

Case study 2

The role of integrated home gardens and local, neglected and underutilized plant species in food security in Nepal and meeting the Millennium Development Goal 1 (MDG)

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Introduction

Agriculture is the main source of livelihood in Nepal for nearly 76 per cent of the people (CBS, 2001), and is largely subsistence-oriented. With large variations in agro-ecological conditions and socio-cultural circumstances, a great diversity of farming systems exists. Farmers are predominantly smallholders owning on average less than one hectare of cultivated land. The land is usually of low productivity and has to support large families. Consequently, many households face food shortage in most years (Food Security Monitoring Task Force, 2010).

Low food intake, together with infections and diseases are the immediate causes of malnutrition (UNICEF, 1990). However, eating adequate calories does not ensure that sufficient micronutrients are consumed in order to keep the body healthy.

A survey on food consumption in Nepal carried out in 1970 shows that 83 per cent of the total calories consumed was from cereals, mainly rice, wheat and maize. The intake of pulses, vegetables, fruits and animal products was very low (Krishna, 2004:47). The consumption of such nutritious food is limited because of high and rising commodity prices (SEWA, 2009).

Nutritious food is difficult to find in the poorer rural areas where most people are dependent on staple foods with little diversity (Krishna, 2004; Johns and Sthapit, 2004; Talukder et al., 2004). It is especially a challenge in the far western and mid-western mountains of Nepal, where the hunger index is categorized as extremely alarming (Food Monitoring Task Force, 2010). Hunger in these areas is mostly caused by undernourishment (WFP, 2009). Geographic remoteness, education levels and poor economic conditions are the main obstacles that limit access to nutritious food among these families (Talukder et al., 2004). Furthermore, there are gender-based inequalities in the access to food. Distribution of food in the household is often uneven and women usually eat last in 70 per cent of

the households. Protein energy malnutrition (PEM), iodine deficiency disorders (IDD), vitamin A deficiency (VAD), and iron deficiency anaemia (IDA) are the common forms of malnutrition experienced by women. Nearly three-quarters of all women are anaemic, and prevalence is especially high among pregnant women. Nepal is one of few countries where the life expectancy rate of women is lower than that of men especially in poor rural areas. As young and able men are forced to migrate in search of opportunities outside their villages, women are left to do more agricultural work in rural areas (Food Security Monitoring Task Force, 2010). These factors of inequalities in health and nutrition are also valid for other excluded groups based on caste and class (FIAN, 2011).

Poor nutrition status of women impacts on the health and well-being of their children, too. Not surprisingly, children also exhibit high malnutrition rates in Western Nepal. Almost 50 per cent of children under five years of age are stunted and nearly 40 per cent are underweight (Food Security Monitoring Task Force, 2010). Undernutrition at this stage of life can have long-term implications continuing through adulthood. Poor nutrition in pre-school days can significantly reduce cognitive capacity and consequently human, social and economic potential in later lives of these children (Ruel and Hodinott, 2008).

Role of home gardens

Home gardening is a traditional land use practice carried out around a homestead consisting of several species of plants that are grown and maintained by the family members with the primary objective of fulfilling the family's consumption needs (Abdoellah et al., 2002; Eyzaguirre and Linares, 2004; Shrestha et al., 2004; Gautam et al., 2004). Home gardening is one of the key components of the Nepalese farming system with over 70 per cent of households maintaining home gardens at varying scales, ranging from 2 to 11 per cent of the family's landholding (Gautam et al., 2004; Sunwar et al., 2006; Gautam et al., 2008). The size of individual home gardens in Nepal is so small that the impact of production is deemed insufficient in commercial terms to receive priority from government and donors.

Despite their size, if production is diversified with more species and managed well, home gardens can increase dietary diversity (Trinh et al., 2003) and help address household malnutrition. By promoting increased consumption of the available diversity, nutrition of farming families can be improved (Johns and Sthapit, 2004; Shrestha et al., 2002, 2004a; Sthapit et al., 2004a). As home gardens are predominantly managed by women, they can also play an important role in ensuring proper diets of women and children, especially in rural areas (Suwal et al., 2008). Hence, the real value of home gardens is in ensuring proper health of women and children first and foremost, who can then have more fulfilling lives to contribute as productive citizens.

In addition to the family's food needs, home gardens also augment household income, especially for women, from the sale of surplus produce. Even with small cash incomes, women in villages can exercise greater economic agency in controlling small family expense. Women also tend to spend money differently



Figure C2.1 A home garden in western Nepal. Credit: Sajal Sthapit, LI-BIRD

than men by giving priority to food, healthcare and education for their children (Meinzen-Dick et al., 2011).

