate General of PKH, 2022).

The results of the evaluation of the impact of the livestock industry on food security require a description of the global trend towards industrialization. By 2050, the need for meat and milk is expected to double compared to 1999-2001 production. Most of this growth will occur in developing countries, which are estimated to contribute up to 78% of the increase in meat production between 2011 and 2020. (Steinfeld et al, 2006).

According to OECD-FAO Information (2011) Most of this growth is in the form of the livestock production industry (IFAP). At the end of the 20th century, the development of IFAP in various parts of the world increased 6 times faster than the grazing system and 2 times faster than the traditional combination farming system.

In various parts of the world, the current industrial system has succeeded in producing up to 2-thirds of egg and poultry production. And meat production is more than half of pork production (Verge, et al, 2007). Based on calculations by the Food and Agriculture Organization of the United Nations (FAO), developing countries produce up to half of the world's pork and poultry industry production (FAO, 2007).

Efforts in the cattle fattening sector in particular, help meet the increasing demand for high-protein foods in the country and are very influential in: (i) increasing food security, (ii) providing jobs, income, investment opportunities and storing value for households, (iii) being able to provide electricity and manure for the needs of the agricultural world in the long term and (iv) livestock activities are in accordance with and help preserve the culture in a region.

Improving Knowledge and Skills of Cattle Breeders can be done through an extension approach and technical tutorials. extension is one of the efforts attempted to improve the knowledge and skills possessed by farmers. According to Permantan (2018) explains the education

process for key actors and business actors to organize themselves in increasing income, welfare, and understanding in preserving the use of environmental areas. The extension program and technical tutorials that are attempted will be evaluated so that it can be known whether the level of farmer knowledge has increased or vice versa.

According to Yuliandri and Rahmah (2021), the solution that can be provided to overcome the case of low farmer knowledge is to provide counseling related to cases currently being experienced by residents in the livestock sector. According to (Hafid et al, 2020), improving the skills of farmers, one of which is by distributing modules to improve knowledge and expertise through technical tutorial activities and the implementation of relevant livestock technology. (Amam et al. 2021). stated that improving the competence and expertise of farmers is a key aspect of the success of the livestock business being run, with sufficient expertise to achieve optimal performance.

Group Based In Cattle Farming Business

Beef cattle farming in the agribusiness system has been proven to generate greater donations than other livestock zones, this is because it can produce high-value products (beef, milk, leather, compost) and employment, and is related to the socio-cultural values and traditions of local residents. According to Agustina et al (2018) In developing beef cattle farming businesses, the position of livestock groups needs to be considered in order to improve effective and cost-effective livestock applications. In addition, strengthening the economic aspects of farmers can be an efficient option in supporting the development of livestock groups. Therefore, an efficient approach is needed in urging farmers to continue to access existing programs with an emphasis on increasing ownership, participation, developing creativity, and community support; Thus, the utilization and development of programs with community participation can be established effectively.

Based on the Regulation of the Minister of Agriculture (Number 2/67/Permentan/SM. 050/12/2016) concerning guidelines for mentoring farmer groups, farmer groups are groups of farmers/breeders/planters built by farmers based on common interests, social conditions and areas, economy and energy sources, commodities, and respect and improving the efforts of each member. On the other hand, Mardikanto (1997) reported that farmer groups are groups of farmers consisting of people aged and young (men and women) who are officially members of a particular group because of common interests

and needs, under the supervision of the group leader.

The Indonesian government has tried various efforts to support the increase in the domestic beef cattle population, including the National Mainstay Commodity Program for Cattle and Buffalo (SIKOMANDAN), the 1,000 Cattle Village Program, the Special Effort Program for Cattle Farming Must Have Two Bodies (UPSUS SIWAB), and various other programs (Aghasafari, 2020). These efforts are based on various main reasons, including the rate of growth of the beef cattle population in Indonesia of 3.52% and is still much greater when compared to the rate of growth of the Indonesian population of 1.13% in 2023 (Central Statistics Agency, 2023).

Based on Nyaman's research (2024), it is explained that the inhibiting aspects of the development of beef cattle in Indonesia include livestock activities that do not have a full business orientation, livestock farming is family savings, market access and long marketing chains, limited accessibility energy sources, poor reproductive management and low feed availability, and weak protection against the selling price of live cattle and tends to fluctuate.

