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EL FUTURO DE LA ALIMENTACIÓN Y RETOS DE LA AGRICULTURA PARA EL SIGLO XXI:

Debates sobre quién, cómo y con qué implicaciones sociales, económicas y ecológicas alimentará el mundo.

THE FUTURE OF FOOD AND CHALLENGES FOR AGRICULTURE IN THE 21st CENTURY:

Debates about who, how and with what social, economic and ecological implications we will feed the world.

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How to make sense of the role of home gardens to the food and nutrition status of households in the global South. A mixed-methods analysis home gardens in rural Myanmar

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Abstract

Home gardens have elicited considerable interest from researchers interested in food and nutrition. However, much of the existing literature is framed quite narrowly around the search for statistically robust associations between home gardens and measurable food and nutrition indicators, using large-scale survey methods. This paper argues that such approaches need to be complemented by qualitative assessments of how home gardening fits into households' livelihood and food provisioning arrangements, if researchers and food policy practitioners are to make sense of these activities. This paper presents a qualitative research agenda for pursuing this objective. Informed by the 'three propositions' of space and place developed by Doreen Massey, home gardens are conceptualised in terms of their multi-scalar interrelationships with human and biophysical environments, the multiple meanings they elicit, and the influence they have on making and remaking processes of social and environmental change. This framework is then applied to mixed-methods research on rural livelihoods and food security in rural Myanmar. A large-scale survey reveals that home gardening is practiced by only one-fifth of households and that home gardens on average have only 2.3 crops. However for landless households, the presence of a home garden is associated with superior food and nutrition outcomes. Follow-up qualitative research then establishes contextual explanations for these outcomes. The low incidence of home gardens is explained through incompatible interrelationships with people's livelihood obligations, village morphologies, biophysical resources, and animal conflicts. However, when these constraints are able to be overcome, they make important additional contributions to the food and nutritional wellbeing of landless households via capacities to offset seasonal food shortages and free-up cash for other uses. These insights demonstrate the importance of mixed-methods approaches in which qualitative research complements large-scale surveys, if researchers and practitioners are to make sense of home gardens and hence structure interventions and policies to optimal impact.

Introduction

Home gardens are a cherished ideal for a wide array of researchers and practitioners interested in the food systems of rural and urban settings of the global South. Defined as a "traditional land use system around a homestead, where several species of plants are grown and maintained by the household members and their products are primarily intended for the family consumption" (Gautam, Sthapit, & Shrestha, 2006, p. 8), they physically exist "in backyards,

farmyards, kitchens, containers, small patches of available land, vacant lots, on rooftops and tabletops, and along roadsides and the edges of fields” (Arimond et al., 2011, p. 49). They are typically small, taken-for-granted contributors to household wellbeing, imposing minimal direct cost imposts and occupying “land marginal to field production and labour marginal to major household economic activities” (Niñez, 1984 as cited in Galhena, Freed, & Maredia, 2013, p. 3).

Home gardens are a cherished ideal because of their seeming ability to contribute to a wide array of social, political and nutritional benefits. They appeal to advocates of food sovereignty because they embody principles of self-control and management by households over their food resources. They appeal to nutrition scientists because they seem to provide a means to address nutrient gaps associated with diets otherwise lacking dark green leafy vegetables and fruit. They appeal to food security analysts because of their capacity to act as a coping mechanism for food insecure households. Gender analysts read into home gardening important issues relating to the gendered management of household food provisioning, because these activities are often the province of women. Agro-ecologists see home gardens as sites where households cultivate and preserve diverse, indigenous food plant species and hence help preserve genetic resources and their wider links to adjacent ecosystems, through the support of production processes involving soil microorganisms, predators and pollinators.

Yet for all the inherent appeal of home gardens as an arena for research and inquiry, knowledge about them is surprisingly narrow. The prevailing literature is dominated by quantitative evidence from large-scale survey-based studies and intervention assessments that treat home gardens as a dependent variable potentially influencing nutrition-related indicators. This literature tends to operate from the presumption that “if...” and “when...” households adopt home gardening, nutrition is impacted in specific, statistically measurable ways.

Although there is obvious merit in examining whether home gardens have statistically robust associations with nutrition-related outcomes, this research agenda produces only partial understandings of their wider relevance to participants’ lives. Large-scale surveys can shed little light on the questions of how and why home gardens may be either present or absent within particular types of households, why they take particular forms, and what inspires or constrains their use. These questions require complementary research built around qualitative methods. Such research is crucially relevant if home gardens are to be advocated within food security and nutrition policies. It is one thing to provide evidence that home gardens are statistically associated with particular nutritional outcomes, quite another to appreciate the circumstances that give rise to these findings.

The aim of this paper is to present an agenda for qualitative research on home gardens, applied to the case of rural Myanmar. Our argument is that to understand home gardens, we must position them within the intertwined livelihood-food system nexus of studied populations. Thus, home gardens become not the object of study, but are understood within wider (livelihood-food system) analytical frames. This allows consideration of daily livelihood-food system struggles, routines and practices to come to the forefront, and hence gives context to how home gardens fit into people’s lives. Applied to the case of rural Myanmar, this approach enables us to make sense of a series of findings from a

complementary large-scale survey which found that most households did not have a home garden, and that of those that did, crop variety was very limited.