Home gardens also make the homestead aesthetically pleasing and help maintain species of ethnic, cultural and religious importance (Soemarowoto, 1987; Abdoellah et al., 2002; Trinh et al., 2003; Sthapit et al., 2008). In Nepal, the home gardens involve the management of multipurpose trees, shrubs, annual and perennial vegetables and fruits, spices, herbs and medicinal plants, birds and animals on the same land units in a spatial or temporal sequence (Shrestha et al., 2002; Gautam et al., 2004; Suwal et al., 2005). Traditionally people supplement food from wild and uncultivated crops besides cultivated species in gardens and arable farming systems (Daniggelis, 2003). Many neglected and underutilized species, from a research perspective, are appreciated by local populations and food culture for their taste and nutritional value (Sthapit et al., 2008; Johns and Sthapit, 2004). The home garden therefore provides a bridge between the social and the biological, linking cultivated spaces and natural ecosystems, combining and conserving species diversity and cultural diversity.

The project on home gardens was initiated to understand the scientific basis of management of agricultural biodiversity in home garden ecosystems; Phase I (2002–2004). Phase II (2006–2008) concentrated on the enhancement of family nutrition and income of resource poor and disadvantaged groups of farmers and Phase III (2009–2013) aimed to mainstream home gardens in an inclusive development programme of the country (Table C2.1). Figure C2.3 shows the distribution of case study sites in Nepal during Phases II and III.

Some level of awareness activities on the relationships between nutrition, health, dietary diversity and biodiversity are important for the communities. Organizing existing women's groups for collective action on these activities can be effective.



Figure C2.2 A farmer and her daughter in their home garden in Rupandehi, Nepal. Credit: Sajal Sthapit, LI-BIRD

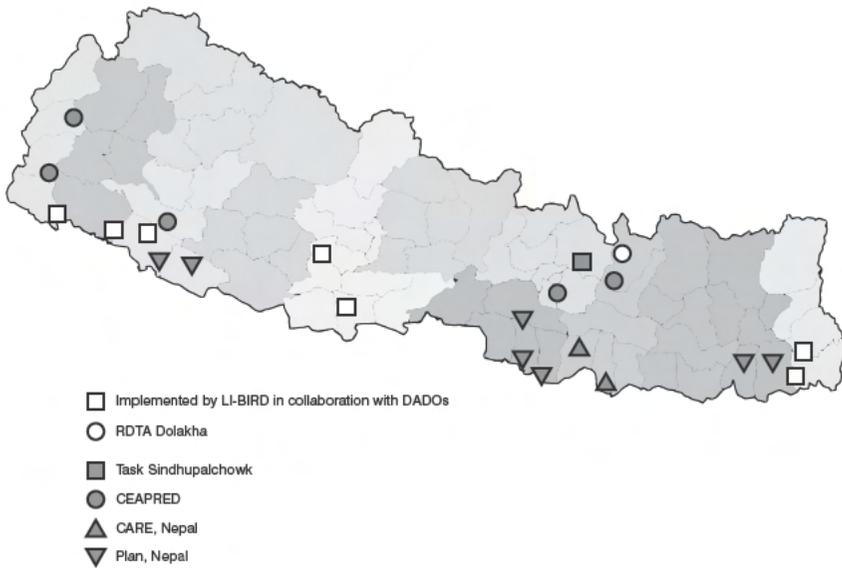


Figure C2.3 Map of the project sites of home gardens in Nepal implemented through partnership of a range of government and NGO partners

Table C2.1 Main objectives, partners involved and survey sites included in Phases I, II and III of the Home garden project in Nepal