This is due to the fact that livestock production in Indonesia is still oriented towards subsistence and is indicated by low production performance. The total amount of meat currently produced from livestock production in the country cannot guarantee the increasing demand of the people. One of the reasons is that most traditional livestock applications are not market-oriented (Belay, 2017). The cattle fattening system by farmers often relies on natural grazing land and plant residues with little or no supplements, traditional applications also do not consider animal nutritional needs, feeding levels are above or below animal requirements

Cattle Fattening Techniques include those carried out by farmers using traditional varieties of rice straw, green grass, sugar cane shoots, wheat and rice bran, molasses, rice bran and local energy sources available, including vegetable by-products, rice porridge, rice bran, oil cakes, etc. In fattening livestock. The use of straw treated with urea molasses in beef cattle increases body weight, dressing percentage and carcass quality compared to untreated straw (Sarma *et al*. 2014).

Farming procedures by distributing feed rations (concentrate feed) and technical support throughout the fattening period. Theoretical and instant training is provided to farmers, so that they have expertise in livestock development including preparation of combined rations, feed management, animal health maintenance, fattening bulls and marketing of finished bulls.

The livestock feed rations were combined from different feed ingredients; wheat bran, Noug Seed Cake (NSC), crushed corn granules and Cotton Seed Cake (CSC). 2 feed rations (Treatment 1: 8 hours grazing + crushed corn granules (20%) + wheat bran (45%) + 35% NSC and (Treatment 2: 8 hours grazing + 35% (CSC) + 65% wheat bran) were formulated in such a way that they had the same amount of energy and protein compared to traditional feeds, which are generally mixed randomly (unbalanced) or given separately and some are mostly independent of agricultural products that only use natural pastures (Gudeto *et al.* 2020).

2. METHOD OF IMPLEMENTATION

In optimizing livestock production, the community service team designed several stages of implementation, including: Socialization, Training, Application of technology, Mentoring, Evaluation and sustainability of the program, these stages of activity are to overcome 9 main aspects of partner group problems, namely; Concentrate Fermentation; Utilization of livestock waste; Disease prevention; Grazing mechanism; HPT production; Utilization of business by-products in the form of cowhide; Management; Marketing system; and Promotion.

a) Socialization

Socialization was carried out through FGD with partners and the surrounding community because the existence of cattle farms also disturbed the comfort of the surrounding community, due to the indiscriminate distribution of cattle feces, which caused an unpleasant odor.

b) Training

- Disease prevention training and assistance; The solution is to provide training and assistance in preventing/controlling livestock diseases, and also involve animal health officers in order to further optimize livestock health.
- Production Training for HPT Management with the Silvopastora Agroforestry system,
- Bookkeeping and financial management training.
- Marketing system training, and market analysis; The training material discusses the application of segmentation, targeting and positioning strategies. Conducting market and competition analysis.
- Promotion aspect training; The focus of the training is related to ICT for marketing products to group members and facilitating the creation of websites and social media, so that partners are able to use websites and various promotional media/online stores.

c) Application of technology. The application of technology activities in this community service activity consists of; Stages of technology application in the aspect of concentrate fermentation/formulation; Stages of technology application in the aspect of livestock feces utilization. and; Stages of technology application in the aspect of by-products of cattle fattening efforts.

d) Mentoring

During the implementation of the PKM Program, partner groups are not only given socialization, training, practice and implementation of innovation, but also intensive mentoring of all cattle farming activities, in order to achieve production targets. Direct mentoring is carried out to make it easier for partner groups to understand the livestock process correctly, the mentoring process is also carried out after the community service activities take place, in order to ensure the success of the partner's business

e) Evaluation

Program evaluation cannot be separated from the indicators of each problem solution, including:

- Fermentation/concentrate formulation; Achievement indicators after PKM is completed, partners are able to make feed formulations independently with observation sheet instruments.
- Disease prevention and control; The indicator of achievement after PKM is that partners understand how to prevent and control livestock diseases, with instruments using pre-tests and post-tests.
- Utilization of livestock waste; The indicator is that partners are able to make organic fertilizer from livestock feces, using observation sheet instruments.
- Independent HPT production with the system, Silvopastora Agroforestry; The indicator after the PKM is completed, partners are able to produce and manage HPT independently, effectively and efficiently, using the observation sheet instrument.

f) Bookkeeping and financial management

The indicator is that partners understand and understand the group's financial bookkeeping system, the instrument uses an observation sheet.

g) Marketing and market analysis system.

The indicator of success is the formation of a long-term network, the instrument used is an interview sheet, after the PKM is completed, the partner group's business can grow rapidly.

h) Promotion

The target is that the partner group is able to use the website as a promotional media/online store, the instrument uses an observation sheet, after the PKM is completed, they are able to use social media in conducting promotions.