The paper is organised as follows. The next section sets the scene for these arguments by revisiting the dominant research agenda in this field, which seeks to use large-scale surveys to establish associations between home gardens and nutrition outcomes. Insights and gaps in that literature then allow us to present a framework for a qualitative research agenda on home gardens. The paper then turns its attention to the application of these ideas via mixed methods (quantitative and qualitative) research in rural Myanmar. A large-scale survey on livelihoods and food security, which included questions on home gardens, was administered to 3,320 households. This was then followed by 120 in-depth qualitative interviews and a series of focus groups and key informant interviews. Results from the quantitative survey revealed a surprisingly low incidence of home gardens across studied populations – only 21% of surveyed households had home gardens – and that home gardens were not unambiguously associated with improved nutrition outcomes for all classes of households. The qualitative research then identified the livelihood-food system processes that gave context to these findings. Home gardens were revealed as requiring resources and investments that were not available to all households, and that when they were, often necessitated difficult trade-offs with other livelihood assets. These factors acted to diminish the presence of home gardens within populations, and for practitioners, frequently encouraged home gardens that were minimalist in species variety and/or aimed at fulfilling only specific, season-dependent needs. The relevance of these insights is reported in the conclusion, which argues that advocacy and intervention efforts in favour of home garden food cultivation need to be informed by understandings of households' livelihood and food system contexts.

Surveys and quantitative data: The dominant agenda for home garden research

The large majority of published research about home gardens in the global South approaches this issue using evidence gathered from surveys that deliver quantitative data on the presence/absence of home gardens and their associations with various nutrition-related variables. A sub-class of these studies has the added characteristic of framing data in terms of the effects of interventions, typically in the form of surveying panel households before- and after- a home garden intervention was conducted.

Several analyses have been published that seek to summarize the key findings of this literature. First, Haider & Bhutta's (2008) review of 23 studies published in the period 1979-2005 found that home gardens were associated with positive impacts for dietary intakes of fruits and vegetables in 14 cases, improvements in anthropometric measures in six cases, improvements in serum retinol levels (a biomarker of Vitamin A deficiency) in one case, and mixed results or no effects in two cases. Second, a review by Hawkes et al. (2007, pp. 21-23) of 11 interventions promoting home gardens during the period from 1993 to 2000 found evidence of increased dietary intake of fruits and vegetables in eight cases, improvements in anthropometric measures in one case, and indeterminate or negative associations

in two cases. Third, Masset et al.'s (2012) review of 23 home garden intervention assessments between 1995 and 2009 found in general that they had promoted the consumption of food rich in protein and micronutrients for participant households, but their overall effect on diets and broader nutrition-sensitive health indicators (stunting, wasting, etc.) was unclear. Webb (2013) also provides an overview of this wider literature, but within a wider frame of reference that assesses the relationships between agricultural interventions on household nutrition more generally.

To update the research base beyond these existing meta-analyses, the present authors reviewed studies published in the period covering 2006 to January 2017 using the search terms (garden*) AND (nutrition) in Google Scholar and PubMed, filtered manually to only include studies from rural contexts of the global South that provide evidence of the effects of home gardens on dietary intakes or health indicators. This analysis revealed 15 studies unreported in the analyses mentioned above (see Table 1). Thirteen of these 15 studies provided evidence of various kinds that generally supported a positive association between home gardens and improvements for food intake, diets or nutrition.

Simple counts of the number of studies reporting positive associations between home gardens and nutritional indicators however do not give justice to the complexity of this research arena. The studies reported in meta-analyses and in Table 1 have numerous different methodologies, study sites and target indicators. In many cases, degrees of confidence in reported findings are mitigated by a lack of statistical power in research design (Masset et al., 2012). This being the case, there is greater merit in focusing on the findings of a smaller number of highly comprehensive studies, rather than the entirety of this research (Girard, Self, McAuliffe, & Olude, 2012, p. 205). In this sense, two major research initiatives stand out – an integrated home gardens, livestock and nutrition education program in rural Bangladesh operated by Helen Keller International (Bushamuka et al., 2005; Iannotti, Cunningham, & Ruel, 2009; Karim et al., 2005; Talukder et al., 2000), and a home gardens-based intervention to address Vitamin A deficiencies in South Africa (Mieke Faber & Benade, 2003; Mieke Faber & van Jaarsveld, 2007; M. Faber, Venter, & Benade, 2002). Both these studies have indicated positive associations between home gardens and nutrition, and the weight of their evidence has had a strong influence on the wider literature. Nevertheless, they remain two studies only, and the extent to which their findings are generalizable across the varied social, ecological and cultural landscapes of the global South remains a point of debate.

These cautions aside, it seems reasonable to conclude that the consensus position within the dominant literature in this field is that households possessing home gardens tend to eat better than those that don't. Yet as earlier rehearsed in this paper, this is an answer that begets further questions. The methodology within the dominant literature of this field is not well suited to revealing the intricate details of how and why home gardens play a role in nutrition. Furthermore, the explicit focus in most of these studies to nutrition impacts means that home gardens are viewed simply and solely through the lens of what do they mean for measurable diet and health factors, rather than a more broader-based (but less measurable) assessment of their wider social and cultural roles, as discussed below. To this end, attention turns now to the capacity for qualitative research to generate understandings of the place and roles of home gardens in people's lives.

Placing home gardens in their human and environmental contexts: A qualitative research agenda

Qualitative research is the collection and analysis of information that sheds light on the quality attributes of the phenomena under investigation. A qualitative research agenda for home gardens therefore implies the systematic investigation of how to ‘make sense of’ (Valentine, 2005, p. 111) them – what prompts (or constrains) people to engage in home gardening and how these practices fit into their lives. Eliciting knowledge about these questions is however not straightforward. As stated by Landon-Lane (2004, p. viii): “Economists and even households themselves sometimes find it hard to describe and value the benefits from a diverse home garden.” The problem is that home gardens can fit into households’ food practices in very different ways, and also service an array of non-food functions relating to culture, identity and recreation. Their roles in practitioners’ lives can range from incidental and marginal, to key components in the ways that householders’ navigate precarious food security conditions, and build a sense of pride and place around their homesteads.

