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Endangered Food Systems: Agriculture, Nutrition and Cultural Heritage in Bali, Indonesia

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ABSTRACT

The long-established, traditional food systems maintained by indigenous and local communities in developing countries have witnessed rapid changes in production, trade, and consumption patterns in recent decades. These changes tend to be detrimental to ecological and human health. The central highlands and northeastern coast of the island of Bali, Indonesia, are illustrative examples of such a regional food system, with centuries of documented history and subject to a longitudinal ethnographic study by the author. This paper describes the recent decline in local biodiversity, ecological sustainability, social resilience, nutrition, and food security in this food system in the wake of agricultural 'modernization.' Greater attention to the culturally modulated dimensions of food systems, it is argued, will contribute to creating a rural development model for (re-)creating moral economies that support ecologically and socially responsible food systems.

Keywords

agriculture; Bali; cultural heritage; endangered food system; nutrition

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INTRODUCTION

Maintaining an adequate and healthy global supply of food in the 21st century against countervailing trends, such as population growth and global warming, will be difficult indeed. Moreover, even an adequate supply will not translate into universal food security in a profit-oriented, market-based food system that currently already denies access to secure food to almost one third the world's population (Food and Agriculture Organization of the United Nations, 2018, 2022). Access to a optimally healthy and balanced diet is much more exclusive still and unaffordable for most (Reuter, 2015). The consequences of this global pattern of exclusion would be much more severe still if it was not for the fact that poverty-related food insecurity has often been mitigated within regional and local food systems (Devereux, 1999), although these systems themselves are severely threatened.

Traditional food systems tended to operate as moral economies, that is, they were or still are governed by culture-specific moral frameworks of norms and values that engender socio-political and agrarian practices that provide most or all members of society with reliable access to food and also help maintain a responsible relationship with the environment. 'Moral economy' serves as a socio-cultural system of mutual insurance, wherein participants mitigate economic risks by sharing resources based on an ethos of mutual care, cooperation, solidarity and trust (Scott, 1977). Finally, traditional food systems also incorporate a vast body of experiential cultural knowledge about food production and processing that has evolved over extended periods of settlement, and serves to maintain a diverse, balanced, complete and healthy food supply and to extract optimal nutritional value from this food through traditional recipes (Wagner, 2002). Local and regional food systems are thus key repositories of our cultural heritage. They contain a wealth of knowledge on food and also serve to illustrate that ethical principles of mutuality and strategies for inclusion are essential to ensure equitable food access and sustainable production.

Unfortunately, the knowledge, resilience and moral ingenuity of traditional food systems are increasingly compromised or lost (Reuter & MacRae, 2019). This trend is part of a broader process of rapid transformation in the life of rural communities around the world. Agricultural biodiversity, inputs, land tenure arrangements, labor schemes, gift exchange patterns, transportation, trade and many other cultural and material aspects of food systems have been radically transformed in the wake of the green revolution and under the structural adjustment programs imposed by creditor institutions on developing countries like Indonesia over the past five decades. A case study from Bali, Indonesia, is presented below to illustrate the vital contribution that

moral economic principles and culture-specific food knowledge make to food security within regional food systems, the negative impact agricultural 'modernization' has had on them, some recent attempts by local social movements to restore them, and the need to support such efforts through cultural heritage protection.

METHOD

This paper aims to convey an appreciation of the moral and cultural heritage aspects of "food systems", which until now have been viewed mostly from an econometric or ecological perspective (Francis et al., 2003; Pinchot, 2014). It draws on data collected in the course of food system-focused field research from 2015 to 2022, as well as on a much larger body of data on general socio-economic change collected by the author in the course of long-term ethnographic fieldwork among the people of highland Bali between 1994 and 2022, incorporating more than 4 years of participant observation in the field. Participant observation is the core method of anthropology and aims to provide a holistic understanding of cultures and societies as fully integrated systems, the complex dynamics of which reductionist methods cannot grasp.

Field research specifically focused on the local food system was designed to trace food pathways from the point of production to the point of consumption, through participant observation of all relevant groups of participants, thematic interviews, and focus group discussions with farmers, fishers, local consumers, government officials and grassroots food and farming activists. Several hundred interviews were conducted by the author.

