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Productivity of Intensively Used
Homestead Plots in a Central Javan Village

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Executive summary

Based on detailed review of the intensive use of 12 homestead plots in Central Java conducted during April and June 2004, we conclude that small homestead plots can contribute significantly to household income and household food consumption. Sale of animals and plants produced on homestead plots with unbuilt areas even as small as 25 m² can provide substantial supplement to household incomes, even where the household members earn their primary income from sources other than agriculture. This finding applies even to households that earn well above the average income in the village. In our sample, sale of production from homestead plots increased the cash income of families by an average of 25 percent and a maximum of 67 percent. This contribution to household income would presumably be even higher if the economic value of foods consumed by the households were considered. We also conclude that there is no social stigma associated with the use of homestead plots to supplement household diet and household income in Central Java. We would expect to find that where poor households make similar intensive use of homestead plots to supplement household diet and household income, that the homestead plot might increase household cash income by even more than the 25 percent average we found here.

I. Introduction

Most programs that consider the land needs of rural families begin with the presumption that rural families require “full-sized” farms—often as large as two or more hectares—in order for the family to make any meaningful use of the land. Because land is often scarce in densely settled regions, it is often apparent that there is not sufficient agricultural land to distribute to each land-deprived family. Distribution of land to the rural poor is then removed from the list of options that policymakers may consider in addressing persistent poverty.

This presumption—that any size of plot smaller than one or two hectares cannot provide meaningful benefits to a family—merits further analysis. This paper reports upon research conducted in a village of Central Java, Indonesia to examine the benefits that families derive from intensively used homestead plots (pekarangan plots) measuring between 100 and 700 m². It is hoped that this research will contribute to the policy dialogue regarding the efficacy of distributing relatively small pekarangan plots to the rural poor as a means of helping poor families to improve their livelihoods.

II. Benefits of homestead plots in published research

International experience shows that existing homestead plots have conferred multiple important benefits to rural households worldwide.¹ Among these benefits are improvement of family nutrition, increase of family income, better wage security and household status, improvement of status of women within the household, and improved quality of the physical environment near the house.

Family nutrition. A number of studies have reported that homestead plots produce a high percentage of fruits and vegetables consumed by homegardening families, as well as a high percentage of overall calories. Homegardens have been reported to provide 18 - 40 percent of household calories on Java.² Homegardens on Java have also been reported to provide 14 percent of household protein requirements.³ Homestead plots can also provide important protections against family food insecurity by providing a year-round source of harvestable foods. On Java, climatic conditions mean that owners of homegardens have something available to harvest throughout the year, either for consumption, for home industry or for sale, and this availability is especially important to the economic

¹ See generally R. Mitchell & T. Hanstad, *Small Homegarden Plots and Sustainable Livelihoods for the Poor*, Livelihood Support Program Working Paper (Food and Agriculture Organization (FAO) March 2004), available at http://www.fao.org/sd/dim_pe4/pe4_040905_en.htm.); L. Brownrigg, *Home Gardening in International Development: What the Literature Shows*, League for International Food Education, Washington, DC 1985); K. Landauer & M. Brazil, *Introduction*, in K. LANDAUER & M. BRAZIL (EDS.), *TROPICAL HOME GARDENS: SELECTED PAPERS FROM AN INTERNATIONAL WORKSHOP HELD AT THE INSTITUTE OF ECOLOGY, PADJADJARAN UNIVERSITY, BANDUNG, INDONESIA, 2 - 9 DECEMBER 1985* (United Nations University Press, Tokyo 1990).

² A. Stoler, *Garden use and household economy in rural Java*, 14 BULLETIN OF INDONESIAN ECONOMIC STUDIES 85 - 101 (1978), cited in I. Hoogerbrugge & L.O. Fresco, *Homegarden Systems: Agricultural Characteristics and Challenges*, International Institute for Environment and Development, Gatekeeper Series No. 39 (1993).