Faced with this scenario, some researchers have resorted to cataloguing the various benefits of home gardens as a shorthand device to capture a sense of their qualitative attributes (for examples, see: Galhena et al. (2013), Kumar and Nair (2004), Reddiar and Reddiar (2016)). However, if a qualitative research agenda is ‘to make sense’ of home gardens, it needs to be anchored by an analytical framework that situates them within broader processes. This implies that home gardens are viewed both as a process (gardening – an act that demands the deployment of time, energy and resources) and an object (a site that takes up land, water and materials, such as fencing). Hence, the qualities of home gardens need to be seen to exist not in and of themselves, but in the ways that people are able to make decisions about them to achieve particular purposes.

These perspectives are usefully advanced by applying the three propositions of space and place developed by Doreen Massey (Massey, 1999, 2004) to the case of home gardens. Massey argues that what is commonly understood as constituting a ‘place’ is actually a space of interrelationships. In other words, an entity takes physical form in the material world because of actions taken upon it from near and far. Home gardens therefore exist because of the interactions between home gardeners and biophysical (soil, shade, water etc) and human (land tenure, fencing etc) environments. These processes are constituted not only via local-scale dynamics, but through multi-scalar human and physical geographies. Hence, the time-budgets available to people to work on home gardens might be shaped by an outmigration of village labour because of job opportunities in the cities; or the seasonal availability of water to maintain home gardens might be influenced by catchment-wide political ecologies (for example, changes to water allocations that impact on downstream villages) or indeed, the effects of global climate change on village ecosystems. Furthermore, in terms of food system dynamics, home gardens have complex and sometimes opaque intersections with wider household food production systems, including field-based cropping, the collection of semi-cultivated and wild foods, and the rearing of livestock. As will be discussed later in this paper, in rural Myanmar, one of the important reasons for an absence of home gardens among some villagers is because these entities are incompatible

with household livestock rearing, which is deemed a more valuable livelihood-food security practice. Thus, Massey's first proposition about space and place directs us to look at the systemic, multi-scalar interactions (both within and between human and biophysical environments) through which home gardens exist.

Second, Massey argues that space is a sphere of multiplicities. By this, she means that the same physical space will take on varied meanings by different actors. Recognition of this point in the context of home gardens brings important issues of gender and identity to the fore. With regards to gender, maintaining home gardens often takes place in the interstices of day-to-day family time-budgets, with women in particular tending to occupy leading roles. The gendered expression of home garden maintenance can be understood as an extension of the overall gendering of the domestic spheres of household life, with some studies showing that men are dissuaded from participating because home gardening is seen as 'women's work' (Herforth, Jones, & Pinstup-Andersen, 2012, p. 21). As a result, women's autonomy in making decisions about home gardens typically exceeds their decision-making in other arenas of household agriculture (Schaetzel, Antal, & Guyon, 2013), and potentially provides an important source of social prestige (Galhena et al., 2013, p. 6). Recent studies of home garden training and development interventions have been found to contribute to gains in women's self-confidence and role in the community, with flow-on effects in terms of heightened abilities to shape household expenditures and food consumption spending, in studies in Bangladesh (Patalagsa, Schreinemachers, Begum, & Begum, 2015), South Africa (Du Plessis & Lekganyane, 2010), Burkina Faso (van den Bold et al., 2015) and Pakistan (Yasmin, Khattak, & Ngah, 2014). International evidence suggests that when women have enhanced control over household budgets, greater emphasis is given to nutrition and health-care needs (Kerr & Chirwa, 2004; Kerr, Dakishoni, Shumba, Msachi, & Chirwa, 2008). Expressed thus, home gardens can be seen to have gender-specific meanings in terms of women's autonomy and power.

With regards to identity, existing research has also brought into focus the wider social functions of home gardens. Beyond their nutritional effects, home gardens can also provide benefits to households in the form of firewood, fodder, medicines and remedies, and if outputs are sold or exchanged, cash income or barter-assets for friends, family and neighbours. Herbs and spices are often features of home gardens, and because these items may not always be readily available in the market economy, they can be vital preserves for the maintenance of local food cultures, including seasonal food-based traditions. Gardening also adds to a sense of home and belonging, providing a source of activity, pride and joy for its practitioners. It needs emphasising that gardening is a purposive act, and this activity, as much as its artefact (a garden) can be a source of meaning. Hence, in a study of indigenous Mayan home gardens on the Yucatan Peninsula, Reddiar and Reddiar (2016, p. 35) reported that: "Participants highlighted the importance of home gardens in day to day activities as well as a starting point in creating rapport for people within each community to relate to one another". They conclude that home gardens have "symbolic use... in creating conversations, relations and shared notions of identity". Thus, although the survey-based dominant research agenda on home gardens addresses these entities in terms of

measurable nutrition-related indicators, from proponents' perspectives, the chief purposes of home gardens may lie in quite different sets of meanings.

Third, Massey argues that space is always open – it is constantly being made and remade. This proposition calls attention to the biophysical and human feedback cycles that influence the incidence and functions of home gardens over time. In terms of biophysical processes, home gardens can contribute to an agro-ecological habitat around the household that provides shade, bees and birds and hence assists the conservation of landraces and local agro-biodiversity (Galluzzi, Eyzaguirre, & Negri, 2010) with positive spin-offs for the resilience of agro-ecological niches (Calvet-Mir, Gómez-Baggethun, & Reyes-García, 2012; Fanzo, Remans, & Termote, 2016, p. 304; Trinh et al., 2003). Beckford and Campbell (2013) describe home gardening in the Caribbean as involving the creation of agro-spaces which mimic tropical ecosystems through the integrated planting of plants of different heights to establish canopies that sustain a variety of species. Through these functions, home gardens can contribute to and help sustain local-scale agro-biodiversity. In terms of human environments, many of the fruits and vegetables that are typically cultivated in home gardens are niche, local foods rich in micronutrients and relatively expensive in shops and markets. A study from Nepal found that in the wetter, middle hill regions of the country, more than 75% of home gardens had 21 to 50 diverse species per household, and contributed strongly to dietary diversity (Gautam et al., 2006, p. 9). Hence, households with home gardens can gain specific nutrition dividends over those without. But also, because home gardens can reduce the call on households to meet their food needs through market purchases, they free up cash for other uses. Consumption of home-produced vegetables therefore provides households with a financial saving that could potentially be reapplied to the purchase of meats or other food items, further enhancing their nutrition dividends. These points alert us questions about the social distribution of home gardens within populations. Although home gardens are characteristically low-input systems, capital expenses can still be required in the form of bed-laying, fencing (as protection against animals) and irrigation. Moreover, it may also be the case that poorer households located on village margins live in physical environments less conducive to home garden construction and maintenance (because of sandy or rocky landscapes; exposure to extreme heat or drought; or unequal access to village water). In scenarios where better-off households have enhanced home garden opportunities, these entities can become reinforcing agents for village-level socio-economic polarisation, especially with regards to nutrition and food security. Questions about the social distribution of home gardens have been addressed by some researchers (inter alia, Mitchell and Hanstad (2004), Baiphethi and Jacobs (2009, pp. 471-473), Puett et al. (2014) (2009: 471-3), and Parajuli, Umezaki, and Watanabe (2012)) but overall, this issue remains under-researched.

