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The Law's Role in Ensuring Food Security for the population: the case of rice agriculture in Madagascar

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Abstract:

Madagascar is considered one of the world's most biodiverse countries. It is among the ten hotspots of global biological diversity and is home to approximately 5% of the planet's biodiversity. In Madagascar, rice is of particular importance as it is both the staple food of the population and the country's leading agricultural production in terms of volume. Nonetheless, food security is still a challenge for the country. This article provides the law's role in ensuring food security for the population.

Keywords: Food security; Madagascar; Agriculture; Rice; Policies

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Resumé:

Madagascar est considéré comme l'un des pays ayant une grande biodiversité. Le pays figure parmi les 10 hotspots de la biodiversité mondiale. A Madagascar, le riz a une importance particulière car c'est l'aliment de base de la population, et aussi la plus grande production agricole du pays. Cependant, la sécurité alimentaire figure toujours parmi les grands défis du pays. Cet article explore comment la loi peut contribuer à atteindre les objectifs en termes de sécurité alimentaire.

Mots-clés : Sécurité alimentaire ; Madagascar ; Agriculture ; Politiques

1 Introduction

Madagascar is considered one of the world's most biodiverse countries. It is among the ten hotspots of global biological diversity and is home to approximately 5% of the planet's biodiversity. Madagascar's biodiversity and ecosystems play an essential role in the economy, environment, and human well-being, providing vital ecosystem services to human and non-human populations (FAPBM, 2021).

Despite their exceptional characteristics, the country's biodiversity and ecosystems are greatly threatened and exposed to multiple pressures. Unfortunately, the effects of these threats on ecosystems and biodiversity are already very real. In fact, according to the International Union for Conservation of Nature, about 40% of Madagascar's species are now threatened.[1] Indeed, recent studies indicate that the island has lost 44% of its natural forests between 1953 and 2014, including 37% between 1973 and 2014 alone (Vieilledent et al., 2018). Conservation efforts include establishing and managing protected areas due to the threats to ecosystems and biodiversity. Madagascar has 171 protected areas, representing approximately 7.5% of its territory. The management of these areas is governed by Law No. 2015-005, which was adopted following the commitments made by Madagascar at the World Parks Congress in Durban in 2003 and in Sydney in 2014.

It is important to note that Madagascar has traditionally been one of Sub-Saharan Africa's leading rice producers. Its climate, soil, and sunshine are ideal for growing Oryza sativa. Indeed, Madagascar has around 36 million hectares of arable land, of which only three million hectares, or less than 10%, are farmed. The country has 1.5 million hectares of irrigable land, of which 1.1 million are equipped, but with network maintenance problems. For several years, the approach adopted for rural development in Madagascar has been to increase production. However, the situation has changed, and the various initiatives adopted have determined the reorientation of actions. According to PLFI, the government plans to reorient towards climate-resilient agriculture to promote food self-sufficiency. Nonetheless, without proper policy and adequate funding, this vision appears to be difficult to realize.

2 The place of rice agriculture in Madagascar

2.1 Agricultural policies

As a crucial sector, various policies have been established to enhance rice production. The "Plan pour l'émergence de Madagascar" (Plan for the Emergence of Madagascar) aims for rice self-sufficiency by expanding new rice-growing areas by 100,000 hectares by 2023 and rehabilitating existing ones (Express de Madagascar, 2022). Complementing this plan, rice policy is also anchored in the implementation of the "Stratégie Nationale de Développement rizicole III" (National Rice Development Strategy). This strategy was adopted as part of the operationalization of the Rice Development Policy to contribute to food security, improve the incomes of those involved in the rice industry, and promote economic growth. Specifically, it aims to strengthen the governance of the rice sector and professionalize its stakeholders; double

[1] According to the International Union for Conservation of Nature's Red List, 13.8% of species are classified as 'vulnerable', 19.8% as 'endangered', and 7.5% as 'critically endangered'.
See https://www.iucnredlist.org/search?landRegions=MG&se

rice production by 2022, with an emphasis on making the sector resilient to biotic and abiotic challenges; structure national supply chains; and capture a significant share of regional and international markets (Stratégie Nationale de Développement rizicole III, 2022).