³ HOOGERBRUGGE & FRESCO, *supra* note 2. Evidence is not limited to Indonesia. Homegardens in the Philippines have been found to provide 50 - 58 percent of the recommended daily allowance for calories. P. Sommers, *Traditional home gardens of selected Philippine households and their potential for improving human nutrition*, Masters thesis, University of Philippines, Los Banos (1978), cited in L. Christanty, *Home Gardens in Tropical Asia, with Special Reference to Indonesia*, in LANDAUER & BRAZIL, *supra* note 1, at 9 - 20. Sri Lankan homegardens have been reported to produce 60 percent of leaf vegetables and 20 percent of all vegetables consumed by the household. Hoogerbrugge and Fresco, *supra* note 2, citing B. Ensing, G. Freeks, & S. Sangers, (1985), *Homegardens and homegardening in the Matara district: the present situation and future prospects*, MSc thesis, Social Science and Economics Department, University of Leiden, Netherlands (1985). Others have reported that homegardens typically produce more than 50 percent of vegetables, fruits, medicinal plants and herbs consumed by the household. R. Marsh, *Building on Traditional Gardening to Improve Household Food Security*, Food, Nutrition and Agriculture No. 22, Food and Agriculture Organization (1998).

stability of poor households, particularly during the period between rice harvests.⁴ Homegardens can also be an important source of micronutrients necessary for child and maternal health.⁵

Household income. Homestead plots can supplement household income in several ways. The household may sell products produced in the homegarden, including fruits, vegetables, animal products and other valuable materials such as bamboo and wood for construction or fuel.⁶ The household may use the homestead plot site to conduct cottage industries to produce crafts or small manufactures that can be sold. In addition to direct earnings from sale of homestead plot production, production consumed by the household free up household earnings for other purchases. In some cases, a portion of the cash income from homestead plot production is used to purchase additional food for household consumption.⁷

⁴ O. Soemarwoto, I. Soemarwoto, Karyono, et al., *The Javanese Home Garden as an Integrated Agro-Ecosystem*, 7(3) FOOD AND NUTRITION BULLETIN (1985). In this way, homestead plots may become the principal source of household food and income during periods of stress and to provide a “buffering effect” against hunger that might otherwise accompany shortfalls in wage income. In the context of a study of land-poor households in Kerala, India, homegardening production has been observed to have a “buffering effect” on household consumption when there are shortfalls in wage income. S.K. Kumar, *Role of the Household Economy in Child Nutrition at Low Incomes: A Case Study in Kerala*, Occasional Paper No. 95, Department of Agricultural Economics, Cornell University (Ithaca, New York 1978).

⁵ A large-scale homegardening project in Bangladesh found that families who grew more fruits and vegetables and families who grew a larger variety of fruits and vegetables were likely have a higher intake of vitamin A. Helen Keller International/Asia Pacific, *Integration of Animal Husbandry into Home Gardening Programmes to Increase Vitamin A Intake from Foods: Bangladesh, Cambodia and Nepal* (2003). A study of homegarden consumption in rural Bangladesh found that fruits and vegetables were the most important factor associated with higher intake of vitamin A by women of reproductive age, that consumption of fruits and vegetables contributed more to vitamin A intake than consumption of animal products, and that the number of varieties of fruits and vegetables produced in the homegardens was significantly associated with a higher vitamin A intake. M. Bloem, N. Huq, J. Gorstein, S. Burger, T. Kahn, N. Islam, S. Baker & F. Davidson, *Production of fruits and vegetables at the homestead is an important source of vitamin A among women in rural Bangladesh*. 50(suppl. 3) EUROPEAN JOURNAL OF CLINICAL NUTRITION S62 - S67 (1996).

⁶ Livestock and tree crops produced on homegardens in southeastern Nigeria accounted for over 60 percent of family cash income in one study. B. Okigbo, *Home Gardens in Tropical Africa*, in LANDAUER & BRAZIL, *supra* note 1. In the Helen Keller International (HKI) pilot homegarden project in Bangladesh, 54 percent of households reported selling homegarden products and earning the cash equivalent of 14.8 percent of total average monthly income. B. Okigbo, *Home Gardens in Tropical Africa*, in LANDAUER & BRAZIL, *supra* note 1.