RESULTS

The local food system explored herein is located in the central highlands and on the northeastern coast of the island of Bali, Indonesia. These two adjacent but ecologically different regions are highly integrated culturally, forming a single and distinct indigenous ethnic group known as Bali Aga or Bali Mula. Villages in the highlands have traditional trade links with communities on the northern coast dating back at least a millennium, which is the limit of available evidence within Balinese historiography. Archeological evidence dating to the first century further shows that interisland trade from India and China through the Java Sea to Bali's northern coast was already flourishing at the time (Ardika & Bellwood, 1991). The same evidence also suggests that local, inland-oriented trade networks running from the coast through the mountains were already in place two millennia ago.

In the highland region of Bali, horticulture and dry rice cultivation were the main agricultural activities for many centuries, with maize taking the place of rain-fed rice in the early 20th century. Agricultural cycles were deeply embedded in, and dependent on, a complex ritual system regulating the seasonal rhythm of planting, harvesting, and communal food consumption in the village and in the wider region. This system featured regular labor sharing and a communal land allocation system (*ayahan desa*) steeped in ritual obligations and closely intertwined with the social organization of highland villages (Reuter, 2002, pp. 55–65, 2002, pp. 123–125, 2006). Communal food consumption, especially of rice and the meat of sacrificial animals, was and still is very significant, and takes place on ritual occasions such as temple festivals and the new and full moon gatherings of village elders and communal land users.

Traditionally, commercial activity around food was limited to regional trade of essential foods between the highland communities and the fishing villages of the northern coast. Kintamani town is the most important market (*pasar*) for the entire region, and its market is held on every first day (*Pasah*) of the Balinese three-day week that regulates market rhythms. The market was relocated from its original location at the foot of the most important regional 'domain' temple, Pura Penulisan, on the initiative of the Dutch colonial government in the 1930s. There is still a shrine marking the location of the original market, called Pura Mas Melanting, and a similar temple (*pura*) was built in the new market. All over Bali temples of this name are found near traditional markets, showing that commercial interests and the moral obligations of religious life were closely interrelated. Personal offerings are made at '*Melanting*' temples by traders seeking divine support for material success. Prohibitions also underline the link between ritual and trade. For example, the people of Batur are forbidden to trade during the harvest festival at the regional temple Pura Batur, from the tenth full moon until the following new moon. Trade with the north coast is underwritten by intense ritual connections maintained through the institution of regional 'domain temples' (*pura banua*). The largest of these regional temples is Penulisan, maintained jointly by more than fifty highland and coastal villages.

The ritual ties among communities supporting this ancient state temple have been in place for many centuries, and trade has been part of the story from the beginning. For example, a 1200AD inscription (Prasasti Kintamani E) states the specific privileges held by the traders of Kintamani with regards to trade from the mountains to villages on the coast, including Julah. Another inscription from 1300AD (Prasasti Sukawana D) grants similar privileges to the people of Sukawana. Production of surplus

food for the purpose of regional trade between the mountains and the coast is thus an ancient practice.

In 1995 I recorded that local food products traded between coastal and mountain villages included salt, palm-sugar, fish, coconuts and coconut oil going uphill, and bananas, maize, root vegetables, spices, coffee and meat going downhill to the coast. Traders traditionally travelled by foot with their packhorses from Pasar Kintamani to the market in Desa Penuktukan the next day and back to Kintamani two days later, allowing more time for the uphill journey. Exchanges of goods in the market place have been 'monetized' for as long as anyone could remember. The turnover is small (today about USD 100/day for coastal and USD 50 for highland food traders). Profit margins have always been slim, and net earnings are similar for the upland and coastal participants (about USD 40/day of earnings after expenses, which are much higher for fishers). There are some full-time traders with modest livelihoods (less than USD 100 net profit/day), but most small traders are the wives of farmers or fishers, who also handle most of the food processing where needed. In short, this was for all practical purposes a rather balanced system of food distribution with an extremely short supply chain that delivered a high degree of food affordability. Regionally traded foods were vital for a balanced diet. Bateson & Mead (1942), for example, noted a high incident of iodine deficiency in a highland village located just outside of the ritual alliance system described above, caused by a chronic lack of access to sea salt and fish.