2.2 Demographics and Development

According to the latest general population and housing census, the population of Madagascar is 25,674,196. This population is primarily young and dynamic. The median age of the population is 18, the average age is 22.3, and the under-15s represent 41.3% of the total population. Also, the annual population growth rate is around 3% and should lead, if current conditions persist, to a doubling of population in 23 years (INSTAT, 2021).

2.3 Job market

Given the rapid increase in the number of people of working age, job creation is a key challenge. Economic opportunities remain very unevenly distributed across the country: between 2010 and 2014, an average of 676 businesses were created each year in each region; this figure reaches 5,267 for the Analamanga region and is less than 200 for the Ihorombe, Atsimo-Antsinana, Betsiboka and Melaky regions (INSTAT, 2021).

In this context, the agricultural sector continues to be the primary source of employment for the majority of young Malagasy (ILO, 2017). Therefore, supporting the development of family production units, and family farms in particular, remains an important priority for creating decent agricultural jobs and responding to the rapid rise in the working population. Support for family farming also makes it possible to work on other issues such as food security, the preservation of natural resources, and the regulation of migration to cities (Sourisseau et al.,2014).

2.4 Food security

In Madagascar, rice plays a crucial role as the staple food for the population and is the leading agricultural product in terms of volume. It is closely followed by cassava and maize, which serve as substitute foods during lean periods. The estimated daily per capita consumption of white rice is 283 grams (World Food Program, 2019), which equates to over 100 kilograms per person annually (INSTAT, 2021). On average, rice accounts for 72.8% of the population's caloric intake. In general, except for medium-sized and large farms that manage to produce a surplus, most of the rice harvested is consumed on the farm. Currently, average rice yields range from 2.45 to 2.73 tonnes per hectare, indicating substantial potential for improvement, especially considering that the global average yield is around 4.6 tonnes per hectare. Based on the average per capita rice consumption and taking into account population growth, we can estimate the national demand for white rice and the corresponding quantity of paddy rice that needs to be produced: 4.509 million tonnes in 2018, 4.918 million tonnes in 2021, and a projected 6.249 million tonnes by 2030 (JICA, 2020).

Despite ongoing food shortages and limited access to adequate nutrition, there has been a slight improvement in food security since 2022, largely due to a recent decrease in drought occurrences. The number of food-insecure individuals is expected to decline from 2.3 million

in early 2023 to 1.7 million in 2024. Key structural factors contributing to food insecurity include insufficient year-round production, high costs of healthy foods, and a lack of fortified options. Additionally, climate-related shocks continue to affect the availability, quality, and affordability of food (IPC, 2023).