Figure 1 brings together these arguments diagrammatically. Massey's three propositions are used to guide the creation of three arenas for enquiry, with the overarching objective of the qualitative research agenda ("how to make sense of home gardens?") being represented as the point of mutual overlap. In the remainder of this paper, attention turns to the application of this model using research findings from rural Myanmar.

What does survey data tell us about home gardens in rural Myanmar?

The data reported in this paper derive from a mixed-methods research project on food security and livelihoods in rural Myanmar. This involved a large-scale quantitative survey (conducted in February-April 2016) followed by detailed qualitative research (in October 2016 and February-March 2017) focusing on the food security and livelihoods contexts of selected villages. In this section of the paper, insights on home gardens revealed by the quantitative component of the study are presented, in order to contextualize the qualitative evidence in the following section.

The large-scale survey collected data from 3,320 households in 120 villages across three major agro-climatic regions of Myanmar – the deltaic intensive rice-growing region of Ayerawady District, the remote and heavily forested hill region of Chin State, and the central dry zone of Magway District. In each of these three major regions, two Townships were selected for survey (In Myanmar, the term ‘Township’ refers to an administrative unit, roughly comparable to a ‘district’ or ‘local government area’ in other countries). Township selection was guided by advice from in-country research partners, on the proviso that the two Townships per State/Division were contiguous with one another, to ensure similarity in agro-ecological contexts. This process led to the selection of Pakkoku and Yesagyo Townships in Magway, Maubin and Kyaiklet Townships in Ayeyarwady, and Mindat and Kanpetlet Townships in Chin (Figure 2).

Population counts for each Township were obtained from the 2014 Myanmar Census. A Probability Proportional to Size (PPS) method was applied to select 20 villages in each Township. Household lists for each selected village were obtained from the relevant local District Medical Office, or in cases when this was not available, from midwives or other primary health care workers in villages. Based on these lists, 30 households were randomly selected from each village. This methodology provided a target sample size of 3,600 households. On the survey’s completion, completed questionnaires were obtained from 3,320 households, representing 92% of the target. For each sampled household, the respondent was defined as the ‘senior woman responsible for home food preparation’.

The survey questionnaire canvassed a wide range of demographic, food security and livelihood issues. For the purposes of this paper however, it included a discrete segment relating to home gardens. Respondents were asked whether they had a home garden, and to list the fruits and vegetables grown within it. Importantly, these data were collected alongside other questions that provided information on respondents’ ownership or lease-holding of agricultural land, their possession of livestock, whether they fished, and whether they collected wild animal and plant foods from forests, fields or vacant land.

The most immediately striking survey finding relating to home gardens is their low incidence. Only 21% of respondent households had a home garden. Not surprisingly, home gardens were more prevalent in the hilly townships of Kanpetlet and Mindat in Chin State, where market linkages are low and households have few options but to self-produce food for own-consumption or local barter. Yet even in these situations, less than one-third of households had home gardens. In the delta and dry zone regions, less than one-fifth of households

had home gardens. A second important observation is that on average, each home garden contained just 2.3 crops. The most common home garden crops were chilli, gourds/pumpkin, tomato and eggplant, with some regional variations being beans in Magway, and mustard leaf in Chin (Table 2).

The relatively low variety of crops in respondent households' home gardens would seem to suggest they are small and make relatively marginal contributions to households' food consumption practices. However, econometric assessment of the survey results, presented in a sister publication (Rammohan et al., in preparation), provides a somewhat more complicated narrative. Across the whole sample, the ownership of a home garden is not found to be a statistically significant factor influencing either household food security (defined in terms of net results from 11 questions on hunger and anxiety about access to food) or dietary diversity (defined in terms of the number of food groups consumed by household members in the 24 hours prior to the survey). However, when data is filtered to separate landholding and landless households, a different picture emerges. Home gardens were twice to three-times more likely to be present in landholding households compared with landless households. However, for those landless households with home gardens, these were found to be a statistically significant variable (at the .001 level) in reducing the propensity for households to report they were hungry, and for higher dietary diversity. What these data suggest therefore is that home gardens are not critically important for the food and nutritional circumstances of households as a whole across rural Myanmar, but they do have an appreciable influence in improving the food security and dietary diversity of landless households. This is in spite of the fact, moreover, that the average number of crops per home garden among landless households was even lower than that for landholding households (2.1 crops per landless household against 2.4 crops per household in landholding households).

In summary, data from the quantitative survey indicates that there is a low incidence of home gardens in the rural Myanmar study sites and that gardens tended to have relatively low numbers of crops on average; but for landless households they nonetheless exerted a positive effect on food security and dietary diversity circumstances. In the next section, qualitative research is used to shed light on the background contexts that inform these findings.

