

MODERN IRRIGATION TECHNOLOGY: MANAGEMENT OF RICE ENDOWMENT FOR PRODUCTIVITY WITH A PRINCIPLES OF BENEFIT APPROACH TO SUPPORT SUSTAINABLE DEVELOPMENT GOALS (SDGS)

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Abstract

This research aims to find out, analyze, and provide alternative solutions regarding productive endowment management of paddy endowment land using a benefit principle approach. This paper examines the optimization of production from rice fields standing on endowment land through the use of modern irrigation technology. The study of productive endowment on endowment rice fields was then studied using the approach of Article 43 of the Endowment Law which explains productive endowment. Since 2004, many productive endowment development projects have begun to be developed. Especially rice field endowment is the dominant object of the endowment allocation aspect in Indonesia. Apart from that, rice endowment is also an object that has the potential to generate benefits for the economic climate in Indonesia. The output of the endowment is a benefit. The application of the principle of benefit in managing rice endowment needs to be considered. One way to achieve the goals and implementation of the principles, endowment managers and rice farmers can develop them through modern irrigation technology. This study supports current issues in the Sustainable Development Goals (SDGs) regarding food.

Keywords: Technology, Rice field irrigation, Endowment land, Productivity, Principle of benefit.

1. Introduction

The existence of land for human life is very essential because from birth to death human life cannot be separated from the land. Even though it is essential for everyone, people's views on land are not the same. People's views on land as part of the natural environment (ecosystem) can be divided into two groups, namely immanent (holistic) and transcendent views. In a holistic view, humans cannot separate themselves from the surrounding biophysical systems, such as land, animals, plants, rivers, and mountains, but feel a functional relationship with biophysical factors to form a socio-biophysical unity. A holistic view, alive and developing in Eastern Society which is still 'traditional'. On the other hand, according to the transcendent view, even though ecologically they are part of their environment, humans feel separated from their environment. This happens because the environment is considered a resource that was created to be exploited to the greatest extent possible. In general, transcendent views developed in Western society [1].

This transcendent understanding is manifested in the form of land endowment philanthropy [2]. In practice, Mubarak believes that endowment is divided into two: (i) expert (family) endowment, namely endowment intended for family members (heirs) of the *wakif* (endowment giver); and (ii) *khairi* (general) endowment, namely endowment whose benefits are intended for the community in general. In terms of economic substance, endowment is divided into 2 types, namely direct endowment and productive endowment [3]. These two forms of endowment also find many applications in Indonesia. *Khairi* endowment is generally aimed at the interests and good (*khairi*) of society. In terms of endowment objects or donated assets, as regulated in the provisions of Article 16 of the Endowment Law, it is explained that "endowment assets consist of immovable objects and movable objects" [4]. It is further explained that "Immovable objects as referred to in Article 16 paragraph 1 letter include: i) land rights following the provisions of applicable laws and regulations, whether registered or not; ii) buildings or parts of buildings standing on the land as intended in letter a; iii) plants and other objects related to land; iv) ownership rights to apartment units following the provisions of applicable laws and regulations; and v) other immovable objects following sharia provisions and applicable laws and regulations [5].

One of the popular endowment land management practices is the allocation of endowment rice fields. Endowment rice fields have the potential to be superior to be developed through productive endowment projects [6]. Productive endowment is an endowment of assets used for production purposes. Whether used for agriculture, industry, trade, and services whose benefits are not directly from the objects, but from the net profits resulting from the development of the endowment which is given to people who are entitled to following the objectives of the endowment [7]. In this context, the productive endowment is processed to produce goods or services which are then sold, and the results are used following the objectives of the endowment.

In managing rice endowment productively, technology and innovation are very necessary for farmers including *nazhir* as endowment managers. Many reports regarding rice have been developed [8-10]. The selection of superior rice seeds, soil quality, and even the water quality of the rice fields need to be considered. Water

has a very important role in farming, especially for lowland rice farming [11]. Rice plants are plants that require a lot of water, especially when growing the plants must always be flooded. For rice productivity to be good and effective in a unit area of land, sufficient water supply is needed through irrigation [12]. Therefore, to support the availability of water for rice farming, water management must be carried out continuously both in terms of quantity and quality to ensure that rice plants do not experience water shortages which will result in reduced production yields [13]. Illustration of rice fields' need for optimal irrigation (see Fig. 1).

