Northern Thai Homegardens: Towards a Comprehensive Analysis of Rural Household Production Systems

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Homegardens are a very old form of plant cultivation in Thailand, whose origins have been suggested to be thousands of years old based on evidence at the Spirit Cave archaeological site. However, the ethnography of Thai agriculture emphasizes rice production and virtually ignores the multi-functional homegarden that provides diverse products and ecological services that touch nearly every aspect of daily life of rural households. This study in a lowland Northern Thai, Khon Muang, community in rural Chiang Mai Province, found homegardens to be a rather stable form of traditional homestead cultivation that provided food, income, medicinal plants, and other benefits such as a social space, ritual products and aesthetic qualities. In contrast, there was rapid environmental change on steep once-forested hillsides resulting from a mono-crop scheme promoted by a multinational company. Any attempt to develop homegardens for commercial production must avoid reductionist tendencies that promote a few cash crops at the expense of the intangible qualities that may be difficult to quantify but are vital for the quality of rural life. Keeping these points in mind, homegardens can continue to serve households' diverse needs in the future just as they have durably done in the past.

Keywords: homegardens, agroforestry, Northern Thai agriculture, Khon Muang, agricultural anthropology

INTRODUCTION

Although humans have a long history of cultivating plants near their residences throughout the world, homegardens are an understudied aspect of Thai farming systems. This is unfortunate because homegardens are a refuge of plant biodiversity and ecological stability in a steadily deteriorating environment of rural Thailand. Thailand has lost considerable forest cover for decades, which Hirsch (1987, 129) attributed to a "particular development dynamic." We observed this "dynamic" in fieldwork of a lowland northern Thai, *Khon Muang*, community in Mae Chaem District of Chiang Mai Province. Farmers had converted steep hillsides into permanent fields to grow maize under contract for a multinational corporation. At the same time, these same farmers were growing 185 plants in 10 homegardens, which were maintained with virtually no industrial inputs.

Ethnographers of Thailand have put most of their attention on rice as the main productive activity of rural subsistence systems.[1] This is understandable because rice is the Kingdom's staple crop and is an important export. However, ethnographers' sparse treatment of homegardens leaves a gap in our overall understanding of the ecology of Thai farming systems and applied approaches to community development. This research identified homegardens as a multi-functional and multiple-use subsystem of

the local northern Thai agroecosystem. Plants from homegardens are sources of products that touched nearly every aspect of life in this community, causing us to suggest that homegardens are a staple of Thai cultural life. Our systematic observation revealed that homegardens not only provided food, medicines and marketable products, but also provided aesthetic and ecological services. Livestock are raised in the homegarden, and they are integrated into the ecological system through animal waste recycling. Finally, homegarden products are commonly used in the rituals of local spirit cults and Theravada Buddhist practices of this community.

Interestingly, archaeological evidence suggests that homegardens might have a very long history in Thailand, as their origins might be traced to as early as 9,500 B.C. to 5,500 B.C. Materials from excavations at Sprit Cave in northwestern Thailand included discarded seeds of fruits and vegetables that had been collected from the natural environment. Whether the materials are early evidence of plant domestication is still unclear (Glover 1977, 158). However, the longevity of these systems was revealed in an investigation of extant homegardens. Trees much as 200 years old were identified in gardens in Uttaradit Province, indicating that the Thai homegarden is an "indigenous" agroforestry system that has been very "stable" through time (Pearmsak 1990:60).[2]

An analysis of Thai agroecosystems that focuses entirely on a few field crops is reductionist and ignores homegardens as "integral" to the system (Kumar and Nair 2004:136). By focusing attention to mono-cropping, economic development practitioners fall prey to the "single-commodity outlook" characterized by land-use specialists of agricultural, economic and forestry disciplines (Kumar and Nair 2004, 148). We would also imitate the economic policymaker mindset that gives preference to a few cash crops and overlooks the social and economic benefits of a diverse, productive system (Kumar and Nair 2004, 148). Such are the perils reflected in classic ecological studies, such as Lucien Hanks' *Rice and Man: Agricultural Ecology in Southeast Asia* (1992 [1972]). Hanks (1992 [1972], 140) mentions gardening only briefly, that "they [farmers] discovered that the housewife with garden produce to sell was a valuable asset...'' in reference to the agricultural transformation to a cash economy in the mid- 20th Century.

Thai people do not subsist on rice alone, and their farming ecology is not so one-dimensional. This calls to mind such observation of ethnographer Karl Gustav Izikowitz (2004 [1944], 136) in a study of the Austroasiatic-speaking Lamét of northwestern Laos:

> However, it is wrong to think that the Lamét eat nothing but rice. That would become too dull. Almost always there are different kinds of vegetables to go with the rice, for example pumpkins, cucumbers, bamboo shoots and a lot of other things, depending on the season.

This essay is an attempt to bring homegardens to visibility in Northern Thai household production systems, and in that vein, bring to light their multiple functions in a Northern Thai community. While economic developers and policy makers may be interested in promoting homegardens to raise household incomes, we must not also lose sight of intangible characteristics that are difficult to quantify in an economic sense. Such qualities provide cultural meaning to households and thus contribute to quality of life. In the best of both worlds, then, any economic development initiative should strive to maintain the multifunctional integrity of homegardens while addressing the possibilities for improved incomes. In that way, homegardens will continue to serve household's diverse needs in the future just as they have durably done in the past.