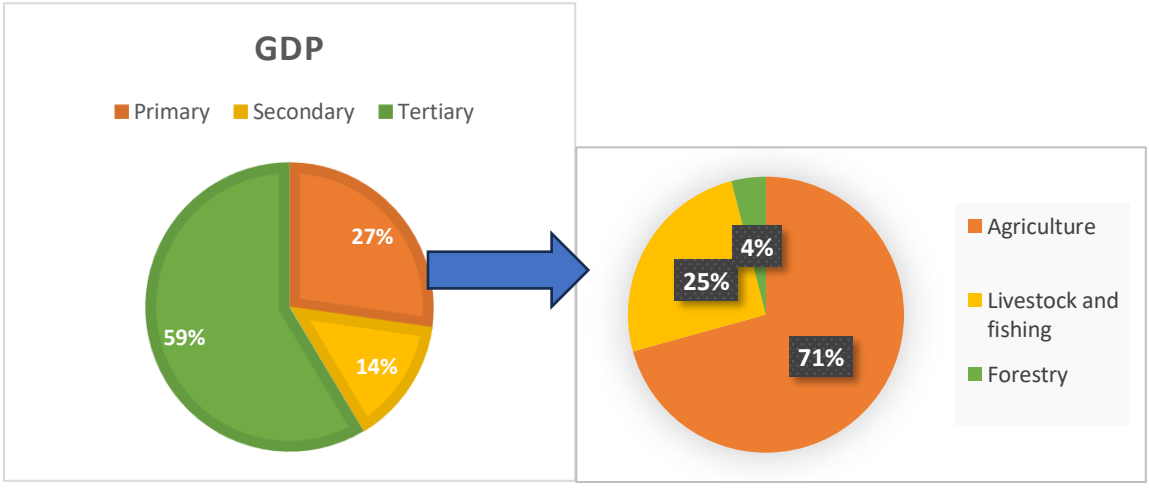
2.5 Tables

Table 1: Practice of agricultural activities

Data point	Value
Households Practicing Agriculture	77.9%
Households Practicing Any Agricultural Activity	83.2%
Agricultural Households in Urban Areas	46.3%
Mixed Farming Households	82.2%
Households Growing Rice	68.6%
Households Growing Tubers	56.3%
Households Growing Industrial Crops	27.3%
Households Growing Cash Crops	17.1%

Source: INSTAT 2021

Table 2: Weight of Agriculture in the Economy



In Madagascar, agriculture is a crucial sector for society, employing around 80% of the working population and, along with livestock breeding, fishing, and forestry, accounting for 27% of the country's GDP by 2020.

Source: Central Bank of Madagascar

3 Challenges in the implementation of agricultural policies

Despite the goodwill of the government to reach food self-sufficiency goals, numerous challenges need to be addressed. Also, the law has an important role to play in setting rules that will help to improve the situation.

3.1 Land tenure

One of the key challenges for Malagasy farmers is the protection of their rights on their land. The legal frameworks governing land rights greatly impact the farmers' security. It is good to note that the land governance in Madagascar is marked by the co-existence of customary law and modern law (McLain et al., 2023). With the increase in the number of populations, it becomes difficult for the government to manage land ownership and guarantee the rights of landowners. In fact, in the case of customary law, the lack of paper certifying the rights on the land implies the weakness of the protection of farmers, who use the land from generation to generation. Indeed, the low rate of literacy profits a network of literate persons who simply stole the land ownership and expelled those who had been using the land for a long period. This situation has led the public authority to reform the law on land governance: in 2005, the decentralization of the service of land governance at the community level started. The law has given the local bureau of land governance the power to deliver a certificate of land ownership to protect the rights of these farmers. The stated aim of the reform is to establish a system for the mass formalization of unwritten rights within a short timeframe and at a cost commensurate with the purchasing power of households. In essence, it aims to reconcile the legal and the legitimate by recognizing de facto customary occupancy as a presumption of ownership (Ferguson, B. et al., 2014). The presumption of state ownership was abolished, and a new status was introduced: untitled private property. The latter can be formally validated by the issuance of a legal title document, the ‘certificat foncier’ signed by the mayor.[2]

In 2021, a significant reform was enacted through the adoption of law 2021-016. A key change introduced by this law is the limitation placed on the ‘certificat foncier’. This legal document, which was first established in 2006 and is issued by the local bureau of land governance within municipalities, can now only be granted to individuals who have developed their land for more than fifteen years prior to 2006. This law has faced criticism from civil society for undermining, violating, and calling into question the achievements of the land reforms enacted in 2005 and 2006. In response to the ongoing debate surrounding this law, public authorities moved to amend it through the introduction of law 2022-013. The objectives of this new law include improving and consolidating decentralized land management by addressing legal gaps; clearly delineating the responsibilities of decentralized and deconcentrated services to reduce mistrust among local authorities; and enhancing the recognition of occupancy and use rights by equating them to a certain form of ownership. Notably, it has revised the occupancy period to five years

[2] Art. 14 of the law 2006-031 of 24th November 2006 establishing the legal regime for untitled private land ownership

from the date of application for all occupied plots.[3] Despite these reforms, it is good to note that farmers need more support from the law to ensure the effectiveness of their rights.