⁷ A study of urban homegardens in the Philippines revealed that homegardening families spend less on food than non-gardening families, while homegardening families who plant a larger number of varieties of fruits and vegetables spend even less. S. Miura, K. Osamu, & W. Susumu, *Home Gardening in Urban Poor Communities of the Philippines*, 54(1) INTERNATIONAL JOURNAL OF FOOD SCIENCES AND NUTRITION (2003). In Cambodia and Nepal, 31 - 65 percent of income (31 percent in

Wage security and household status. Ownership of the homestead plot can make important contributions to rural livelihoods in ways that are often overlooked, including improved leverage in labor markets, enhanced social status and greater political participation. One objective to providing ownership to homestead plots in some settings is to free wage laborers from exploitive land-labor linkages. Several states in India have provided ownership of (typically) small house plots to agricultural laborer families in order to remove them from feudal-type dependence on employers on whose land they had been living. Households who own the plot on which their home is constructed also enjoy an immediate increase in status within the village.⁸ In West Java, homegardens are an important symbol of social status, and households who are forced to build their house on homegardens owned by others are considered to be low status.⁹ Increases in household status not only provide psychological benefits to household members, but are believed to provide households with better access to trade relations within the village, as well as better access to government programs serving village households.

Welfare of women and children. Sales of homegarden produce may be one of the only sources of independent income for women, and such sales may be an important source of income for women.¹⁰ An abundant homegarden may be an important source of status for women, and may demonstrate the woman's freedom from dependence on vendors and neighbors, her ability to expend resources on developing the garden demonstrate her fiscal standing, her production of flowers to adorn the church demonstrate her piety, and her investment in cultivation demonstrates her devotion to family.¹¹ Where women

the case of Nepal and 65 percent in the case of Cambodia) derived from sale of poultry raised on homegardens was used to purchase other foods, while other proceeds were used to invest in production, education, savings and other purposes. HKI/AP, *supra* note 3.

⁸ A survey of rural households in Karnataka, India revealed that among households that had received small plots to construct homes and gardens, increased status within the village was the most cited benefit of ownership, surpassing even income and nutrition benefits; poorer households cited increased status even more often than other households. T. Hanstad, J. Brown & R. Prosterman, *Larger Homestead Plots as Land Reform?: International Experience and Analysis from Karnataka*, 37(29) ECONOMIC AND POLITICAL WEEKLY 3053 - 3062 (2002).

⁹ O. Soemarwoto, *Homegardens: A Traditional Agroforestry System with a Promising Future*, in H. STEPLER & P.K.R. NAIR (EDS.), *AGROFORESTRY: A DECADE OF DEVELOPMENT* 157 - 170 (International Council for Research in Agroforestry, Nairobi 1987).

¹⁰ Marsh, *supra* note 3.

¹¹ R. Finerman & R. Sackett, *Using Home Gardens to Decipher Health and Healing in the Andes*, 17(4) MEDICAL ANTHROPOLOGY QUARTERLY 459 - 482 (2003).

control homegarden resources, this may improve household nutrition, especially nutrition of children.¹²

Environmental benefits. Diversity of plant species and the layered canopy of species are the most striking features of homegardens.¹³ For example, traditional Thai homegardens are reported to contain multiple and sometimes rare varieties of each planted species and represented “in-situ reservoirs for biodiversity at all levels: genetic, species, and ecological,” all of which helps to prevent pest and weed outbreaks.¹⁴ The high density of homegarden plants also provides habitat for wild animals such as insects, reptiles, birds and small mammals.¹⁵ Homegardening may also promote land conservation.¹⁶ Allocation of homestead plots may also have beneficial off-site environmental effects. For example, where population pressures and lack of arable land threaten to push families to resettle in forests and wetlands, allocation of homestead plots to landless and land poor families can reduce pressures to migrate to overcrowded cities, and may reduce the need for land-poor families to gather fodder and fuelwood from marginal lands, contributing to the sustainability of such lands.¹⁷

III. Research objectives and methodology

The research was designed to investigate the productivity of intensively used homestead plots smaller than 700 m² owned by families that control less than 5000 m² of land, including the homestead plot land. We were interested to determine the potential contributions that intensively used homestead plots can make to family livelihoods, including family income, family diet, household status and status of women within the household. We were also interested to explore

¹² Kumar, *supra* note 4; A. Talukder, L. Kiess, L., N. Huq, S. de Pee, I. Darnton-Hill, & M. Bloem, *Increasing the production and consumption of vitamin A-rich fruits and vegetables: Lessons learned in taking the Bangladesh homestead gardening programme to a national scale*, 21(2) FOOD AND NUTRITION BULLETIN (2000).