LITERATURE OF THAI HOMEGARDENS

Geraldine Moreno-Black et al. (1996) conducted the most extensive ethnographic study of Thai homegardens in the Northeastern region, *Isan*. The research recognized that female stewardship maintained the garden as a refuge of biodiversity in contrast to the ecological change caused by deforestation and expanded upland mono-cropping schemes. The investigation of 49 home gardens and

their managers documented 230 species for a mean of 36 species per garden and related their uses in daily life. Just as important, Moreno-Black et al. (1996, 7) captured the flexibility of homegarden management systems, which the women adapted to their households' economic and social needs: "The women gardeners in this study used the areas within their house compounds in a *variety of ways* and exerted control over them *through various management strategies*" (emphases added).

Moreno-Black et al. (1996) brought visibility to *Isan* women's contributions to rural household production systems, in response to Ester Boserup's clarion call in *Women's Role in Economic Development* (1970). Moreno-Black et al. argued that homegardens empower women with nutritional security, economic independence, a means to raise their status, and even provided a way to express a progressive attitude. Women sustained these benefits over the long-term because gardening is a stable, traditional method of production that persists regardless of economic and demographic change.

Laurence Judd (1961) made the first substantial mention of homegardens in Thai ethnography. The highly regarded study concerned a northern Thai village whose main subsistence activity was shifting cultivation. Judd's detail of gardening practices and dietary data showed that gardening favored the villagers' nutritional status: "[the] villager eats surprisingly well. Although he does not have the wealth of the Bang Chan villager, he does have many food resources" (Judd 1961, 131-2).[3] Despite the extensive dietary evidence, Judd minimized gardening as a "supplementary" occupation (1961, 178).

A few years after Judd's study, Gertrude Woodruff Marlowe (1969) recognized the significance of gardening in her elaboration of the "economic variety" of agricultural activity in the lowland *Khon Muang* village, Ton Kwen, south of Chiang Mai. The obscure, but insightful article cautioned against characterizing northern Thai farmers as exclusive rice growers. Marlowe (1969, 20) identified the garden, or *suan,* as a land-use type relative to irrigated fields for growing rice and cash crops' or *naa*. According to Marlowe, the *suan* is a broad land-use category for "everything that is not *naa*," an observation that also comported with F.G.B. Keen's (1983, 295-6) more than one decade later.

Except for Moreno-Black et al. (1996), ethnographers left untouched Marlowe's proposed lines of inquiry. They chose to cultivate research in the paddy and hill fields, leaving homegarden research in a state of fallow. Hence, Marlowe's (1969,16) warning rings prophetic today:

> If the traditional view of [lowland *Khon Muang*] villagers as paddy farmers persists, planners will have an unrealistic picture of the lowland economy and the points of articulation between it and that of the hills, as well as an incomplete view of the wide variety of economic opportunities exploited by rural North Thais.

The three aforementioned studies do peel away at another layer of the complexity of Thai farming systems. However, their value for understanding longitudinal change is limited given that the studies addressed very different regional ecologies at sporadic intervals. For that reason, we are unable to assess any extent of change, the drivers of change, nor the relationship of change to other agro-subsystems or upon the household production system, all of which may be localized to the region of study.

COMMUNITY BACKGROUND

The site for this study was a lowland *Khon Muang* hamlet of 30 households, Baan Lek, located within a 5-kilometer radius of the district seat, Mae Chaem Town.[4] The hamlet was part of a larger village, Baan Yai, which was the administrative unit where the village head, *pu yai ban* resided. However, Baan Lek was a natural community geographically, socially and ritually. Most of the houses were strung out on either side of a 1-kilometer road parallel to the base of a hill. The hillside descended into a valley bottom, drained by a river, where farmers cultivated irrigated rice paddies. The valley separated the hamlet from the larger village. From a social standpoint, the hamlet hosted a small Buddhist temple, which was the gathering site for many religious rituals in this Theravada Buddhist society. The hamlet also had its own Guardian Spirit shrine where residents propitiated in an annual ceremony. Finally, a sign at the hamlet

entrance indicated the name of the hamlet, and people identified themselves as residents of this hamlet, rather than of Baan Yai.

Decades prior to this research, low rice productivity in Mae Chaem resulted in annual food deficits, and a nascent Communist insurgency prompted the government to dispatch a military force to the district. By the early 1980s, the insurgency was rendered ineffective, and the joint U.S.-Royal Thai governments-funded Mae Chaem Watershed Development Project was launched to introduce new rice production technologies throughout the decade. Consequently, lowland *Khon Muang* farmers learned to grow enough rice for household consumption and to diversify their irrigated paddies into dry-season cash crops. Between the end of the project (1989) and up to the years prior to this research, cash-cropping had taken an extreme turn in the hills where farmers had converted steep slopes into permanent fields of maize grown under contract to the Thai multinational agro-industrial concern, Charoen Pokphand Group, also known as "CP."