How do home gardens fit within households' livelihood and food provisioning arrangements?

Qualitative research into the livelihood and food provisioning arrangements of households within rural Myanmar was undertaken to provide explanatory detail that complemented survey findings. This occurred through two periods of fieldwork, in October 2016 (Magway) and February-March 2017 (Chin and Ayeyarwady). On the basis of the survey results, villages in each Township were ranked in terms of their average Food Security Scores and the village that was closest to the mid-point between the worst and best was selected as the case study site for qualitative research. In each selected village, approximately 20 of the 30 surveyed households were invited to participate in lengthier, in-depth interviews. This was then augmented by village-level focus groups comprising a cross-section of members who had not participated in the survey. This created a

forum to establish perceptions about livelihood transformations and food security issues at the village level, and to triangulate points raised in the in-depth interviews. Finally, a further series of interviews were conducted with local key informants, including village heads, local health officials, etc.

Information collected through these means was transcribed and then coded in NVivo with 'home gardens' specified as a node. The transcript text identified through this procedure was then reviewed in line with a grounded theory praxis (Creswell, 2013) in which the objective was to identify analytical themes that emerged from the transcripts. These were then interpreted in line with Massey's three propositions about space, discussed earlier. Key insights are reported in the text that follows. [It should be noted that at the time this paper is being submitted, coding has been finished for only three of the six villages. A more complete analysis will be provided in a later version of the paper.]

Gardens contextualised as sites of multi-scalar human-biophysical interrelationships

The incidence, form and function of home gardens were found to be contextualised through a wide range of multi-scalar interrelationships within and between human and biophysical environments. Firstly, their presence was dictated by particularities in village morphologies, including the ways that people constructed concepts of home and habitat. Within the studied villages, uses of fencing and other types of barriers to demarcate property varied. Oftentimes, spaces between houses were common-accessed interstices that people and animals used as vantage routes. In Chin, the two case study villages were located on ridges and flat land for home garden cultivation is limited. Open spaces adjacent to houses in the two case study villages in Ayeyarwady were typically low-lying and muddy.

In the Magway and Ayeyarwady villages, many respondents spoke of the struggle to find a site for a home garden because of shade from canopies overhead:

"My father passed away when I was 10 years old so that we had to rely only on my mother. Therefore, we couldn't spend money on food too much and ate mostly vegetables... got from our home garden. After getting married, I grew vegetables in our residential area for our home consumption. But, I [haven't been able to]... grow [a] home garden since 10 years ago because of the shades of big trees such as coconut and betel nut trees." (Respondent from village in Kyaiklet township, Ayeyarwady)

"I have tried to grow veggies in a kitchen garden but it did not work. There is too much shade from nearby trees. We tried to grow a vine. Kitchen gardens don't work for most households. It is too sandy. Nobody has them" (Respondent from village in Pakkoku township, Magway).

"I don't have a kitchen garden, but I have a drumstick leaf tree that I use for soups and curries, and I also eat the fruit. The land around my house is no good for growing vegetables. We can only grow shade trees" (Respondent from village in Pakkoku township, Magway).

These quotes highlight a set of ecosystem and food system trade-offs. Trees provide fruit, cooling shade and a source of timber (wood being a major cooking fuel in these villages). It may be the case that not all parts of a village are shady, but for some households, the only available areas for home gardens are, and this precludes their adoption.

A further set of biophysical environmental interactions occurs with regards to soil. The Magway villages in particular suffered from poor quality soils:

“We want to grow some vegetables in our house compound, but the soil is too poor to do this” (Respondent from village in Yesagyo township, Magway).

“I don’t have kitchen garden because the soil is not suitable to grow the vegetables” (Respondent from village in Yesagyo township, Magway).

“I don’t have kitchen garden as the soil condition in our home is not suitable to grow fruit and vegetable. Also water are [sic] not enough to grow vegetables for the whole year” (Respondent from village in Yesagyo township, Magway).

“There is no kitchen garden in my home because of poor soil condition. But we can have seasonal vegetables grown in our field” (Respondent from village in Yesagyo township, Magway).

Yet even if soil could be improved, respondents noted that interrelationships with animals proved a major constraining influence. Goats, in particular, prevented many households from establishing home gardens:

“We don’t have a kitchen garden because other people’s goats would just eat whatever we grow” (Respondent from village in Kyaiklet township, Ayeyarwady).

“We don’t have a kitchen garden because there isn’t enough water to grow veggies. Our goats would also eat the plants!” (Respondent from village in Kyaiklet township, Ayeyarwady).

“We can’t make kitchen garden in our home as we rear the goats” (Respondent from village in Kyaiklet township, Ayeyarwady)

“There is no kitchen garden in our home because of goats” (Respondent from village in Pakkoku township, Magway).

The incompatibility of goats and gardens speaks to an additional set of trade-offs between biophysical and human systems. Goats, as well as pigs and chickens, make a key contribution to many households’ domestic food supplies. In the case study village of Maubin (Ayeyarwady), intricate modes of cultural exchange were associated with the keeping and slaughter of these animals and then sharing of meat among households as an emblem of village prestige. Hence, when respondents spoke of animal-garden conflicts these narratives need to be contextualised against a larger dynamic in which meat is prioritised over fruits and vegetables for reasons of household food security and identity in the community. A further set of goat-garden trade-offs occurred in the case study village in Pakokku (Magway), where the rearing of goats (either as a goat-owner or as a herder managing goats owned by others) was an important livelihood pursuit.

The various incompatibilities described above help explain the survey findings of a rather limited incidence of home gardens across the sample. Focusing now on those households with gardens, the first question to ask is how did respondents explain their benefits?