All other foods were available from subsistence production at the household level or from cashless gift exchange among neighbors and kin. Food was not sold at a village level or among villages with a similar range of products. Consumption of locally produced meat was and is almost entirely restricted to communal ritual meals associated with ceremonial sacrifices. All food was organic at least until the 1980s. Diets were extremely varied and there was hardly any imported or processed food. Finally, the environmental impact of agriculture was modest, given that highly biodiverse mixed gardens predominated. In the early 1990s I would encounter between 40 and 80 different food, condiment, and medicinal plant species within a typical highland garden. Such food gardens looked rather similar to uncultivated native forest to the untrained eye. Today, much of this biodiversity has been lost (see also Sujarwo et al., 2014).

This traditional system of morally sound and sustainable inter-human and human-environment relations was gradually transformed from the colonial period (1908-1949) onward (Reuter, 2019). A first step was the establishment of plantations of cash crops, including clove, coffee, cacao and citrus, destined for distant markets

outside the island of Bali. While plantations were few in number and area, largely thanks to the inalienability of 'communally owned village land' (*tanah ayahan desa*), cash cropping did spread as individual farmers mimicked the plantation's economic model on their 'privately owned land' holdings (*tanah milik*), gained through individual forest clearing, and later also on village land (by communal decision).

Note that the traditional *tanah ayahan* system had regulated access to land – the most important resource required for the production of food – in a very most fair and equitable manner for many centuries at the village level. Comparing this to the present situation in many countries around the world, where land has been reduced to a commodity and an object of financial speculation (Li, 2014), this is a remarkable achievement, and it was never simple matter. The accumulation of land in a few hands can only be prevented in a socio-political system that is specifically designed to avoid this kind of economic dominance, which in turn discourages political dominance. Strong and resilient safe-guards are needed to prevent either an economic or political monopoly. In this case, village land was awarded to each newly married couple and this was accompanied with rank- specific duties within the ritual and also the political life of the village. Land had to returned when a couple retired from the village council (for details, see Reuter, 2002). The ritual and political order was designed to maintain an egalitarian society and egalitarian access to resources by a system of precedence, whereby each household head was allocated a very specific rank at any given time, but also moved through all the ranks of the village council (*ulu apad*) in the course of their life time. This prevented an accumulation of political power, which may have led to the abolition of the system of land allocation. Note that water was not as heavily regulated by 'water temple societies' (*subak*) in the highlands as it is in southern Bali, because agriculture here was largely rain-fed. 'Dry *subak*' (*subak abian*) were instead focused on labor sharing during the planting and harvest seasons. The village ritual calenders essentially reflected the varying seasonal activities associated with food production.

The authoritarian government of General Suharto (1966-1998) actively encouraged a shift to privately owned land and cash crop production to boost exports. This led to a number of economic crises, for example when one of Suharto's sons, who had a monopoly position in the clove industry, squeezed farm gate prices, leading highland farmers to cut down their clove trees in protest (Ruf & Schroth, 2015; Paul et al., 2015). Another crisis occurred when a fungal disease decimated monocultures of citrus in the foothills toward the northern coast, ruining many farmers. It is thus unsurprising that, in the 1990s, I found that about two thirds of farmers in the highlands

were still continued or had returned to their traditional mixed garden horticulture as a subsistence activity in parallel with some cash cropping and non-intensive livestock raising for the purpose of participation in inter-local trade with the coast, as this continued to be perceived as the safest livelihood strategy.

In the three subsequent decades I have been able to observe socio-cultural and economic change in this region in the course of short ethnographic research visits, usually twice a year. I witnessed the status of agriculture change in some interesting, non-linear ways during this time. In the wake of so-called agricultural 'modernization', ecologies, moral economies, nutrition and associated aspects of public health all experienced a significant decline.

While farming was still the main occupation for the overwhelming majority in the early 1990s, it was already seen as old-fashioned and associated with poverty. Such poverty did not typically entail food insecurity so much as an inability to raise cash for consumer goods and educational and medical services, which had entered people's imaginary through the introduction of electricity and broadcast media, especially television. Many young people left their villages for work or study. However, I noticed a reversal during a follow-up visit in 1999. In conversations with local farmers, they laughed off the issue of the Asian Financial crisis and the associated downturn that was rocking Indonesia's economy. Instead, farmers reported significant increases in the market value of their coffee due to the devaluation of the Rupiah. Generally, successful farmers with adequate land holdings had become steadily more commercial and wealthier, and today their income by far exceeds that of public servants, who were once the envy of farmers.