METHODS

The homegarden data was collected as part of a larger study of this community's ecological and cultural transformations from a subsistence mode of production to an increasingly commercialized system. A household survey was conducted on the 27 residences occupied year-round out of the 30 residences in order to obtain basic descriptive data of household composition, crops and areas sown, labor allocation and trends in agricultural development. The survey also obtained basic data of homegarden production, such as household laborers and disposition of products. In all, 26 homegardens were identified, as two households related by marriage shared a homegarden.

We then chose 10 residences for a more detailed study of homegarden production. To obtain as much information about plant knowledge and indigenous management practices, we included residences with the oldest residents, as well as residences with the larger homegardens regardless of the residents' ages. Consequently, we interviewed five men whose ages averaged 69 years old (range 58 to 75 years), and five women whose ages averaged 48 years old (range 44 to 55 years). Unfortunately, the eldest women declined to be interviewed, thus skewing the older age range toward the men.

We walked the selected gardens with the household member to document the species and the uses of the plants. In open-ended interviews with the garden caretaker, we probed about the care and management, with the object of eliciting indigenous knowledge, as well about the uses and disposition of garden products. Afterwards, the author and research assistant analyzed names of the inventoried plants and identified the scientific names by consulting Tem Smitinand's *Thai Plant Nam*es (2001).

Homegarden products were important in the ritual lives of the lowland *Khon Muang* as we participated in ceremonies at the hamlet's temple and at nearby larger temples in the district. A key informant was the lay leader of hamlet's temple congregation, the 71-year-old *aa-jaan wat* (literally, "temple teacher"), who also cared for his household's homegarden. We also built relationships with the Buddhist monks, and the research assistant for this study is a former Buddhist monk, all of whom explained the meanings of Buddhist rituals and practices. We attended the Buddhist Sabbath, *Wan Phra*; life cycle ceremonies, i.e. funerals, and healing ceremony for a sick monk, *Subchata*; and annual ceremonies, the End of the Rainy Season Retreat, *Ok Pansa*, and at the annual new rice donation, at which farmers presented the recently harvested rice to support the temple upkeep.

The Northern Thai also observe numerous spirit cults, which Keyes (1995, 115) in agreement with Tambiah (1970) argued "Buddhism and animism belong to a single religious system…" In this hamlet and in a neighboring village, we observed harvest rituals in the field, where farmers acknowledged gratitude to local spirits for bringing the maize or rice crop to fruition. We also noticed spirit houses on properties of small businesses and local government, although none was located at peoples' residences. Finally, we attended the hamlet's annual propitiation of the community's Guardian Spirit at a shrine on a hillside overlooking the community. For these spirit propitiations, we observed the presentation of homegarden products, which we shall discuss later in this essay.

SUMMARY OF DATA

Land Use Categories

The hamlet's land-use types can be sorted into four categories: 1) irrigated lowland paddy for wet-season glutinous rice and dry-season non-rice cash crops, 2) rainfed sloping hill areas cultivated in upland rice and permanent maize fields, 3) irrigated and non-irrigated homegardens, and 4) forest. Farmers' terms for these categories can be contrasted with those identified by Marlowe south of Chiang Mai. According to Marlowe (1969: 20), the general principle is that lands recognized as a "garden" (*suan*) are "everything that is not *naa*" (paddy). At Baan Lek, residents referred to homegarden cultivation as *bplook puet suan krua*, or literally, as "growing plants in a kitchen garden," indicating the close association between the plants and their household use. Lowland paddy is referred to *naa kaao,* literally, "rice field." However, the term applies only to wet-season rice, as the dry-season crops in irrigated lowland paddy were referred to as *suan* and the specific non-rice crop cultivated there, i.e. *suan hua hom* for onion; *suan gra-tien* for garlic, and *suan tua leuang* for soybean. Fields in the sloping uplands were referred to either *suan,* or else *rai* or "farm plot." Forest is referred to as *bpaa*.

Homegardens occupied the smallest cultivated land area in this hamlet, but it was richest in biodiversity compared to the mono-cropped paddy and hillsides. Based on the Thai unit of land measure (*rai*), we calculated the average homegarden size was little more than 1 *rai* (0.18 ha), for a total hamlet-wide homegarden area of 29.25 *rai*, (4.68 ha) or about 9 percent of the cultivable land base. Hill lands constituted the largest agricultural land use of 257 *rai* (41.1 ha)—about 76 percent of total agricultural area--while the paddy lowlands (wet-rice followed by dry-season cash crops) occupied 51.5 *rai* (8.24 ha), or 15 percent of total cultivable lands (Figure 1).

In terms of biodiversity, the 10 homegardens chosen for the intensive survey had 185 plant species of which 25 species could not be identified for their scientific classification in Smitinand's (2001) botanical guide. This averaged to 54 species per homegarden, in contrast to the hill fields and lowland paddy, which were seasonally mono-cropped. While the continuous maize cropping in the hills posed potential environmental problems in terms of forest loss, soil erosion and agricultural chemical runoff, the homegardens were a rather stable productive area requiring much few, if any, agricultural inputs. This presents a clear case study for agricultural development. While intensified land use in the hills, as defined by high input use, might be viewed as "development," its uncontrolled expansion had serious environmental ramifications. The situation calls to mind geographer Hirsch's observation (1987:129) that "rather than seeing deforestation as a symptom of underdevelopment, it is more useful to view the problem as part of a development dynamic." In contrast, the homegarden has been a traditional system that maintained its ecological integrity and provided multiple outputs of food and material products. In other words, "less" development can mean "more" in terms of ecological services and multiple outputs.