Households in the Ayeyarwady villages typically responded to questions about these issues by referring to roles of home gardens associated with what could be understood as coping strategies in contexts of high food prices. For example, one respondent in the case study village in Kyaiklet township (Ayeyarwady) explained that they had expanded their home garden because of rising vegetable prices in the town market. There is a strong seasonality aspect to this, moreover. During the monsoon, market prices spike and if home gardens can be maintained during these months (which is often difficult, it must be noted), food security is aided.

The use of gardens for own-consumption however can also take on other meanings with regards to trade-offs with cash cropping. In the two Chin villages, where access to productive agricultural land is difficult, spaces around houses have taken on contested meanings as to their role in the construction of household livelihood activities, highlighting the trade-offs between maintaining household reproduction through subsistence or self-provisioning of food, and pursuing expanded reproduction through income generating activities. In recent years, the cultivation of elephant foot yam as a cash crop has expanded rapidly in Chin state, driven by increasing demand in Chinese-destined supply chains for dried elephant yam chips. Elephant foot yam, which can be grown as a small scale cash crop using just family labour, represents one of few opportunities for Chin households to earn cash income. Space around houses that could be utilised for home garden production is increasingly planted with elephant foot yam, or allocated to processing and drying of chips. There is a gendered aspect to this contestation, as men are typically in charge of decisions around income generating activities, while women's decision making is confined to the realm of household reproduction.

Gardens as sites for the making and remaking of social and biophysical processes

A final important consideration is the role of home gardens in the making and remaking of biophysical and social processes. Households with squeezed time-budgets, illness or disabilities have constraints on their abilities to grow food. This can perpetuate and potentially exacerbate inequalities. For example, one household told us:

"In the past, I grew seasonal vegetables such as roselle, bottle gourd, cucumber in the garden not only for household consumption but also for selling extra ones to the villagers. After I got [a] stroke, I cannot grow vegetables anymore." (Respondent from village in Kyaiklet township, Ayeyarwady)

"I can't grow home garden because of my health condition so that I buy vegetables for consumption. I buy dried food from the grocery with credit payment (15000 Kyats/month). The grocery owner is my sister, so, I can buy with credit payment" (Respondent from village in Kyaiklet township, Ayeyarwady)

Constraints associated with the arduous hours of manual labour was also a recurring theme for many respondents across the different study sites. “Busy with farm work” was cited as an explanation for not having a home garden, on several occasions:

“We don’t have kitchen garden as we are busy with farm work” (Respondent from village in Mindat township, Chin)

“We don’t keep kitchen garden as we are busy with farm work all the time” (Respondent from village in Kanpetlet township, Chin)

“There is no kitchen garden in my house because we even don’t own residential land. We own the house but our residential land is owned by my parents” (Respondent from village in Kyaiklet township, Ayeyarwady)

Other households, particularly landless households, simply do not possess the capabilities to successfully grow home garden crops. A weakness of the existing home gardens literature is its often implicit assumption that all rural households in the Global South are capable food producers, equating rural households with agricultural households. However, in the Ayeyarwady and Magway villages, where there is a long history of landlessness, and landless households can comprise up to 80% of households in a village, many people’s livelihoods have been disconnected from agriculture. Production of home garden crops takes skill and knowledge that not all households possess.

Likewise there is a political economy to the distribution of home gardens, and the types of crops grown in home gardens, that reflects existing social relationships and the uneven distribution of livelihood resources. While home gardens are often low-input undertakings, households need to possess a certain level of financial and physical assets to successfully establish them. In the Chin villages, vegetable crops are constantly threatened by roaming chickens, wild and domesticated pigs, and a locally important species of oxen known as Na Nauk. Sturdy wooden fences are therefore necessary to protect any home garden. Households must therefore be able to access the necessary wood to construct these fences, whether through purchase or barter. While this may appear a trivial issue, in the context of Chin households’ generally poor access to cash generating opportunities this places a real limit on the ability of some households to establish home gardens:

“For the Na Nauk, fencing is a big problem. They can roam anywhere and destroy crops. We know how to build good fences, but we need money to be able to do so” (Respondent from village in Mindat township, Chin)

The same applies to seed access. Households in the Chin villages who possess home gardens typically only grow one or two crops, usually mustard leaf and sometimes spring onion or sugarcane. Without access to seed markets, or cash with which to buy seeds, many households are limited to planting seeds that can be foraged from the forest or otherwise accessed locally. Finally, the distribution of water resources has a significant impact on home garden distribution in the Chin villages. In each village there is a scheme to pipe water for domestic use from a nearby stream uphill to households. Given the terrain and dispersed location of households, only around half of households in each village had access to piped water, or had a water pump outlet in proximity to their home. The uneven

distribution of water access appeared to influence the distribution of home gardens:

“We do not keep kitchen garden as we have difficulty to access water”
(Respondent from Mindat township, Chin)

“We don’t have kitchen garden as we don’t have water pipe access to the house”
(Respondent from Mindat township, Chin)

In Magway, goat raising as a livelihood activity is unevenly distributed between households, with only better-off households able to own goats. While goat-owning households may happily trade-off the income benefits of goat raising for home gardening, their choice of livelihood activity also impacts on the ability of (typically poorer) non-goat owning households to establish home gardens:

“We don’t have a kitchen garden because other people’s goats would just eat whatever we grow” (Respondent from village in Pakkoku township, Magway)

This highlights the necessity of understanding the occurrence of home gardens as not just an individual choice, but rather as located within broader social relations that make particular livelihood activities, including home gardening, possible for some households, but not for others.

Conclusion

More than three decades ago, Brownrigg (1985, as cited in Marsh, 1998, pp. 4-5) pointed to the frequent failure of intervention programs seeking to promote home gardens, because of the “familiar litany of development project errors. Foremost [of which was] a lack of understanding of and adaptation to local conditions”. The central argument of this paper is the need for an approach to the study of home gardens that uses mixed methods – qualitative research that complements large-scale survey data. Research that emphasises statistical associations on the relationships between home gardens and measurable food and nutrition indicators will provide important evidence for justifying attention to this topic, but those approaches alone cannot explain how home gardens fit into people’s lives. Such insights are vitally important for the appropriate framing of interventions and programs.