Massive demand in the hospitality sector for fresh fruit, vegetables, poultry, and beef, along with vastly improved roads and transportation facilitating market access, have led to a new boom in commercial cash-crop agriculture. This has benefited larger farmers more than small landholders. Individual landholdings declined at first during the last few decades, due to population growth and the division of estates through inheritance. Once plots became too small to sustain a household, however, they were purchased or leased by farmers whose landholdings thereby increased beyond what had been the typical sized, single-household-operated farm of the 1990s (about 0.5 ha). In short, farmers eventually became fewer and richer. Many land-poor farmers were reduced to the status of agricultural laborers.

Bali as a whole has seen a dramatic rise in demand for arable land, fueled by the food needs of a fast-growing population (2.15% per annum in the decade of 2000-2010) (cf. Erviani, 2011) and the millions of tourists arriving in Bali annually. During the 1980s in Bali, some 6,000 ha of irrigated land and the same amount of dry farm land

were lost to agriculture, at an annual rate of about 1,000 ha by the end of that decade (Foley, 1991). The rate of land conversion increased further to about 3,000 ha in the year 2003 (Bali Post, 2003). In the highlands, this demand has been less pronounced but significant, and has been met in part by deforestation.

Ecological change has been dramatic. Almost the entire highland region is now covered with citrus monoculture (tangerines), while the traditional, highly biodiverse mixed gardens have all but disappeared. Coffee orchards have also been largely displaced by the momentarily more profitable citrus farms. Unlike coffee, citrus does not require shade trees, which have all been felled now. Grass and weeds are killed with copious amounts of glyphosate and the soil beneath citrus tress tends to be denuded of any other vegetation. The entire highland region will be devastated if there is another major outbreak of a citrus disease resistant to the chemical fungicides and insecticides currently used in large quantities.

Highland Bali is emblematic of a dramatic global decline in food biodiversity (75%), which began as farmers worldwide replaced their diversified cropping practices and unique indigenous varieties with monocultures and genetically uniform, high-yielding hybrid varieties (Food and Agriculture Organization of the United Nations, 2004). In the early 1990s, the mixed gardens typical of highland agriculture contained at least 50-80 different food crop species overall, based on my records, assuring a highly varied diet as well as high resilience against total crop failure due to adverse weather, natural disasters or pests. Wild species were also foraged, including forest vegetables (e.g. fern fronds, *paku*) and some insect species (e.g. *dedalu*). Now that the region is almost entirely covered by citrus, fat- and sugar-rich and nutrient-poor processed food is being imported to fill the lack of locally produced staples, transforming what was once a balanced and varied diet into a modern junk food diet in less than a generation. On the basis of my observations, the typical diet now includes about 30% (in calories) of processed food, predominantly in the form of cakes, biscuits, sweets, chocolate bars, instant noodles and sweetened drinks, and this percentage is even higher among children. A further 35% comes from nutrient-poor, low-grade white rice. The result is a pattern Shrimpton & Rokx (2013, p. 2) have labelled the 'double burden of malnutrition,' a pattern whereby over-nutrition and under-nutrition coincide in the same population. Unsurprisingly, national population percentage rates of type-2 diabetes have doubled in Indonesia since 1980 (World Health Organization, 2016).

The moral economy of the highlands is rapidly transforming in parallel to these other food system changes, even though local and regional ritual ties and ceremonial

life remain intact. A separation of increasingly formalistic religious concerns and increasingly liberalized economic concerns is causing major tensions in the local status economy, with material wealth gradually becoming more important than ritual status. Most important in the context of food system analysis, however, is a significant reduction in the amount of social solidarity, which previously served as a source of resilience and insurance against food insecurity.

The cornerstone of the traditional moral economy in the highlands was, and to a lesser degree still is, a system of cashless and time-delayed gift exchange of the kind described by Mauss (2011) and known in Balinese as *baang-ngidih*, which literally means "to give and to ask for." The *baang-ngidih* system is designed for reciprocal aid between persons irrespective of their kinship or seniority status. This gift-exchange system provided a way of distributing excess and alleviating shortfalls in food production, as well as distributing all manner of other material resources. This exchange system is currently seeing diminished use. The reason is a decline in sociality and reduced dependence on mutual aid, which is the result of an extremely vulnerable but currently buoyant cash crop-based economy.