Labor Allocation and Social Change

At the risk of resurrecting the debate about John Embree's (1950, cf. Keyes 1995, 163-166) observations of Thailand as a "loosely structured social system," the data collected from the hamlet survey (Table 1) showed a mixed pattern of gendered labor allocation for homegardens across the 27 surveyed households. In this community, at least, the homegarden division of labor was not exclusively men's or women's work; the data shows that 32 females and 37 males were involved in homegarden tasks. Their ages ranged from 5 to 85 years old. Overall nearly half the households (48 percent) reported that homegarden tasks were distributed among various household members both female and male. In eight instances (32 percent), one or two females were the main homegarden caretakers, while in five instances (20 percent) one or two males were main caretakers. Consequently, homegarden care and management is largely a household activity, while trending solely toward the females in about one-third of the cases.

We recognize the gender division of labor in this study is mixed relative to conventional development thinking that regards homegardening solely as women's work (Chambers 1983, 8; Nair 2006, 359), and it contrasts to the findings of Moreno-Black et al. (1996) in Northeastern Thailand. We suggest the data

reflects an intra-household gender division of labor not captured by Moreno-Black et al., as that study focused only on women, nor did it probe deeply enough to identify specific gendered tasks. The differences may also reflect a regional difference in the gender of homegarden work and management. For example, we did observe that men tended to the trees, and these gardens had a notable variety of tree species, many of which were for commercial purposes. We also noticed that women tended to be the marketers of homegarden products, which comports to the cultural role ascribed to women in Southeast Asia (Kirsch 1975 as quoted in Keyes 1995, 146).

A division of labor was also constructed along age groupings, whereas it was usually the young boys who fed the livestock, which were raised in the homegarden. Typically, they tended the animals as a before- or after-school chore. For the elderly, all retired household members were involved in the homegarden if they were physically able, as they were usually available all day while other family members were busy in fields or working in off-farm jobs.

The findings at Baan Lek did reflect differences gender roles of homegarden caretakers relative to participation in post-secondary education. Young males were being groomed for participation in the rural economy, while young females were taking advantage of educational opportunities in urban areas. In other words, young women were not as available as middle-aged women to tend to homegardens as they were studying in the city. Table 1 shows a gender imbalance that favors males as homegarden caretakers in the 18-to-29-year-old age category, i.e. nine males and three females. The disparity is explained by the fact that five women were pursuing post-secondary educational opportunities in Chiang Mai, compared to just one male. In fact, we found three households with two sons each in this age category, all of whom had taken on the homegarden as a household enterprise. In no cases did we find any women of this age category as the major homegarden caretaker.

The traditional gender role becomes apparent for the 30-39 age grouping, which finds more women working in homegardens than the men (Table 1); however, a more even distribution between the genders occurs beyond age 39. We hearken back to Moreno-Black et al. (1996:8) regarding how households adapt the homegarden to "their own circumstances." Although Baan Lek is an agricultural community, it is much diversified in terms of occupational structure. One-third of the households had a member, mostly men, working off-farm, while women are actively involved in weaving the traditional northern Thai fabric and the emblematic design known as *tin chok*. We were unable able to find a pattern between a particular household occupational structure and homegarden labor allocation. Nevertheless, the diversified occupational structure would make it necessary for households to be flexible in adapting its labor to homegarden cultivation.

Regardless of differences, the findings of this study comport with Moreno-Black et al. (1996, 7) that the homegardens "reveal much about the people who construct and tend them," as households structure labor arrangements according to the availability of members, their constraints and limitations, as well as to the purposes and goals of the production.

Homegarden Ecology

The homegarden is a multifunctional system whose integrity is maintained through human intervention with plants and animals. Through this process, the homegarden provides numerous services to the homestead and the social community. Thus, the value of the homegarden extends beyond its purpose as a source of nutritional or marketable produce, which complicates an attempt to quantify its economic value. For example, at the homestead level, the plants define the property boundaries, provide aesthetic appeal, and the homegarden serves as a social space, as well as provides ecological services concerning soil, water and climate. At the community level, homegardens contribute ritual products to religious ceremonies that help to maintain the social system integrity by promoting the social solidarity of the local residents.

The northern Thai homegarden requires human management, so it is not self-regulating in an ecological sense (*cf.* Rappaport 1979, 148). Humans provide their labor as an energy input, and the ecological functioning may involve purchased inputs in the form of animal feeds that are fed to livestock that are integral to this system. A few householders indicated they used some homegarden produce to

make livestock feed mixtures; for others, this was too time-consuming. In addition, the homegardens were relatively free of any chemical inputs to maintain soil fertility and weed control. Farmers reported they cut or pulled weeds by hand. They considered herbicides unsafe for this purpose and too expensive to use in the homegarden.