The relevance of this agenda is clearly demonstrated in rural Myanmar. The incidence of home gardens is relatively low, but the contextual reasons for this become clear through the lens of qualitative research that exposes the biophysical and livelihood trade-offs that are associated with home gardens because of their interrelationships with other systems.

Table 1. Summary of studies reviewing the role of home gardens on nutrition, 2006-January 2017

Citation	Study site	Sample	Findings
Musotsi, Sigot, and Onyango (2009)	Butere division, Western Kenya	100 households	No association between home gardens and a range of measures of food security.
Akrofi, Brouwer, Price, and Struik (2010)	Eastern Ghana	32 HIV-positive and 48 HIV-negative households	"Home gardens contribute significantly to dietary diversity in HIV-positive rural households, although no significant change in plant species diversity was observed compared to HIV-negative households." (p. 125)
Cabalda, Rayco-Solon, Solon, and Solon (2011)	Rizal Province, Philippines	Survey of 200 households with children	"The presence or absence of a garden was not significantly associated with food security. Having a home garden was positively associated with the child's diet diversity and with frequency of vegetable consumption." (p.711)
Campbell et al. (2011)	Rural Bangladesh	Data drawn from Bangladesh Nutrition Surveillance Project 2001-2005 (158,898 children aged 12-59 months)	Children from households without home gardens had increased odds of night blindness, an indicator of Vitamin A deficiency.
Taruvinga, Muchenje, and Mushunje (2013)	Eastern Cape Province, South Africa	118 households	Home gardens had positive significance with high dietary diversity at the 0.05 level.
Adekunle (2013)	Eastern Cape Province, South Africa	60 households	"home gardening plays a significant role in food security of rural households" (p. 67)
Puett et al. (2014)	Chipinge District, eastern Zimbabwe	Survey of households of people living with HIV. Sample size not stated.	Households participating in a low-input home garden program found to have higher Food Consumption Scores and Household Dietary Diversity Scores relative to comparator households of people living with HIV.
Walsh and Van Rooyen (2015)	Rural and urban Free State Province, South Africa	Survey of 886 households	Households growing vegetables found to be negatively associated with food insecurity.
Beyene, Worku, and Wassie (2015)	Dangila Town, Northwest Ethiopia	Survey of 920 infants and children aged 6-23 months	Children from households with home gardens a significant predictor of their dietary diversity.
Chauhan (2015)	India	Data drawn from 2004-05 Indian Human Development Survey (nationally representative survey)	Home gardens positively associated with household dietary diversity and height-for-age z-scores.

		of 41,554 households)	
Harris-Fry et al. (2015)	Three districts of rural Bangladesh	Survey of 2,809 women of reproductive age	Women from households with vegetable gardens are significantly more likely to have higher dietary diversity scores.
Bhandari et al. (2016)	Nine districts of rural Nepal	Survey of 21,111 women of reproductive age	Information on home gardens collected in the survey but not reported in the publication.
Osei et al. (2016)	Baitadi District, Nepal	Randomized Control Trial of pre- and post-surveys of 2,106 and 2,614 mother-child pairs 2.5 years apart	"The Enhanced Homestead Food Production Program intervention improved anemia among children aged 12 to 48 months and their mothers in Baitadi District of Nepal." (p. 1).
Gebremedhin et al. (2017)	South Wollo, Ethiopia	Survey of 2,080 infants and children aged 6-23 months	Children from households with home gardens a significant predictor of their dietary diversity.
Schreinemachers, Patalagsa, and Uddin (2016)	Bangladesh	Baseline and follow-up survey of 646 intervention and control households	The intervention significantly ($p < 0.01$) increased vegetable production (+16.5 g/person/day), vegetable consumption and the micronutrient supply from the garden.

Table 2

Township	State	Percentage of households with home gardens	Average number of crops per home garden	Five major crops listed (percentage of households with home gardens that grew the crop)
Mindat	Chin	25.5%	2.5	Pumpkin (45%), mustard (36%), kangkung (26%), tomato (21%), chilli (20%)
Kanpetlet	Chin	34.7%	2.6	Garlic (26%), mustard (22%) tomato (22%), onion (18%), chilli (17%)
Pakokku	Magway	10.1%	2.1	Beans (47%), gourd (47%), eggplant (35%), tomato (25%), chilli (12%)
Yesagyo	Magway	25.3%	2.5	Beans (46%), tomato (38%), gourd (37%), eggplant (32%), chilli (19%)
Kyaiklet	Ayeyarwady	21.0%	2.1	Gourd (68%), chilli (27%), eggplant (22%), bittermelon (21%), beans (18%)
Maubin	Ayeyarwady	14.8%	1.9	Gourd (60%), beans (32%), chilli (19%), tomato (16%), eggplant (16%)
Total		21.2%	2.3	

