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Traditional ecological knowledge in Thailand: Mechanisms and contributions to food security

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ABSTRACT

Despite worldwide advances in science and technology, human well-being of the rich and poor has been threatened by food insecurity. Due to socio-economic and environmental pressures on agriculture, developing countries have faced a shortage of food access and degraded quality of food resources. We argue that traditional ecological knowledge (TEK), when appropriately used and adapted could play a significant role in addressing food security for rural, smallholder farmers. Data were collected in two rural farming communities located in the drought-prone and poverty-stricken Northeast Region of Thailand. Both were situated in diverse ecological settings: one characterized as a subsistent, lowland rice farming community and the other, the upland, all of which were dominated by cash crops. We employed a combined data collection method including in-depth interviews, participant observations, and household surveys to examine household-based food acquisition patterns. We found that the lowland subsistence farming community was endowed with a higher level of TEK and showed a stronger indication of food security than the upland cash-crop focused community. Furthermore, under environmental change, local villagers drew upon TEK to support their way of life. TEK also helped villagers to adapt to new environmental and socio-economic changes, to sustain ecosystem services and agricultural activities, and to build a secure and safe food system. This finding suggests that over-promotion of export-oriented agriculture could leave smallholder farmers and disadvantaged populations in a vulnerable situation. Their food security could be enhanced by the conservation of community-based natural resources with respect given to the role of TEK.

Introduction

Food security is a global concern, particularly for the "poor" and disadvantaged sector of the population. Given the continued impact of climate change on agriculture and natural resources, the future of food security for low-income people is full of uncertainty. Research shows the majority of low-income countries, in particular, have continued to encounter problems associated with food shortage, access to food resources, health, and well-being (Ingram, Eriksen, & Liverman, 2010). As such, food security is more complex an issue than generally perceived, as it encompasses a multi-faceted food production system. In other words, food encompasses a number of key concepts: availability, accessibility, and quality. The consumption of food is not only linked to human nutrition, but also to socio-cultural needs (Kuhnlein, 2009).

The availability of sufficient food to provide for a country's entire population requires both capital investments and technological resources. However, food

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acquisition is also susceptible to external factors, such as a rise in global oil prices. Access to key resources (that is, land, water, markets, labor) are intertwined with concepts like social justice, particularly in terms of the right to access food (Ingram et al., 2010). Both the availability and accessibility of food could easily hurt low income populations in food-deficit countries (United Nations, 2010). With regard to food quality, even when availability is high, as in developed countries, new health problems have arisen from overconsumption of processed foods (Thai National Food Committee, 2012). Research also shows that new diseases, such as diabetes, high blood pressure and heart failure, are directly related to diets based on high levels of carbohydrates, fat, and refined sugars, all of which are the characteristics of modern food acquisition (Kuhnlein, 2009).

This paper examines the impacts of changes in food acquisition on communities of farmers through a study of two rural communities in Thailand's drought-prone and poverty-stricken Northeast Region. Our analysis sheds light on some of the mechanisms and contributions of traditional ecological knowledge (TEK) to community food security.

Literature Review

Impacts of Climate Change

Global ecological degradation and climate change has become real threats to agriculture, the major source of food production in both the affluent and low-income countries. We have begun to witness the impact on the majority of the world's disadvantaged and marginalized populations, namely indigenous people, minority-ethnic groups, and smallholder farmers, most of whom live in remote rural areas. For example, in the Mekong River basin, where rainfed rice cultivation was widespread, many farmers have experienced water shortages due to severe seasonal changes (Chinvanno, 2008).

In low-income countries, a decline in agricultural production due to global climate change has led to a dependence on imported grains. High demand has led to price surges in both the domestic and international markets. According to the World Bank 2012 reports, major food crops such as sugar reached a 30-year high in 2011, and a 12 percent increase since January 2010. Therefore, the future of food security world-wide cannot be taken lightly and there is an urgent need to explore an alternative way forward (Corway & Edward, 1990; Shiva, 1991).

Impacts of the Green Revolution on Community Livelihoods and the Natural Environment

In most low-income countries, an increase in agricultural production levels has not only been an option to raise income, but a necessary one. In the early 1960s, the global community witnessed the adoption of what was to be a promising solution for developing countries to feed their ever increasing population. This new approach called the "Green Revolution" drew upon the applied sciences and new technologies to increase yields on traditional farms (Shiva, 1991). However, a large number of experts have questioned the successes offered by the transfer of "Green Revolution" technology to the developing world. Chiefly, the Green Revolution has been criticized for causing environmental damage, such as biodiversity loss due to excessive and inappropriate use of fertilizers and pesticides and land degradation through a focus on mono-cropping (Eakin, Webhe, Avila, Sanchez Torres, & Bojórquez-Tapia, 2007).

In Thailand, farmers have become dependent on synthetic fertilizers and agricultural chemicals to sustain productivity. Foreign fertilizer companies have benefitted as the demand for imported fertilizers is high. Inappropriate use of pesticides is evidently harmful to farmers' health. A 2003 survey of 606 agriculturalists from six provinces revealed that almost every person showed at least one symptom of toxicity from the chemicals they used; 56 percent had moderate symptoms and one percent had severe symptoms. In addition, blood tests from 187 agriculturalists showed that 11 percent were at high risk (Thai National Food Committee, 2012). Despite strong opposition, the Green Revolution innovations are still the predominant form of agriculture on a global scale and there have not been any new ways to replace long lines of productivity with a pro-Green Revolution reference.

The Challenges of Small-farmers and TEK Relating Ecosystems

TEK is most easily understood within the context of ecology. Conceptually, an ecosystem is a dynamic complex of plant, animal, and microorganism communities and the nonliving environment, interacting as a functional and adaptive unit (Berkes & Carl, 1998). Humans are an integral part of ecosystems, interacting through services (Millennium Ecosystem Assessment, 2005). Viewed from a holistic ecological perspective, human beings borrow from the ecosystem to attain well-being through knowledge passed on from generation to generation and shared among members of society such as observation and classification, situated knowledge, management system, and world views (Brigg, 2005). Broken down into a series of skills and abilities TEK is applied in the following fields: 1) observation and classification, for example, by type, weight, color, 2) situated knowledge by transmitted knowledge of the past and current uses of the environment transmitted through oral history, 3) management system by constructed norms and local law, 4) world views by connection between belief and ways of life (Berkes, 2008; Grenier, 1998).

These characteristics have directly and indirectly been turning scholars and researchers toward TEK as an alternative form of sustainable development (Grenier, 1998). In this paper, we offer an alternative way to cope with food security, especially in low-income countries where a large number of disadvantaged and politically marginalized populations live in rural, farming areas. We are strongly convinced that the key to achieving food security in disadvantaged groups of people rests upon the components of what we refer to as TEK. This study will show the ways in which communities that uphold the practice of TEK in relation to agricultural practices, biodiversity conservation, and as a form of self-help to support, have a higher