Novelties of this study are reveals about the management of waqf land, specifically creating the productivity of waqf rice fields through the development of drip irrigation technology. This study supports current issues in the Sustainable Development Goals (SDGs) regarding food [14-18].

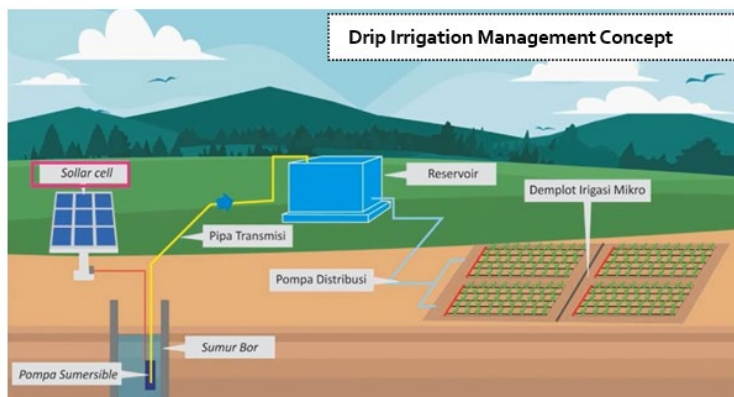


Fig. 1. Drip irrigation management concept [19]

2. Literature Review

From the perspective of the principle of benefit, optimal management of rice endowment needs to be carried out to obtain quality rice fields. This is the embodiment of the legal ideals of Pancasila. The form of Pancasila legal ideals is in the form of ideas, creative works, and thoughts regarding the law or perceptions about the meaning of the law, which essentially consists of three elements, justice, usefulness, and legal certainty. Therefore, utilizing rice endowment and optimizing its management is part of the way to achieve the noble ideals of Pancasila, namely usability [20].

The concept of endowment land management has been widely used by academics and researchers. Both from the perspective of the Islamic Law approach, Economics, and Social Sciences, to the perspective of the new technology approach. This article conducts a study of the field of endowment, specifically rice endowment and productive endowment, using the principle of benefit approach in legal science.

3. Method

The study in this paper is a normative juridical study. The research stages in writing the article were carried out by interpreting, systematizing, and evaluating statutory regulations with legal concepts related to the management of endowment land

designated for rice fields as well as conducting tests on the suitability of the management of rice field endowment in the aspect of developing rice field water irrigation technology. This paper offers an idea about productive endowment that is produced optimally through modern irrigation technology for rice fields located on endowment land.

4. Results and Discussion

The construction of dams and their complementary facilities, networks, or channels is intended to facilitate the distribution of water to land in a smooth and orderly manner and to satisfy all parties with an interest in the irrigation water. Therefore, good water management is needed which includes all series of continuous activities in an integrated manner carried out in the irrigation network from the time of collection activities followed by regulation, measurement, distribution, distribution, provision of safe irrigation water to water users up to the level of farming promptly. Thus, the development of the plants cultivated in the production process can be guaranteed [21].

Referring to Fig. 2, the working mechanism of the drip irrigation technique is carried out by distributing water from the well using a pump into the storage tower. Next, from the reservoir using a gravity system, it enters the irrigation network pipe and exits the nozzle at each position that has been installed. A well-designed, managed and installed drip irrigation system can help consume water and reduce water evaporation as well as a deep drainage system, when compared to other irrigation alternatives, such as overhead sprinklers or wet systems, because the water can be more precisely targeted at the roots main plant. Moreover, a drip irrigation system can stop various diseases that are transmitted through water contact with foliage. In addition to simplifying the network of pipe operations, this technology has proven to be very useful for the accurate monitoring and control of water distribution, and for achieving a better understanding of the irrigation management practices followed by farmers, in particular through the possibility of retrieving and analyze historical data.

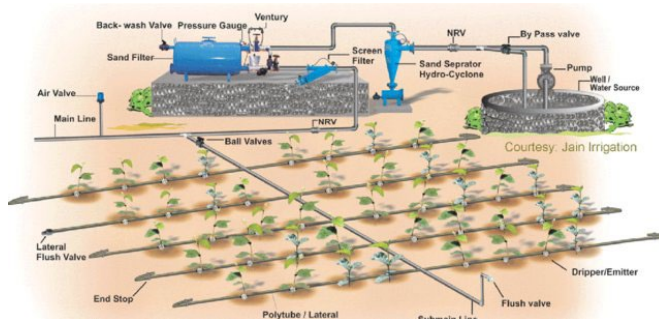


Fig. 2. Drip irrigation system [22]

Apart from the water-saving benefits, drip irrigation systems have proven to be very effective and useful for plant growth [23]. In addition, the cost-to-cost ratios and different discount rates indicate that investment in drip irrigation cultivation is economical. The drip irrigation system pattern must be inspired in all areas.