Baan Lek households did employ ecological principles of human-plant-animal interactions and waste product recycling in maintaining the system. A common sight was an elderly household member, often accompanied by a child, sweeping the leaf litter to mulch the homegarden. Households recognized the organic value of leaf biomass to maintain soil quality. Farmers appreciated the compost value, and they associated a good tree stand with good soil. Leaf litter was spread around plants, or else burned, and the ash distributed to various plants. Animal manure was sometimes mixed with ash, which was believed to enhance a nutrient effect. We also learned that farmers deposited the leaf-ash-manure compost in the hole dug for tree plantings.

The homegarden is the site for animal husbandry. In this hamlet, 633 chickens, 27 pigs and one cow were raised in the homegarden. Animal manure contributed to plants' nutrient cycling. Gardeners of 23 households reported they used manure to fertilize their homegardens, while eight households also used manure in crop fields. As the *aa-jaan wat,* said, "The animals help me, and I help the animals. We help each other."

Pigs were raised for marketing purposes, and they were kept in a pen enveloped beneath the tree canopy in the middle of the homegarden. The shady environment kept them comfortable because they lack sweat glands to cool them off. Farmers fed commercial feeds to pigs, although a few farmers made mixtures of banana, rice and papaya, which seemed to be more common decades ago in the subsistence economy.

Typically, chickens were raised for household consumption i.e. for eating or else for religious rituals. Poultry free-ranged on vegetation in the homestead compound, although household members also fed them maize and rice. The random manure droppings fertilized the plants, or else the human caretakers manually distributed it to plants (*cf.* Kingshill 1965, 42). Some farmers said chicken manure was the best fertilizer because chickens ate many insects and plants, which they believed enriched the manure. However, the amount produced was too limited to apply across the entire farm, and farmers described chicken manure as a "salty" material that damaged soil when over-applied. While the "salty" quality appears to be an indigenous criteria/category regarding practical effects of chicken manure applications, it may also have some validity from a scientific standpoint (Yao et al. 2007).

Householders valued trees for the shade in this tropical environment. Farmers related that planting trees of different heights created a microenvironment that made *aa-gaat dee*, or fresh air. Some householders said in the hot season (mid-February to mid-May), they slept outside to enjoy the fresh air of these interactions.

Householders associated the homegarden with good water quality and availability in their wells, especially in the dry season. Some indigenous principles may constitute the base of a northern Thai indigenous knowledge system. For example, the householders believed that interactions between roots of different trees affected subsurface nutrient flows and water supply to other species. An elderly villager described this process as trees "helping each other." Such beliefs appear to be common elsewhere in northern Thailand (Pornchai 1996), although the effect between roots would have to be studied systematically to verify its scientific validity (Hamilton 1985:682; Kumar and Nair 2004, 144-145). Regardless of the hydrological validity, this sort of belief reflects the ecological significance that northern Thai attribute to homegardens.

Commercial Aspects of Homegarden Production

Prior to the 1980s, householders in this hamlet practiced a subsistence mode of production, and the homegarden would have served the function of a modern-day supermarket that provided for the many daily needs of the household. They raised plants for food, for materials to make useful household items, medicinal plants, and even for dyes for coloring homemade cloth. Many of these functions persist, but gardening has taken on a commercial character, as the products have increasingly entered the market,

albeit small-scale. This becomes apparent when we analyze the uses of major fruiting and nut-bearing species in Baan Lek's homegarden, based on a survey of 27 households (Table 2). The major species, betelnut palm (*Areca catechu L.*) and longan (*Dimocarpus longan Lour.*), were sources of products that were sold outside the household. While betelnut was also used in the household, the longan was planted for its commercial value.

The hamlet saw a flurry of longan plantings in the homegardens in the 1990s with some support of a major nongovernmental organization. At the time of this study, not all residents had not yet reaped a return because the trees were still a few years away from maturity. In general, though, the residents saw longan as an opportunity to generate income. Women typically said they saw longan fruit sales as a means to obtain cash to support children's education. In fact, some parents said their children would never know farming because they were preoccupied with book-learning through the local school system, with the intent to pursue post-secondary training.

Other commonly sold products were the coconut (*Cocos nucifera L.*), and to some extent, banana (*Musa sapientum L.*), and its leaf for cigarette making, tamarind (*Tamarindus indica L.*) and mango (*Mangifera indica L*). Otherwise, most of the produce from the homegardens was used for household consumption. An exception was a household that raised the homegarden as a major household income-generating activity. The homegarden caretaker, a 44-year-old woman, was married to a truck driver. They rented out their irrigated paddy to relatives, so the homegarden was their only land under their direct management. The wife sold products such as tamarind, banana and plum mango [*Bouea oppositifolia (Roxb.) Meisn.]* in the local markets. She also had the hamlet's largest livestock operation. Buyers came as far as 100 km away from Chiang Mai city to buy pigs. She found a good business in selling chickens for ceremonial purposes.