3.2 Insufficient infrastructures

The development of infrastructure supporting agricultural activities is currently inadequate. The budget allocated to the agricultural sector remains extremely low compared to the needs for its development. In 2020, the State's contribution to financing agriculture, livestock, and fisheries amounted to 624.9 billion Ariary, which represented only 5.7% of the general budget. This contribution falls short of the Maputo international commitment to allocate 10% to agriculture, as well as the financing requirements outlined in sectoral programs (UNICEF, 2020).

Madagascar also faces significant challenges regarding its road infrastructure, which poses a major obstacle to socio-economic development. Approximately two-thirds of rural roads are impassable, leaving nearly 17 million Malagasy people isolated, especially during the rainy season (Midimadagasikara, 2024). This situation profoundly affects access to healthcare and markets, significantly diminishing agricultural yields and farmers' willingness to engage in commercial farming. Impassable roads create a substantial barrier to mobility and access to essential services for rural communities. The limited access to markets complicates the marketing of agricultural products, resulting in considerable economic losses for farmers.

3.3 Slash and burn practice

Slash and burn agriculture (tavy) is still one of the main causes of loss of biodiversity and forest cover. Outside of the provinces of Antananarivo and Toliara, tavy rice cultivation still occupies 160,000 ha of land, which accounts for 13% of the total area under rice (MAEP, 2006). Nearly 70% of the area concerned is in the Vatovavy Fitovinany and Antsinanana regions, where this practice is one of the main ways for households to extend the area under cultivation and a rapid means of producing to meet food needs after shocks such as cyclones. It persists insofar as there are no other options available to households, who find it a means of ensuring their survival. The damage to the environment is sometimes irreversible, and the profits are small and unsustainable: cultivation is practiced on slopes and marginal soils, generating erosion, and the soil rapidly loses its fertility. In all cases, demographic pressure, with its attendant rise in demand, is also at the root of this situation. While the practice of tavy is most often motivated by farm survival, it can also be developed in response to commercial opportunities such as maize exports to Reunion Island, the Seychelles, and Mauritius. Maize production using the ‘hatsake system’ has been at the root of extensification and deforestation, leading to a loss of biodiversity in the thorny forests of south-west Madagascar (Minten and Méral, 2005).

3.4 Seeds and Fertilizers governance

The management of seeds poses a significant challenge for the agricultural sector's development in Madagascar (NLEND NKOTT, 2021). Notably, the country has established national seed legislation, which was adopted on January 3, 1995. This law is based on the OECD model and is comprehensive, including necessary definitions and provisions for the creation of institutions responsible for its implementation, as well as outlining the roles of various stakeholders. It

[3] Art. 2 of the law 2022-013 recasting the rules establishing the legal regime of untitled private land ownership

mandates that the Ministry of Agriculture will draft texts that specify the operation of management bodies and set regulations to standardize activities. These regulations mainly address: seed production, multiplication, and marketing (including import and export); quality control and certification; protection of plant breeders' rights; and penalties for infringement.

In 2008, a national policy document was validated, and the National Seed Strategy was established. This strategy defines the measures the State intends to implement to create and strengthen the seed industry in Madagascar as a tool for national agricultural development. Furthermore, in 2016, the National Strategy for the Development of the Rice Seed Industry was adopted. The vision of the National Seed Strategy is that "controlled and competitive quality rice seeds are used by all rice growers in Madagascar and are exported to regional markets." To achieve this vision, the overarching objective is to "promote the production and use of quality rice seeds in sufficient quantities to meet the needs of rice growers and regional markets."
Although the seed law reflects the aspirations of the government at the time, it has only been partially implemented. Although some decrees for creating various structures and defining their respective roles have been issued, this process has been gradual and somewhat delayed. For example, the body responsible for implementing the seed strategy was established in 2006, the National Catalogue was created in 2010, and ANCOS was founded in 2013.