3. RESULTS AND DISCUSSION

Community service on food security and independence strategies through increasing knowledge and skills of group-based livestock farmers in cattle farming with partner groups Sumber Rezeki Rambong Payong Village, Teunom District, Aceh Jaya Regency as follows.

Preparation for Community Service Implementation

Preparation for community service implementation in addition to ensuring the readiness of the community service team, tools and materials, must also ensure the readiness of the partner group and the surrounding environment that have a direct impact on the partner's livestock activities, in preparing the Community is carried out through FGD activities with partners, village officials and the surrounding Community.

Through this FGD activity, a mapping of the obstacles faced by the partner group, as well as the surrounding Community towards the cattle farming business can be carried out, in addition through this FGD, FGD participants in addition to conveying obstacles/barriers also convey their desires and hopes in this cattle farming business. On the same occasion, the community service team conveyed the potential and strategies for an appropriate livestock system, in addition to having a positive impact on the livestock group, the positive benefits are also felt by the surrounding Community.

Implementation of Community Service Activities

1) Disease prevention training and assistance

Training for prevention of diseases that often occur in cattle such as scabies, bloat and other diseases, was directly delivered by drh. Irwan, M.Si as an Animal Health officer from the Aceh Jaya Regency Agriculture and Livestock Service. Animals, the involvement of animal health officers in order to further optimize the understanding and skills of livestock in dealing with livestock health, this disease prevention training and assistance activity began with a presentation of material by drh. Irwan, M.Si, which was continued with practice and field review to the livestock group partner by animal health officers together with the service team, this was done to ensure that the partner group truly mastered the process of dealing with this livestock disease.

Figure 2. Training and mentoring activities from Animal Health Officers (drh. Irwan and team)

2) Production Training for HPT Management with the Silvopastora Agroforestry system

The livestock feed greenery (HPT) processing system so far has been traditional, with a cut and transport system for livestock, of course with a method like this causing it to be less than optimal during the rainy season and floods, because the process of cutting green feed cannot be carried out. Through training activities and implementation of HPT management with the Silvopastoral Agroforestry system, it is hoped that it will have an impact on increasing the weight of livestock within 6 months to be marketed. This activity began with training on the HPT Production Management mechanism, this material was delivered by Dr. Izwar, S.Pd.I., M.Pd, as the head of the Community Service Team, after the provision of material, the partner group was also provided with direct practice in implementing HPT Production Management with the Silvopastora Agroforestry system by planting odut clumps, etc., as animal feed.]

3) Bookkeeping and financial management training.

The group's financial management system so far has not been structured and is not recorded, thus reducing the transparency element of group management, who delivered the material in this session was Mahrizal, SE. M.Si, the provision of material was active and had a direct impact on group financial management, the speaker explained examples of group financial recording tables so that it was easier for partner groups to

understand, in addition, partner groups were also provided with cash notebooks for all Sumber Rezeki groups.

4) Marketing system training, and market analysis.

The training material discusses the implementation of segmentation, targeting and positioning strategies. Conducting market and competition analysis, the speakers at the activity also took place actively, helping to increase the motivation of the partner group to achieve the sales target of the results of the threshing.

5) Promotion aspect training

In this session, not all group members must master this field, this training process emphasizes more on the system of creating and managing social media as a promotional media for partner products, especially Facebook and Instagram as promotional media/online stores.

6) Application of Technology

a) Stages of technology application in the aspect of concentrate fermentation or formulation.

Partners have not been able to develop feed fermentation and concentrate formulation. The solution is with direct assistance in making locally available concentrate fermentation and formulas.

- Explanation of stages and types of materials for Concentrate Fermentation/Formulation.
- Assistance and practice in making Concentrate Fermentation or Formulation
  - Prepare waste products;
  - Prepare Em4 type prebiotics;
  - Prepare a large place used to mix ingredients and process fermentation;
  - Fermentable green fodder ingredients;
  - Chop all green fodder ingredients into smaller sizes
  - Dissolve molasses and Em4 probiotics (according to size) with water into one;
  - Prepare a tarpaulin to stir all ingredients;
  - Put all ingredients into a container and then step on it until solid;
  - Cover all ingredients tightly with plastic so that the fermentation process is more perfect;
  - Fermented feed is ready to be given to livestock after 2 weeks. (Cybext, 2014).

Figure 3. Making Fermented Feed

b) Stages of technology application in the aspect of livestock feces utilization.