¹³ P.K.R. NAIR, AN INTRODUCTION TO AGROFORESTRY 91(Kluwer Academic Publishers, London 1993).

¹⁴ J. Gajaseni & N. Gajaseni, *Ecological rationalities of the traditional homegarden system in the Chao Phraya Basin, Thailand*, 46 AGROFORESTRY SYSTEMS 1, 19 (1999).

¹⁵ Mitchell & Hanstad, *supra* note 1, at 12. A detailed study of four traditional Thai homegardens found that the households refrained from harvesting everything that could be harvested, and that this ensured minimal nutrient export from the system.

¹⁶ Terraced homegardens have been recommended to preserve soils on sloping areas. G.J.A. Terra, *Mixed-Garden Horticulture on Java*, 3 THE MALAYAN JOURNAL OF TROPICAL GEOGRAPHY (1954). Fruit trees, bamboo and other trees can be used to rejuvenate infertile soils.

¹⁷ See R. Mitchell, *Property Rights and Environmentally Sound Management of Farmland and Forests*, in J.W. BRUCE, ET AL., LAND LAW REFORM: ACHIEVING POLICY OBJECTIVES (World Bank: Washington, DC, 2006).

whether and to what extent the unbuilt area of small homestead plots (that is, the area not occupied by buildings) affects the productivity of the plots.

We selected two villages, one in Central Java and one in West Java, and conducted extensive interviews of 12 households in each village. This paper reports on the findings from the village in Central Java, which was chosen as a representative rural village not located close to a major metropolitan area. (The village in West Java, the results of which have not yet been analyzed, was chosen as a representative peri-urban village located near a major metropolitan area.)

The rural village that was the subject of the study is located in the Kecamatan of Wanadadi in the Kabupaten of Banjarnegara, which is in the Province of Central Java. Central Java is one of four provinces of the densely populated Indonesian island of Java. We contacted the Indonesian Ministry of Agriculture to ask for recommendations of areas in which homestead plots are well developed. The ministry identified the subject village as one of two villages in Banjarnegara in which the ministry had implemented a project to intensify agricultural production.

Mr. Akhmad Safik conducted the 12 interviews in the village over a period of two days in April and four days in June 2004. The village has a population of 1,814 individuals (912 male and 902 female) and 425 households. The village is located 2.3 km from the center of the kecamatan and 16 km from the center of the kabupaten. According to village officials, the administrative area of the village includes 212.7 ha, including 18.3 ha of pekarangan and buildings, 16.5 ha of irrigated sawah, 98.1 ha of non-irrigated sawah, 8.7 ha of tegalan, 3.8 ha of fishpond (in addition to smaller fishponds located on pekarangan plots), 4.1 ha of plantation and 63.2 ha of other land. Of the irrigated sawah, 3703 m² is classified as bengkok (seluruhnya sawah), which is owned by the village and rented out by village officials in lieu of salary. The average income per capita in the village in 2001 was Rp. 2,583,648 according to local records, which also lists the occupations of villagers described in Table 1.

Table 1. Professions of 582 workers in the studied village.

Profession	No. of workers	Profession	No. of workers
Trade	131	Construction	34
Agricultural labor	96	Fish farming	18
Other	83	Social service	10
Government	71	Retired	8
Transportation	71	Industrial labor	6
Farmer	49	Businessman	5

Within the village, we asked village officials and local residents to help us find households who were using their homestead plot intensively. We eliminated from consideration any household that controlled, either through ownership or renting in, a total of more than 5000 m² of agricultural land, or which owned a homestead plot larger than 700 m².

Each interview consisted of several hundred questions and required several hours. Two interviews were conducted per day. Each interview was conducted with the head of household, though other family members were frequently present and occasionally contributed information to the discussion. Interviews were conducted in Bahasa Indonesia by a fluent speaker.