Title	Major Objective	Focus	Name partners involved	Number of sites and target Households (HH)
<p>Phase I Enhancing contribution of home gardens to on-farm management of plant genetic resources and improve livelihood of Nepalese farmers (2002–2004)</p>	<p>Understand and document the dynamics (historical perspective, structure, composition, structure, utilization and underlying indigenous knowledge systems) of home gardens</p>	<p>Understanding the dynamics (structure, size, composition and use) of home garden Measuring the potential of home gardens to contribute in livelihood enhancement of resource poor Developing technologies, approaches and methods for a sustainable on-farm management of plant genetic resources for improving food security, nutrition and income of resource poor farmers</p>	<p>Biodiversity International implemented by Local Initiatives of Biodiversity, Research and Development (LI-BIRD) in partnership with Nepal Agricultural Research Council (NARC), Department of Agriculture (DoA) and Helen Keller International (HKI)</p>	<p>Jhapa (Gauriganj-5 community; 355 HH) Ilam (Panchkanya 4–6 community; 366 HH) Rupandehi (Dudrakshya1, 8 community; 634 HH) Gulmi (Durbardevasthan 2, 3 and 5 communities; 800 HH)</p>
<p>Phase II Enhancing Family Nutrition and Income for improved livelihoods of Resource Poor and Disadvantaged Groups through Integrated Home Gardens in Nepal (2006–2008)</p>	<p>Improvement of nutrition and income of poor and disadvantaged families through promotion of integrated home gardens</p>	<p>Experiences and good practices of integrated practices of integrated home garden from first phase scaled up to a wider geographic region Enhanced capacity of disadvantaged groups to increase access to livelihood assets, decision making and benefits from collective action Improving access of poor to quality diets</p>	<p>Local Initiatives of Biodiversity, Research and Development (LI-BIRD) directly implanted in partnership with Nepal Agricultural Research Council (NARC), Department of Agriculture (DoA), SDC funded projects (TUKI, CEPREAD) and Biodiversity International and HKI technical backstopping.</p>	<p>Experiences and good practices of integrated home garden approach of the first phase (2002–2005) of the project were scaled out in 12 districts extended from eastern to far-western regions of Nepal through different partners. Ilam (5 communities; 801 HH) Jhapa (3 communities; 465 HH) Gulmi (5 communities; 660 HH) Rupandehi (3 communities; 426 HH) Bardiya (2 communities; 344 HH) Kailali (1 community; 120 HH) Kanchanpur (1 community; 146 HH) Dolkha (5 communities; 421 HH) Sindhupalchowk (4 communities; 357 HH)</p>

Phase III

Linking Home garden in inclusive development programme for contributing to securing livelihoods of resource poor and disadvantaged groups of Nepal (2009-2013)

Supportive institution and policy environment development for mainstreaming of home garden promotion concept

Mainstreaming home garden into national agriculture development programme
Encouraging local government and local service providers to support and adopt home garden into their livelihood enhancement programmes

Local Initiatives of Biodiversity, Research and Development (LI-BIRD) directly implanted in partnership with Nepal Agricultural Research Council (NARC), Department of Agriculture (DoA), SDC funded projects (TUKI, CEPREAD) and Bioversity International and HKI technical backstopping.

Ilam (7 communities; 1031 HH)
Jhapa (6 communities; 1174 HH)
Gulmi (8 communities; 978 HH)
Rupendehi (5 communities; 608 HH)
Bardiya (4 communities; 555 HH)
Kailali (3 communities; 324 HH)
Kanchanpur (3 communities; 280 HH)
Dolkha (3 communities; 700 HH)
Sindhupalchowk (6 communities; 557 HH)
Ramechhap (2 communities; 245 HH)
Okhaldhunga (2 communities; 219 HH)
Kabhrapalanchok; 2 communities 100 HH
Surkhet; 1 community 50 HH)
Baitadi; 2 communities 100 HH)
Dadeldhura; 3 communities 150 HH)

Increasing diversity using home garden diversity kits

Diversity kits include small quantities of seeds or saplings of different kinds made available to farmers to complement the available resources (seeds and saplings of vegetables, fruits, fodder and other home garden species) (Sthapit et al., 2006). Analysis of the nutritional gap, demand of farmers, agro-ecology and farmers' capacity are the basis for determining the composition of diversity kits for home gardens. The composition of diversity is a mixture of local and underutilized crops species both perennial and annual that are not easily available from commercial seed companies.

Specific foods are required for use in traditional ceremonies and rituals in Nepal. As a result, social customs require Nepalese farmers to maintain a wide variety of fruits and plants in their home gardens for use at festivals. Celebration and commercialization of local festivals also create local demand for unique species grown in home gardens. For example, during Maghesankranti (January/February), the demand for and hence the price of root crops such as yams, sweet potatoes and taros climb steeply. Likewise, a wide range of citrus fruits, especially pommello and pseudo lemon are necessary for the celebration of the Diwali and Chhath festivals. Promoting diversity kits that include crops of cultural importance is often ignored, but can play a big role in maintaining home garden diversity.

Technology transfer for low-cost home garden management

One of the basic tenets for successful home gardening for the rural smallholders is to make it as cost effective as possible. Therefore external inputs (fertilizers, seeds and other chemical and physical materials) are not promoted. Instead, focus is placed on locally available seeds, compost, farmyard manure and local production technologies to ensure secure access to production inputs as well as safe and healthy food for family well-being.