DISCUSSION

The highlands and northern coast cannot be separated from the fate of other parts of Bali, where some very disconcerting trends can be observed. Food price volatility and vulnerability to food crises are rising sharply in Bali and in Indonesia as a whole (Anggraeni et al., 2014). Poor urban labor migrants and those employed to the tourism industry, are especially vulnerable, as the recent Covid-19 pandemic has shown. Indeed, during this period the highlands became a refuge for thousands of workers laid off due to the crisis.

The food system of highland Bali is now hard pressed by exponentially rising demand and declining resources. There is little scope for further agricultural intensification, and indeed a need to take firm sustainability, biodiversity and water conservation measures to undo the damage already done to local ecosystems and human health. Considering also the increasing impact of climate change on agriculture (Cambridge Institute for Sustainability Leadership, 2014), a shift to more sustainable agriculture and diversified nutrition is essential for enhancing the resilience of food systems, given that sustainable agriculture and healthy, tight knit communities are less vulnerable to external shocks (Badjie & Barrow, 2017). Responding to this challenge, one important trend in recent years has been attempts to revitalize local food

systems, often combining a renewed appreciation of traditional agricultural methods with cutting edge innovation.

As a practical method to achieve ecological and social resilience, the best option available seems to be a revitalized and augmented form of organic, community-based farming. The International Federation of Organic Agriculture Movements states that: "organic agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment" (Institute for Market Ecology, 2007). Halberg & Muller (2013) provide evidence that organic farming has a positive influence on smallholder food security, livelihoods and communities. My own observations similarly suggest that the restoration of sustainable food production and moral economies of distribution, as well as the protection of cultural knowledge on food preparation are inseparable parts of a whole.

These aspects of food system restoration are also recognized by a new social movement that is promoting organic farming and nutrition in Bali today. Their aim is the revival of 'resilience communities,' as Bankoff (2003) calls them. In such resilience communities, the dominant model of social discourse and practice is a moral economy ethos, which also considers the environment and human nutritional health. None of this precludes innovation, and indeed, sustainable farming movements in Indonesia make good use of new technologies, for example, by networking with consumers for direct marketing with the help of social media.

Sustainable farmer cooperatives and movements are beginning to develop in Bali. Most of the government mandated and forcibly depoliticized 'village-level cooperatives' (kooperasi unit desa or KUD) that had been established under the military dictatorship of General Suharto, and which I witnessed in the 1990s, have now vanished. Some new state- or private sector-led farmer networks emerged in the post-Reformasi period but similarly failed to inspire lasting local engagement and disappeared. Independent, farmer-managed initiatives are now taking their place. One local example is the grassroots cooperative KSU Bale Dana Mesari, established in 2004, which now has 16 local subsidiaries and 1700 members. This cooperative provides members with access to shared machinery, low interest loans and, most importantly, allows farmers to sell their products at a fair price through collective marketing schemes. Governance of the cooperative is transparent and fair, and rotating leadership is used to create a sense of solidarity that strongly echoes traditional, egalitarian values and social organization patterns characteristic of Bali Aga culture and morality (Reuter, 2002). There is a growing awareness among farmers that the extreme domi-

nance of citrus orchards in the Kintamani district is a great economic and nutritional hazard for local communities, and a range of sustainability, diversification and education measures are being considered. Government agencies and international organizations should support these efforts.

More case studies of food systems in other parts of the world are required to pinpoint the various pathways by which culturally regulated, moral economies as well as cultural knowledge on agriculture and nutrition have contributed to food security and food sovereignty. It is nevertheless evident that food system resilience is significantly affected by the extent to which food production, exchange and consumption is supported by cultural knowledge, values and practices that engender social and ecological responsibility and promote healthy diets. Looking forward, there is some hope that a renewal and redesign of traditional moral economies is beginning to take shape, with the potential to deliver better farmer livelihoods and more resilient food systems.

Policy makers need to give far greater consideration to the total embeddedness of f=ood systems within wither systems of cultural practice, including social organization, political organization, religion and ritual. These wider systems are repositories of food production and food preparation knowledge, and also regulate access to the most important food-related means of production, including labor, land, water and seeds.

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