The solution is to implement a feces handling mechanism for making fertilizer, so that the feces do not become a source of disease and can be reused.

- Sort the feces first with other materials
- then spread evenly into a fairly thin layer. Prepare 5 liters of water and EM4.
- The EM4 solution is sprayed evenly on the manure. After it is slightly damp with a wetness level of around 30 - 40 percent, then put the manure in a sack, tie the sack with a rope and place it in a shady place.
- The fertilizer needs to be monitored every 2 weeks. If the condition of the manure is too dry, water or spray it again with EM4 solution. Organic cow dung fertilizer is only ready after the fermentation process has been going on for 2 months.

c) Stages of technology application in the aspect of cattle fattening by-products

The processing of cattle fattening by-products in this case cowhide, goes through several stages including:

- Soaking the hide in a 2-4% quicklime solution
- Soaking the hide in hot water (±50oC for 3-5 minutes).
- Soaking in clean water for ± 24 hours.
- Liming, concentration 2ºBe, which is 0.4 kg of lime / 5 liters of water for 1 kg of hide, and stirring every 5 hours /
- Removing hair by boiling hot water (temperature ± 50 º C for 3-5 minutes)
- Boiling the hide at a

temperature of 90ºC for 2 hours, and airing it.
- Soaking Cracker Seasoning in the seasoning solution for 1-2 hours
- Drying until dry
- Frying I (temperature ±80ºC for 30 seconds), and Frying II (Temperature ±160ºC)

7) Evaluation

Program evaluation cannot be separated from the indicators of each problem solution, including:

- Fermentation/concentrate formulation.

  Achievement indicators after PKM is completed, partners are able to make feed formulations independently with observation sheet instruments. Based on the results of the activity observation sheet, it can be seen that all group members 100% understand and know the process of feed fermentation and concentrate formation.

- Disease prevention and control.

  The indicator of achievement after PKM is that partners understand how to prevent and control livestock diseases, with instruments using pre-tests and post-tests. Based on the results of the post-test, it can be seen that eight people or 80% understand the mechanisms for preventing and controlling diseases in cattle.

- Utilization of livestock manure.

  The indicator is that partners are able to make organic fertilizer from livestock feces, using the observation sheet instrument. Based on the observation sheet, 100% of all group members understand the mechanism for making fertilizer from cattle feces in particular.

- Independent HPT production with the Silvopastoral Agroforestry system.

  The indicator is that after the PKM is completed, partners are able to produce and manage HPT independently, effectively and efficiently, using pre-tests and post-tests, there is an increase in value between the pre-test and post-test, in the pre-test no one understands the silvopastoral agroforestry management system in particular, after being given training, as many as 7 people or 70% understand the silvopastoral agroforestry farming and livestock system.

8) Bookkeeping and financial management

The indicator is that partners understand and comprehend the group's financial bookkeeping system, the instrument uses a pre-test and post-test, after being given training, it was seen that 70% of group members understood the effective group bookkeeping system, there was an increase compared to the pre-test, only 1

person understood the group bookkeeping system.

9) Marketing system and market analysis.

The indicator of success is the formation of a long-term network, the instrument used is an interview sheet, after the PKM is completed, the partner group's business can grow rapidly. Based on the results of observations and final tests, 60% understand the marketing system and market analysis of livestock products and cattle farming by-products, although further assistance is needed.

10) Promotion

The target is that the partner group is able to use the website as a promotional media/online store, the instrument uses an observation sheet, after the PKM is completed, they are able to use social media in conducting promotions. Based on the observation sheet, it can be seen that 3 of the group members who were trained in managing social media, fully understand the mechanism and positive impact of product promotion through social media.

4. CONCLUSION

The livestock business activities based on cattle fattening by the Sumber Rezeki group have so far been carried out as community livestock farming that is not structured and directed, harvesting and product sales are not on schedule, in adjusting the ability of partner members to accept new things about the integrated livestock system, the material is provided in an interesting way, not boring and simulations are carried out immediately after each training, the positive impacts of the implementation of this service include increased knowledge and skills in managing an integrated livestock system; 1) have knowledge and skills in preventing and treating diseases in cattle; 2) can increase productivity, quality and quantity of livestock and shorten the harvest period; 3) increase economic independence and public health by implementing profitable production management and marketing systems; 4) Lighten the burden on farmers who have had to cut livestock feed every day, can be given a break in the form of concentrate formulations and preserved green feed; 5) able to make organic fertilizer from goat feces; 6) and able to Manage livestock with agroforestry system.

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