IV. Findings

A. Description of sample

The 12 households contain a total of 53 members, including 29 members older than 20 years of age and 34 members younger than 20 years of age. The households have an average size of 4.42 members and each head of household is a married male. This is slightly larger than the average household size reported for the village, which is 4.27 persons per household. The average age of the head of household for the sample is 48, with a range of 28 to 70 years of age.

Although only one of the 12 families reports agriculture as the main source of household income, 11 of the 12 report sales of homestead plot production (plants, livestock, poultry or fish) as a source of agricultural income. The main source of income reported by the 12 households falls into eight categories: village official (3), small trader (2), horse cart driver (2), food seller (1), fish farmer (1), pensioner (1), teacher (1), and home industry (1). The one household that reported agriculture as the main source of income raises fish.¹⁸

In two households only the head of household works, in seven households both the head of household and his wife work, in two households the head of household and one child work, and in one household the head of household, his wife and one child work. A total of 23 of the 53 household members work, an average of 1.92 workers per household.

¹⁸ In the case of village officials, income from village sawah controlled by the official is likely to have been a significant source of income; however, this income represents compensation in lieu of salary.

Table 2. Sources of household income in the studied village.

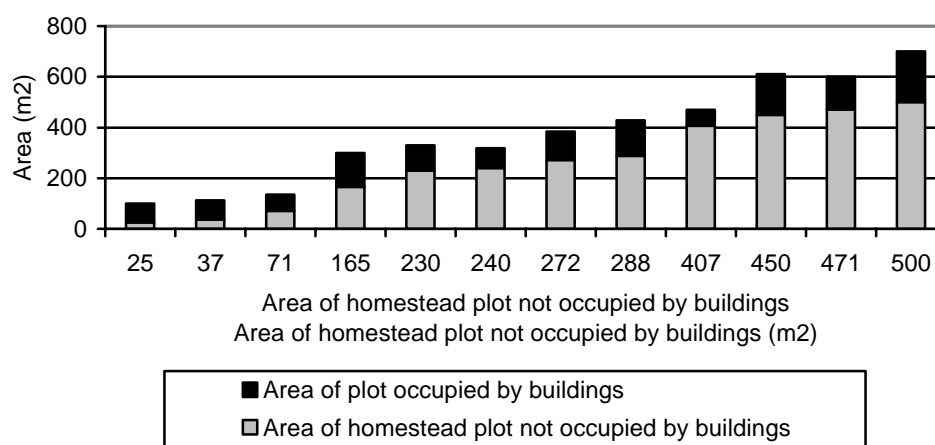
Household ID No.	Main income source	Agricultural income sources	Non-agricultural income sources	Unbuilt homestead plot (m ²)
I	Small trader	Homestead plants, fish farming	Small trader	25
II	Village official	Homestead plants	Small store operator	39
III	Food seller	Sawah, homestead plants, cows	Food seller	71
IV	Village official	Sawah	Building laborer, bus driver, sale of herbs grown by others	165
V	Small trader	Sawah, homestead plants	Dadang, tailor, work at livestock enterprise	230
VI	Fish farmer	Fish farming, homestead plants	Work at livestock enterprise	272
VII	Village official	Sawah, homestead plants	Teacher	288
VIII	Pensioner	Sawah, homestead plants, fish farming	Pensioner, teacher	332
IX	Teacher	Sawah, homestead plants, chickens	Teacher, water pump rental	407
X	Home industry (soy cakes)	Fish farming, chickens	Home industry (soy cakes)	450
XI	Horse cart driver	Sawah	Horse cart driver	471
XII	Horse cart driver	Sawah, homestead plants, fish farming	Horse cart driver, pedicab driver	500

The sample households appear to be at the average or slightly above the average income level of village households. The reported average annual household income of the sample is Rp. 11,662,500 (range Rp. 5,171,304 – 34,800,000). For comparison, village statistics for 2001 record a per capita annual income of Rp. 2,583,648, which when multiplied by the average number of persons per household in the village (4.27), yields an average annual income of Rp. 11,032,176. Thus, the income of the sample of 12 households (June 2004) exceeds the average income of village households (2001) by only 5 percent.