Other residents were just as resourceful in adapting their homegardens for specialized commercial purposes. A 75-year-old man, who also happened to be the caretaker of the community's Guardian Spirit shrine, raised the hamlet's only cow in the homegarden, and he sold the manure to a local tourist resort for fertilizing its landscaped environs. A 58-year-old man harvested fibers from the silk cotton tree, *nun* (*Ceiba pentandra [L] Gaern*), to sell as a stuffing for mattresses and pillows. A 68-year-old retired man used materials from the coconut tree to make brooms, which he sold to the community's residents. The hamlet's most prolific longan producer also grew medicinal plants for curing both humans and livestock. All of these cases reflected the residents' enterprising nature and their ability to capitalize on niche markets for homegarden products.

While householders raised plants for their specific end uses, we would be remiss to say that households benefited only from a single use from each plant. The hamlet's residents described how the plants served multiple functions. For example, the longan is valued commercially, but the tree's thick canopy also provided shade and also served as a windbreak that protected houses. Householders also mentioned that its wood provided valuable and long-lasting heat when burned.

Banana was another multiple-use species. It was common gesture of hospitality to offer banana to visitors, and it was a common ritual offering at religious ceremonies. Banana was an ingredient, along with coconut and glutinous rice, for making a northern Thai sweet, *ka nom,* which was commonly offered at rituals. The banana leaf was used to make food containers or for a kind of small wrap, *suay dok,* for bundling flowers, both of which were used in rituals. In field situations, the leaf was used to cover the ground where farmers sat for the meal breaks. Banana leaf was also used for rolling cigarettes composed of locally grown tobacco.

Coconut served multiple purposes as well. It was an ingredient for making *ka nom*, and the juice had ritual uses, such as pouring on the face of the deceased before cremation. The ritual value was derived from the fact that the juice is considered "pure" liquid as it is sealed from the outer world until the coconut is broken open for pouring.

From a policy perspective, then the multiple functions of homegarden plants would complicate any economic analysis that would attempt a monetary valuation of each function. In sum, then we can categorize plant uses according to tangible, intangible, and ecological qualities. Tangible qualities include food for household consumption, products for marketing, medicines, construction materials, and

firewood. Less quantifiable, and thus intangible, qualities are shade, ritual, ornamental, decorative and social purposes. Overarching these specific uses are the ecological benefits that maintain the environmental quality in the lowland *Khon Muang* community.

Ritual Aspects of Homegarden Products

Making merit, *tam boon*, is a cardinal tenet of Theravada Buddhist doctrine. By performing good works over time, one is able to accumulate merit, which can reduce suffering in this life or in a future lifetime (Keyes 1995, 114-119). Donating rice as alms to the monks is a daily merit-making ritual in Thai communities. However, Baan Lek residents said that another way to make merit was to contribute homegarden produce at numerous ceremonies at the local temple, *wat.* We observed the presentation of such produce as fruits, the *ka nom* sweets made from homegarden products, and flowers at the numerous ceremonies at the local temple at Baan Lek as well as at other temples in the area. Householders each had a favorite kind of flower, based on either color or fragrance, for ritual presentations. A 68-year-old resident named the coconut as an important homegarden product because it was an ingredient in *ka nom,* which was presented at temple ceremonies. This calls to mind that anthropologist Konrad Kingshill (1965, 99) wrote that only the "finest food and the sweetest dessert [*ka nom*]" are presented on the Buddhist Sabbath, *Wan Phra*.

Temples with larger congregations received great amounts of produce through these ceremonies, and the products were subsequently redistributed to needy people throughout the area. After temple ceremonies, monk novices, *nen*, sorted out the produce for distribution. According to an abbot of a nearby larger *wat,* which also supported a novices' school, members of non-Thai ethnic groups regularly came from their hill communities on Buddhist holy days to collect this produce.[5]

The religion of the northern Thai also encompasses propitiations to local guardian spirits (Keyes 1995, 114-115). These practices are outside the realm of Buddhist doctrine, but residents performed them to obtain protection for their activities in fields, houses, and village-at-large. A common practice in fields was to make an offering to obtain the spirit's protection for the crop. One such ceremony for the rice crop involved two chickens, a banana-leaf container holding glutinous rice, two cigarettes and whiskey. At a maize field, we observed a farmer presenting one chicken, glutinous rice and flowers, at a small spirit house on the hill. The farmers said that by "feeding" the spirit, at harvest, they were fulfilling a promise made at planting time that they would return to give thanks for a good crop. The chickens were the noticeable homegarden product at this ceremony. As mentioned earlier, the entrepreneurial woman who raised the hamlet's largest flock said she often sold chickens to people who used them for spirit propitiations.

While rural residents presented their homegarden produce for temple and spirit ceremonies, the offerings reflected a trend in social and economic change. At temples in the main town, it was common to see residents present store-bought packaged foods and small consumer items, indicating their integration into the cash economy. It was also the same at ceremonies in Baan Lek that drew relatives from nearby communities, thus indicating their integration in the cash economy outside of the hamlet.