FIGURE 1. CONCEPTUAL MODEL FOR QUALITATIVE RESEARCH ON HOME GARDENS

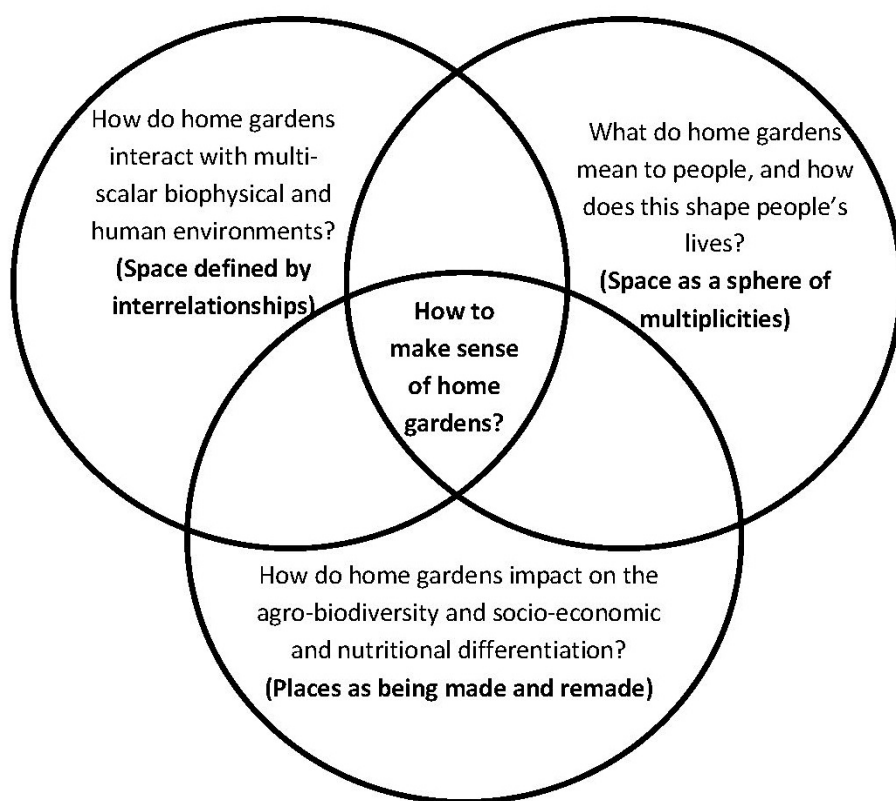
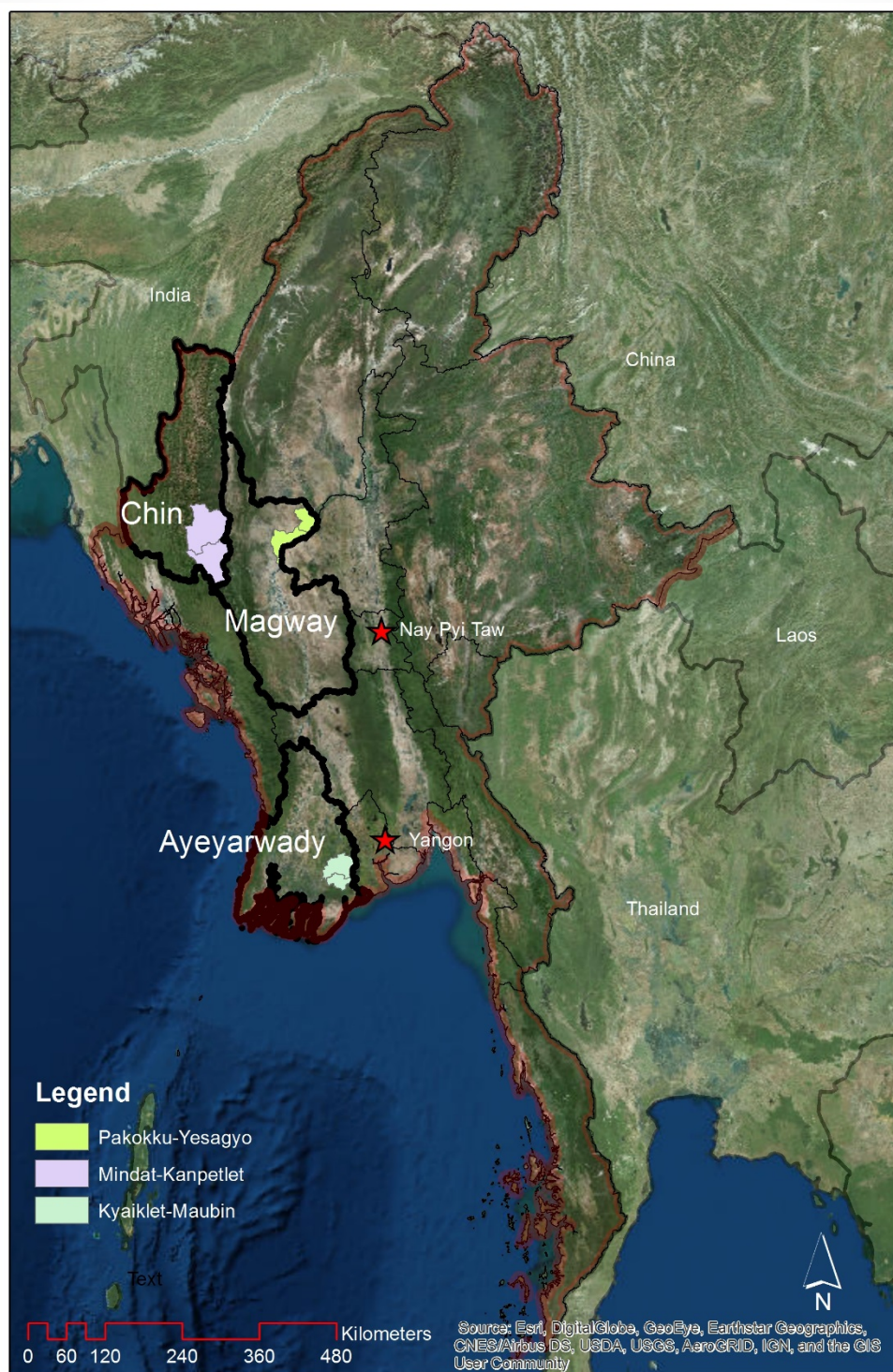


FIGURE 2. MAP OF FIELD SITES, MYANMAR



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Nazioarteko Hizketaldia

ELIKADURAREN ETORKIZUNA ETA NEKAZARITZAREN ERRONKAK XXI. MENDERAKO:

Mundua nork, nola eta zer-nolako inplikazio sozial, ekonomiko eta ekologikorekin elikatuko duen izango da eztabaidagaia

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