B. Homestead plot productivity

Area of homestead plots used. The average size of the homestead plot in the sample is 374 m² (range 100 m² - 700 m²), the average area of land occupied by buildings is 103 m² (range 48 m² - 200 m²),¹⁹ and the average unbuilt area of homestead plot (the area not occupied by buildings) is 271 m² (range 25 m² - 500 m²), as illustrated in Chart 1. Calculated household by household, the average area of the homestead plot not occupied by buildings (and thus available for planting, raising animals and other uses) is 63%. On the plot with the smallest amount of unbuilt area (25 m²), only 25 percent of the homestead plot is unbuilt, while on the plot with the largest amount of unbuilt area (500 m²), 71 percent of the homestead plot is unbuilt.

Chart 1. Area of homestead plot occupied by buildings



As Chart 1 illustrates, the size of buildings on the plots varies much less than the size of the plots themselves. The smaller range of variation in house building size may be a function of both local preferences and household budgets available for enlarging or replacing the house.²⁰

Size of other land controlled by the households. The sample was limited to households controlling less than 0.5 ha of land, including the homestead plot, other owned sawah and tegalan, and other rented in sawah and tegalan. Of the 12 households, three controlled less than 1000 m² of land, two controlled between 1000 m² and 2000 m², five controlled between 3000 m² and 4000 m², and one

¹⁹ Only one household had more than one house constructed on the homestead plot.

²⁰ Only one of the 12 households intends to undertake major construction on the homestead plot (a new house), while four households report that they cannot afford to construct any improvements.

controlled 5070 m². All but one of the 12 households has registered ownership of the homestead plot.

Variety of trees and other plants on homestead plots. We did not attempt to count all plants grown on the homestead plot, but asked households to identify the more significant plants on the plot. The households identify a total of 14 types of trees on the homestead plots, including coconut, durian, jackfruit, jambu, mango, rambutan, guava, apple, orange, lanseh, kelenkeng (longan), sawo, coffee and papaya. The most common trees are coconut (7 plots) and rambutan (7 plots), while apple, orange, sawo and kelenkeng trees each appear on only one plot. As of the time of the survey, the sample plots contained a total of 13 types of other plants, including bananas, cassava, salak pondah, pineapples, petai (stink bean), taro, tomato, chili, spinach, pepper, vanilla, sweet potato and a local tuber. By far the most common plant is the banana plant, which is grown on 10 of the 12 homestead plots. At the other end of the spectrum, tomato, chili, spinach, pepper and vanilla each grows on only one plot. The variety of plants is likely to change from season to season.

On average, the plots contain 6.58 different types of trees and other plants. The least diverse plot contains only 3 types of trees and other plants, while the most diverse plot contains 13 types of trees and other plants, including several plants not found on the other plots.

Three of the 12 households report that they received some agricultural advice from the Government. This suggests that the Ministry of Agriculture's program to intensify agriculture in the village reached a modest percentage of village households.²¹

Number of trees and other plants on homestead plots. The plots contain an average of 21 trees, counting banana plants. The largest number of trees found on one plot is 43, while the two smallest plots contain only 3 and 4 trees, as shown in Chart 2. If banana plants are not counted as trees, the average number of trees per plot falls to 9.42, and the range falls to between 1 and 21 trees per plot.

²¹ In addition, we were told that each household received seedlings for one durian tree and one petai (stink bean) tree. Our interviews revealed that three of the 12 households had a durian tree on their homestead plot and two had a petai tree.

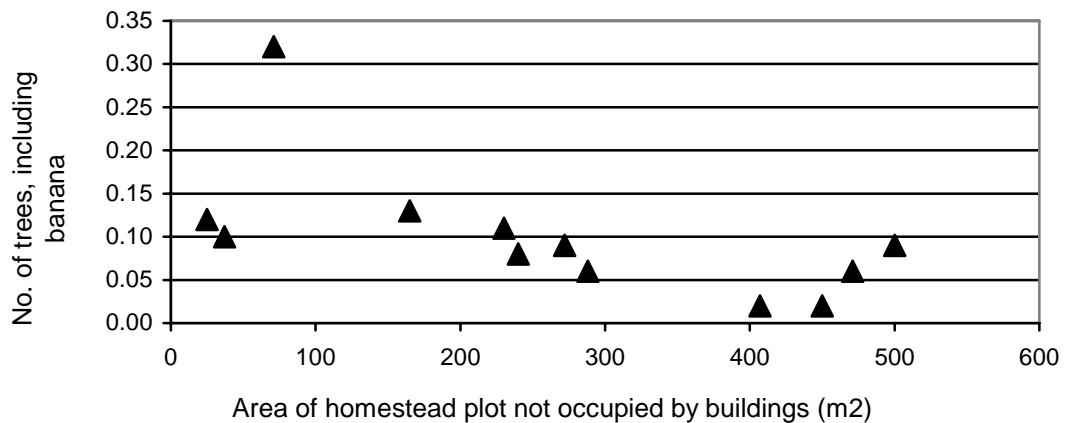
Chart 2. Number of trees on homestead plot