Kitchen waste, water management, multi-layer cropping, combination of perennial and annual crops, local bio-pesticide, vermi compost and sack farming in flood-prone areas are some proven techniques used in low-cost home garden management. A year-round refresher training at the local resource centre, cross-site exchange visits and travelling seminars are a few mechanisms employed for transferring skills and promoting local innovations.

Establishing resource home gardens as knowledge sharing and exchange centres

Although home gardens are very common, only a small proportion are managed efficiently to get the maximum output for their size. Those gardens which are producing diverse food products throughout the year and are well managed can be utilized as demonstration sites. The owners of such home gardens are identified and developed as resource home gardeners to provide management and material inputs to other home gardeners. The owners of such home gardens are role models in the area for other farmers to aspire to.

They can train other fellow farmers and also act as local sources for seeds/saplings and knowledge.

A home garden alone cannot address all the livelihood requirements of a family. Due to its diversity and with the guidance of a proper nutritional calendar, home gardens contribute to the quality of food consumption (safe, nutritious and preferred), especially in terms of fulfilling the micronutrient requirements of the family. However, due to their small size, fulfilling the required quantity of food security might be beyond the scope of many home gardens (Gautam et al., 2008). Therefore, other programmes and projects that are related to the livelihood of those particular farmers should be implemented collaboratively to increase impact. Major demand of staple food and income generation in higher degree should be addressed by such particular projects and home garden production will complement them by providing diversified food and nutrition, and supplementary income. Home gardens would be the ideal entry point for developing the confidence of poor and marginal farming communities.

Food-based approach to better nutrition

The success of home gardens has been measured as an increase in diversity. However, from a nutritional perspective, it is important to look at whether the diversity is increasing in functional categories (DeClerck et al., 2011). The home garden project in Nepal examined how increases in biodiversity correlates with increased functional and nutritional diversity.



Figure C2.4 A resource home gardener and her son in their home garden in Rupandehi, Nepal. Credit: Sajal Sthapit, LI-BIRD

Mean home garden (household) species richness increased in 10 out of 11 sites between 2006 and 2011 (Table C2.2).

Food culture and cooking traditions play important roles in the availability of nutrients in food (Englberger et al., 2010; Rijal, 2010). Bioavailability of nutrients also depends on how the food is prepared, what other foods it is consumed with and the health status of the person eating it. The approach used in this study did not address the different levels of bioavailability of the nutrients and this limitation is acknowledged.

Table C2.2 Mean household (HH) species richness of edible and all species found in home gardens in 2006 and 2011

Site	Altitude (metres above sea level)	Mean HH edible species richness (range)		Mean HH species richness (range)	
		2006	2011	2006	2011
Eastern Hills					
<i>Ilam district</i>					
Chulachu VDC	173	20 (1–36)	27 (13–50)	27 (3–50)	34 (15–72)
Gorkhe VDC	1717	17 (3–31)	24 (14–43)	24 (3–42)	35 (21–66)
Sumbek VDC	1413	17 (8–29)	25 (1–37)	18 (9–30)	35 (6–60)
Eastern Terai					
<i>Jhapa district</i>					
Chakchaki VDC	95	9 (2–21)	14 (2–33)	13 (3–11)	19 (2–58)
Duwagadhi	116	18 (5–39)	25 (8–59)	21 (5–49)	36 (12–97)
Western Hills					
<i>Gulmi district</i>					
Amarpur VDC	1180	6 (2–11)	21 (9–48)	no records	27 (10–63)
Hardineta VDC	1132	6 (1–13)	17 (7–46)	no records	24 (7–64)
Western Terai					
<i>Kailali district</i>					
Godawari VDC	679	13 (2–24)	13 (4–40)	no records	14 (4–54)
<i>Rupandehi district</i>					
Khadawa Bangain VDC	120	10 (5–20)	20 (1–45)	no records	24 (4–60)
Siktahan VDC	115	4 (1–8)	23 (13–37)	no records	30 (15–55)
<i>Bardia district</i>					
Taratal VDC	167	3 (1–7)	18 (8–31)	No recods	22 (8–38)



Figure C2.5 An integrated home garden with vegetables fruits and fisheries extended to crops. Credit: Mahesh Shrestha, LI-BIRD

However, by promoting a greater range of diversity, with foods that are prepared and consumed in a variety of ways, better nutrition can be achieved (Frison et al., 2011; Fanzo and Pronyk, 2011). Increasing awareness of the importance of nutritious diets and providing access to safe fruit and vegetables will be needed to attain the long-term outcome of diet diversification: to have a healthy, balanced diet fulfilling the recommended per capita consumption rate of 400 g of fruit and vegetables per day (Keatinge et al., 2010).