The main challenge lies in creating a secure environment that encourages the development of the seed industry. This requires not only the preparation and enactment of rules but also the establishment of structures capable of enforcing them. The seed legislation can only be effectively applied if technical regulations governing all segments of the seed chain are adopted.

In practice, formal seed production and dissemination are low and are primarily conducted through donor-funded projects. Distribution channels are nearly non-existent, and poorly managed production costs lead to unaffordable prices for most subsistence farmers. For instance, collaboration between China and Madagascar led to the introduction of hybrid rice seed into Malagasy agricultural practices. These seeds were distributed free of charge to 1,400 farmers in an effort to enhance rice production. The use of hybrid rice seeds has allowed China to increase its production and achieve food self-sufficiency. However, Malagasy farmers face challenges with these seeds, primarily due to the financial costs associated with their use. Specifically, hybrid seeds require significant amounts of fertilizer and do not allow for seed retention from one year to the next. Additionally, for the project to succeed, certain conditions must be met, including sufficient access to irrigation and appropriate input management (Moctar Ficou, 2025).

3.5 Insufficient knowledge

Adoption of improved techniques and inputs remains low because farmers do not have sufficient knowledge in this area, a situation that the weakness of extension and training services has not yet been remedied. For instance, SRI concerns only 2,300 ha of rice fields out of the 980.000 (MAEP, 2006). The level of fertilizer consumption in Madagascar is among the

lowest in the world, with average quantities estimated at 5kg per ha of arable land per year (this figure was estimated at 15 kg/ha/year for sub-Saharan Africa in 2006). This figure rises to an average of 200 kg/ha for the main rice growing countries of Southeast Asia. The low level of solvent demand from farmers and the lack of suitable transport and storage infrastructures go some way to explaining the very low levels of fertilizer use. Because of the low demand for inputs, fertilizer distribution networks remain limited in Madagascar, and a large proportion of agricultural areas are not supplied.

4 Recommendations

There are some recommendations to improve the rice agriculture sector and food security in Madagascar.

First of all, the development of irrigation infrastructure should be included in the general politics of state and have appropriate funding. It implies the rehabilitation of existing irrigation systems and the development of investment in small and medium-scale irrigation projects in key rice-growing regions. In addition, it is important to develop water harvesting techniques for rain-fed agriculture areas.

Secondly, it is critical to improve land certification procedure. It includes implementing land certification programs focused on smallholder farmers. Also, simplifying land registration procedures in rural areas is very important. Therefore, the law governing land certification should take into account the difficulty for rural farmers to get land certification and implement procedure that will make it easier.

Thirdly, it is important to develop research on agriculture. For instance, in Madagascar, the FOFIFA is among the main research center for agricultural development. Nonetheless, without proper funding, it is difficult for the center to develop their activities. Therefore, the budget allocated to research should be increased. Indeed, it is necessary to strengthen the national rice research program to develop drought and flood-resistant varieties. Also, establishing farmer field schools in major rice-producing regions constitute a critical condition to enhance production. Besides, addressing tavy in Madagascar requires a multi-faced approach that recognizes both the environmental imperatives and the socioeconomic realities facing rural communities. Therefore, it is critical to combine sustainable agricultural alternatives, economic incentives, and community engagement to reduce slash and burn practice in Madagascar.

Moreover, it is necessary to create a targeted subsidy program for quality seeds and fertilizers. In line with this, establishing community seed banks for locally adapted rice varieties is critical. Also, the state should support local production of organic fertilizers.

Furthermore, it is critical to improve rural roads in key rice-producing regions, and support rice farmer cooperatives for collective marketing. The use of digital platform should be promoted to connect farmers to markets.

Finally, the development of policy related to agriculture should be made in a participative approach. It should be the result of the resolution from different stakeholders and not solely from the public authority. This method will result in a better result and performance of the developed policy or programs.

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