Cultural Meanings of the Homegarden

Lowland *Khon Muang* of Baan Lek valued the biodiversity of both the forests and their homegardens, as householders said the forest was the source of some plants cultivated in the garden. However, it would be inaccurate to say that householders looked to forests as an ecological model for managing their homegardens. The people distinguished their homegardens as a purposeful human activity compared to the unmanaged natural ecosystem of the forest. Baan Lek residents seemed to be mildly astonished when we asked whether they modeled homegardens according to a forest ecology. The householders' depiction of the forest comported with the Thai cultural meaning of the forest, or *bpaa,* as a wild place forbidding to human habitation (Hirsch 1987, 137). Soemarwoto and Conway (1987, 159, *cf.* Kumar and Nair 2004, 137) reported that Indonesian gardeners made similar distinctions, noting "a person feels offended when his homegarden is said to resemble a forest." Gardeners' meanings ascribed to homegarden pursuits calls to mind the term "engineered landscape," coined by Stephen Lansing (1991, 9; Lansing and Kremer 1993,

98). According to Lansing, the manipulation of the landscape for productive purposes reflects a cultural meaning that people want to express of their society.

To the Baan Lek residents, the homegarden expressed a cultural meaning as a comfortable, pleasing social space for the household members. The data showed that nearly 40 of the 185 total species propagated (22 percent) were used for ornamental/aesthetic purposes. Plant foliage delimited the homegarden boundaries, either as hedges, such as the gold-tinged leaf of *cha thong (Carallia euryoides Ridl.),* the *khruea khao kham* (C*uscuta reflexa Roxb.*), or else vines were propagated on fences for food crops or for medicines. Various potted plants decorated the interior, usually at the steps of the house. These included "good luck" plants such as *wan setthi* (*Chlorophytum campense Kuntze)*; the seven-clustered *poi sian* (*Euphorbia milii Des. Moul.)* often referred to as a "Chinese" plant, and the fire lily, or *wan sit hit* (*Hippeastrum puniceum (Lam.).*

As mentioned, homegarden products were used for their social functions, such as presenting visitors the nut of the betelnut palm as an act of hospitality for chewing. A 55-year-old woman mentioned that she was happy to be able to present foods from the homegarden to her nephews when they visited. She also said she prepared the red flower of the shrubby tree, glossy Ixora, or *khem daeng,* (*Ixora lobbii King & Gamble)* for the children to present at the annual Teachers Day at school. The red color symbolizes intelligence and wisdom. These examples show that the homegarden produce is used to foster social relationships with other kin, community members, and respected individuals. In this way, the homegarden not only sustains the household by providing useful products for its members, but it also contributes to sustaining important relationships within the community at-large.

As a social place, the value of the pleasing homegarden atmosphere was apparent at a funeral for one of the hamlet's farmers. Northern Thai funerals last several days and involve ceremonies at the cremation ground and the local *wat*. The homestead was the gathering point for these ceremonies where relatives and friends came from near and far, as well as neighbors, to remember the deceased, console the survivors, and to visit each other. Under the shaded of the homegarden canopy, people socialized, foods were prepared and consumed, and others found time for gambling. A custom was a community slaughter of a pig from the homegarden to feed the family and mourners. Within several hours, the men butchered the pig and the women cut up the carcass. An end-product was the finely chopped pork for a northern Thai dish, *lap*, which was laced with homegarden herbs and eaten raw. Particularly the men considered *lap* as a sort of "medicine" that conferred strength to those who consumed it.

The aesthetic, spiritual and social appeal of the homegarden is an intangible aspect that cannot be quantified by researchers pursuing a strictly economic agenda of homegarden care and management. The 71-year-old *aa-jaan wat* articulated that the rich array of vegetation provided a cool, peaceful surrounding that was beneficial for good health and long life. Residents also said that Buddhist monks had preached that people should cultivate trees and plants around the homestead to support a self-sufficient household. This way, villagers could save money and secure their family's well-being. A similar self-reliance model is mentioned in Seri Phongphat's (1990, 151-155) historical and cultural account of the *Isan* region. In other words, a good homegarden is the epitome of a good life in the Thai cultural context.

HOMEGARDENS: THE FUTURE AND DEVELOPMENT

While homegardens have escaped the attention of ethnographers of Thailand, they have intrigued researchers of the natural and agricultural sciences around the world. The past three decades has seen of spate of descriptive studies in the agroforestry literature that extol the homegarden as an expression of peoples' ecological wisdom while providing tangible benefits in terms of nutrition and marketable produce (Nair 2006, 356). Homegardens, then, provide the best of both worlds in terms of long-term ecological sustainability and productive potential, in contrast to the high-yielding and high-input mono-cropped systems that are prone to environmental instability.

According to P.K.R. Nair (2006, 367), researchers find homegarden systems to be "fascinating," but there are still very few rigorous studies that model homegarden functioning and sustainability or quantify their economic valuation. In other words, scientists study and write about homegardens from the vantage

of intuition rather than from empirical analysis (Kumar and Nair 2004, 148; Nair 201, 244). Hence the paradox: how could such a widespread worldwide land-use system type such as the homegarden belie the rational inquiry of positivist scientists for all of these years? The paradox presents difficulties in promoting homegardens as a development vehicle, unless researchers can specify what quantity of benefit will be obtained for which amount of effort or investment, and all this being done without affecting ecological integrity (Kumar and Nair 2004, 148; Nair 2001, 243; 2006, 367; Soemarwoto and Conway 1991, 112). Therefore, it would not be expected that development would drive the research agenda until researchers can make an empirical argument for interventions.