Species available before (2006) and after (2011) the implementation of the home garden project were categorized depending on nutrients provided (such as proteins, iron, folate, vitamin A, etc.). For each nutrient category, the number of species providing the nutrient were counted to determine the increase in number of choices for each nutrient.

Along with an increase in household species richness (Table C2.2), the number of species contributing sources of nutrients were found to also increase for all nutrients and all seasons considered.

Hence, it was found that in this project “Enhancing family nutrition and income for improved livelihoods of resource poor and disadvantaged groups through integrated home gardens in Nepal” (see Table C2.1), increasing species richness of home gardens also increased the sources of nutrients available to households.

Scaling up

The Nepal Agricultural Research Council (NARC) has identified the home garden as a research area for targeting poor and marginal farmers (NARC strategic

planning meeting, 2005). This is an important change because historically home gardens were ignored by research in Nepal. There is a great need to involve stakeholders from health sectors to use home gardens as a food-based approach to nutrition that can complement dietary supplements. Therefore, a partnership between the agro-biodiversity, agriculture and food, health and environment sectors needs to be cultivated at the national and local levels.

One of the great achievements of the second phase of the home garden project is the acceptance by the government's planning commission to apply the concept all over the country. The Ministry of Agriculture and Co-operatives approved the norms for home garden establishment and management and has also issued a circular to District Agriculture Development Offices (DADOs) for the protection, management and utilization of biodiversity for supporting livelihoods of local people. The traditional Kitchen Garden programme that promoted hybrid vegetable seeds from exotic sources has now been revamped to an integrated home garden scheme that encourages the use of indigenous crops and varieties of vegetable, fruits, small ruminants and trees. The initiation of the government could be further capitalized on and used as an opportunity by providing technical support in future.

The government sector found the home garden project an attractive intervention to reach the agriculture programme for socially excluded and disadvantaged groups of society and also a way to meet objectives and MDGs. Most strategies to address malnutrition in Nepal are rooted within the health sector. While critical, these programmes generally address disease-related effects and emphasize the immediate determinants of undernutrition. Addressing undernutrition through the production of diverse foods within the agricultural sector, such as home gardening for family well-being, has been an eye-opener for policy makers.

Lessons learned

Access to a wide range of local crop diversity through community actions such as biodiversity fairs, diversity kits and establishing community-based home garden resource centres are important lessons learned. The lessons learned from the project fall within two key areas.

First, situation analysis within the four main areas (assessment, access, use and benefit) can, and most probably will, lead to a number of different community actions. Second, the decision to implement a particular community action, and therefore its success, will depend on farmers and the farming community having the knowledge and leadership capacity to evaluate the benefits that this action will have for them. This in turn emphasizes the importance of strengthening and empowering local institutions so as to enable farmers to take a greater role in the management of agricultural biodiversity in home gardens.

Much can be learned from the projects profiled in this case study that might assist countries that are currently off-track in meeting the hunger component of the MDG1 target. The main objective of Phase II was to improve the nutrition

and income of the families from disadvantaged groups (DAG) in remote and conflict-affected areas through the promotion of integrated home gardens. The project focused on families of DAG with a particular focus on women in an effort to promote the mainstreaming of social equity, governance and gender at grassroots levels. The past three years of the project have focused much on land-poor farmers, mostly women, to enable them to utilize their land resources effectively and to empower them economically and socially through organization, voice and influence to enhance social capital of smallholder women farmers. The term “social capital” captures the idea that social bonds and norms are critical for sustainability. Where social capital is high in formalized women groups, people have the confidence to invest in collective activities, knowing that others will do so too. Modest investments in capacity building and targeted training, and engaging different sectors in setting priorities, would have a significant pay-off. With technical support from LI-BIRD, the Department of Agriculture and other donor-funded projects scale up good practices of the home gardening programme in 17 districts through respective DADOs under their third thematic area of “Livelihood improvement of disadvantaged families”. Vulnerable groups usually lack enough land to grow staple crops, but many of them have access to small plots which they can cultivate intensively. Home gardening can be a means for reaching excluded people, but it cannot address all their problems. More structural means, such as rights-based approaches, are necessary to complement more direct interventions such as support for home gardening. Policy support guided by outcome based upon large number beneficiaries per unit of investment might require rethinking.

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