Considering the rapid decline in water availability for irrigation and the low efficiency of water use when using conventional methods initiatives should be taken for the use of drip irrigation [24].

The government regulations that form the basis of endowment for owned land were refined in Law Number 41 of 2004 concerning Endowment, which provides a wider scope for the development of endowment practices in Indonesia, which was subsequently followed by the issuance of Government Regulation Number 42 of 2006. The implementation of productive endowment is regulated in Article 43 paragraph 2 of the Endowment Law which states "Management and development of endowment assets is carried out productively."

Confirmation of the meaning of productive in Article 43 above is that productivity is carried out by collecting, investing, capital investment, production, partnerships, trade, agribusiness, mining, industry, technology development, construction of buildings, apartments, flats, supermarkets, shops, offices, and facilities. education, health facilities, and businesses that do not conflict with sharia" [25-27]. Until now, the use of endowment for rice fields and agriculture is still a superior potential. One example of the practice of managing mosque endowment which is the same as rice field endowment by the same *nazhir*, namely the mosque and rice field endowment in Village of Coper, Ponorogo, Indonesia. It is known that the rice fields are managed by the *nazhir* using the concept of '*mertelu*' [28].

The '*mertelu*' concept is a method of sharing the results with the same conditions as '*maro*', but in this case the rice field cultivator only receives one third of the results, two thirds are the share of the rice field owner. *Maro* is a method of sharing the results that requires the rice field cultivator to buy his own seeds, fertilizer, and pay farm laborers, and hand over one half of the part to the rice field owner with the tax burden on the land in the hands of the rice field owner). *Mertelu* Endowment is also known as the *muzaro'ah* system in Islamic economics. The distribution of rice field cultivation results is carried out according to the time period/season that has passed [29].

In rice fields, water loss can occur through evaporation, transpiration, and location and varies greatly. Water loss in irrigated rice fields varies between 5.6-20.4 mm/day. The most frequently observed variation in water loss ranges from 6-10 mm/day [30]. Thus, the average amount of water needed to produce optimal rice is 180-300 mm/month. In one planting period, the need for all irrigated rice field management operations (seeding, land preparation, and irrigation) is 1,240 mm.

The rice irrigation program on endowment land is an initiative that not only builds community welfare but also strengthens the agricultural sector and maintains food security [31-33]. With collaboration between related parties, it is hoped that this program can become a sustainable solution to overcoming problems of poverty and social inequality. Good quality agricultural products will certainly provide added economic value for endowment institutions, including *Mauquf 'alaihi* [34]. Therefore, rice irrigation technology on endowment land needs to be properly regulated. In its management, it is necessary to know the water requirements that must be provided for irrigation of agricultural land, information or data on plant water requirements is very necessary. Plant water needs depend on the type and age of the plant, the time or period of planting, the physical characteristics of the soil,

the water application technique, the distance from the water source on the agricultural land, and the size of the planting area to be irrigated. Therefore, to use irrigation water more efficiently and effectively, it is very important to know the consumptive water use of plants. In practice, rice endowment cannot be separated from the social, economic, and cultural dynamics that accompany the development of Muslim community life from time to time [35].

5. Conclusion

Endowment land has a multi-dimensional function in supporting the welfare and development of society. With optimal management of endowment land, public welfare and economic stability of the community will be created which are supported through policies in implementing the role of the state. Irrigation of rice fields using modern technology has surpassed traditional irrigation methods. By using modern irrigation, farmers can regulate irrigation based on crop needs and water use can be efficient and measurable. Apart from being environmentally friendly, this technology can also increase the amount of crop production. Indeed, the beneficial value of rice endowment will continue to increase. From the perspective of endowment regulations in Indonesia, especially regarding productive endowment, the Indonesian government needs to collaborate with stakeholders related to agricultural management and associations or communities of Indonesian farmers. This aims to open insight and mobilize *Nazirs* as endowment managers to increase the productivity of rice endowment in Indonesia.

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