Regardless of how the future will play out, homegardening systems are not static by any means as residents in this lowland *Khon Muang* community adapt to changing circumstances. While the literature expresses concern about effect of commercialization, the lowland *Khon Muang* have avoided the wholesale conversion of homegardens into monocropped longan systems (Nair 2006, 364). We suspect several factors are at work. Almost all households had allocated labor for hill fields where they cultivated contract maize, and in many cases, leaving elderly to tend homegardens. Intensifying their homegarden production to a great extent was not feasible from a labor standpoint. Secondly, the homegarden is a way to diversify the household production system. Householders recognized the multiple functions provided by a species-diverse garden, and that they have adapted their homegarden to the social, ritual and aesthetic needs of the household as well. Regardless of any attempt at commercialization, they will desire these other aspects of a good homegarden too.

The hamlet's most prolific longan-producing household provides an example. The husband and wife planned to expand their longan plantings on the hillside, rather than transform the entire garden into an orchard, thus maintaining the garden's multiple purposes and functions. It would seem hard for developers to improve upon what householders are already doing for themselves. Nevertheless, if improvements were to be made, it would require timing labor requirements of the homegarden system to other activities in the household production system.

Homegardens may not have caught the widespread interest of the development community, but gardeners are developing homegardens to their household's specific needs. In this way, households have seemed to have staked a claim in their own development, and that in the long run will continue to make homegardens a sustainable component of the household production system.

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ENDNOTES

1. "Agroforestry" is defined as "a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence" (B.O. Lundgren and J.B. Raintree, as quoted in Nair 1989:18).

2. Important ethnographic accounts that deal with the centrality of rice to the Thai agriculture, are Konrad Kingshill, *Kudaeng—The Red Tomb: A Village Study in Northern Thailand* (1965); Michael Moerman, *Agricultural Change Asia* (1972); Shigeharu Tanabe, *Ecology and Practical Ecology: Peasant Farming Systems in Thailand* (1994). Beyond production agriculture, *Contributions to Southeast Asian Ethnography* dedicated its 1994 issue to "Rice in Southeast Asian Myth and Ritual" (Walker 1994).

3. Bang Chan Village, now incorporated into the Bangkok metropolitan area, was site of a seminal multidisciplinary study of Central Plain agriculture in the 1950s (Hanks and Sharp 1978).

4. Pseudonyms are used for the names of the studied communities in accordance with a human subjects research protocol approved by the Institutional Review Board, Ohio State University.

5. The two prominent non-Thai ethnic groups residing in Mae Chaem District were the Karen and Hmong.

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APPENDIX

FIGURE 1
AGRICULTURAL LAND USES, BAAN LEK HAMLET

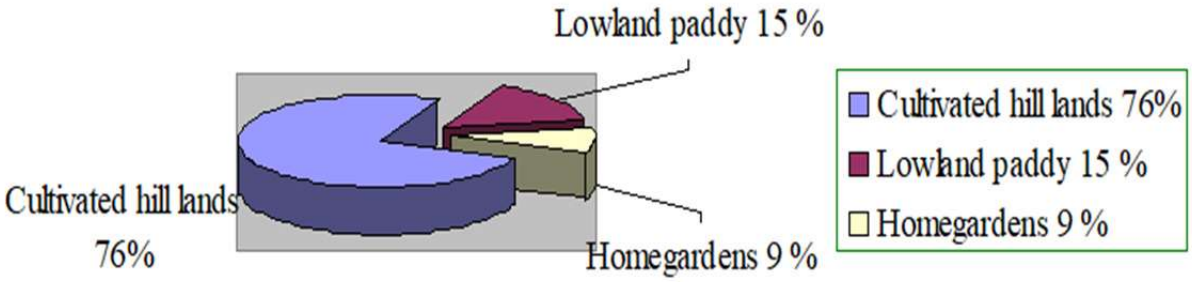

TABLE 1
GENDER-AGE LABOR DISTRIBUTION, 26 HOMEGARDENS, BAAN LEK HAMLET

Age category (years)	# Males	# Females	Difference relative to females
0-17	7	4	-3
18-29	9	3	-6
30-39	2	7	+5
40-49	9	8	-1
50-59	6	6	0
65-85	4	4	0
TOTAL	37 (54%)	32 (46%)	5

TABLE 2
MAJOR FRUIT- AND NUT-BEARING SPECIES, BAAN LEK HAMLET

Common name	Scientific Name	No. households reporting	Total	Mean per household
Betelnut palm	*A. catechu L.*	19	255	13.4
Longan	*D. longan Lour.*	23	252	10.9
Coconut	*C. nucifera L.*	17	96	5.6
Mango	*B. oppositifolia (Roxb.) Meisn.*	17	85	5.0
Banana	*M. sapientum L.*	15	73	4.8
Tamarind	*T. indica L.*	10	30	3.0
Papaya	*Carica papaya L.*	8	16	2.0
Other*		12	24	2.0

* pomelo (*Citrus maxima [Burm.f.] Merr.*), custard apple (*Annona reticulata L.*), guava (*Psidium guajava L.*), jackfruit (*Artocarpus heterophyllus Lam.*), lemon (*Citrus limon [L.] Burm.f.*) and plum mango (*B. oppositifolia (Roxb.) Meisn.*)