As of the time of the survey, the plots contain an average of 56.2 other plants (that is, plants other than trees and banana plants) per plot. As such, the survey provides only a snapshot of annual and perennial plants, which are likely to change from season to season or year to year. At the time of the survey, the largest number of other plants found on one plot is 155, and the smallest number of other plants on one plot is zero. The smallest homestead plot in the sample, with an unbuilt area of only 25 m², contains only 3 trees and 9 other plants.

Density of trees and other plants on homestead plots. When compared to the area of homestead plot space not occupied by buildings, the average density of the trees in the sample is 0.11 trees per m², and the range of density is from 0.02 to 0.32 trees per m², as shown in Chart 3.

Chart 3. Density of trees on unbuilt area of homestead plot



The average density of other plants in the sample is 0.21 plants per m² (range 0.00 to 0.54 plants per m²).

Number of poultry, fish and livestock raised on homestead plots. Almost all surveyed households use the homestead plots intensively to raise poultry. Roughly half of the households farm fish intensively on the homestead plots. A third of the households raise and keep livestock on the homestead plot, both for meat and as draft animals.

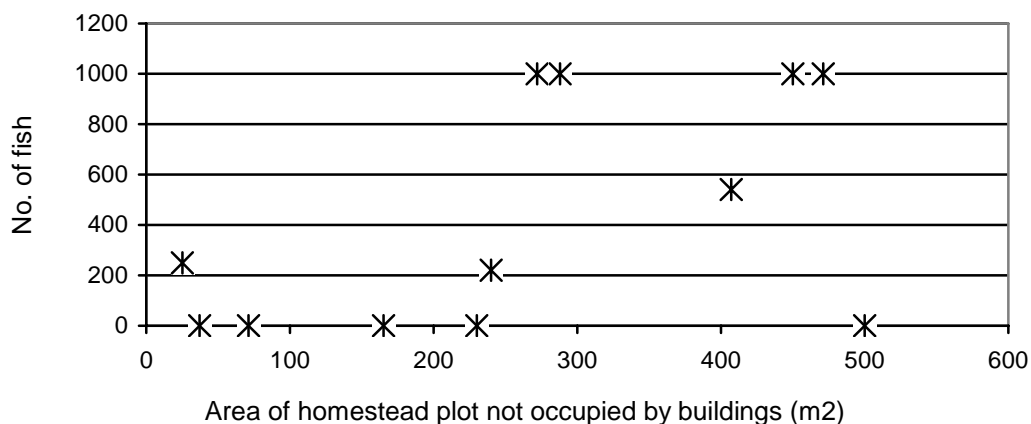
Poultry—chickens and ducks (and in one case, pigeons)—are the most common animals raised in the sample, with all 12 households keeping some form of poultry. The plots contain an average of 15 birds. The largest number of birds found on one plot is 32, while one plot keeps only three birds. It is interesting that the homestead plot with the second smallest unbuilt area (37 m²) raised more birds than all but one other plot. The distribution of poultry production is shown in Chart 4.

Chart 4. Number of poultry on homestead plot



Fish are raised on seven of 12 homestead plots, and in large numbers on four plots. The most common fish is mujair, while nagri, catfish, gurame, nilam and goldfish are also raised. The 12 plots contain an average of 418 fish, while the seven plots that raise fish contain an average of 717 fish. The more substantial fishponds are found on plots with an unbuilt area of more than 240 m². The distribution of fish production among the plots is shown in Chart 5.

Chart 5. Number of fish raised in homestead plot fishpond

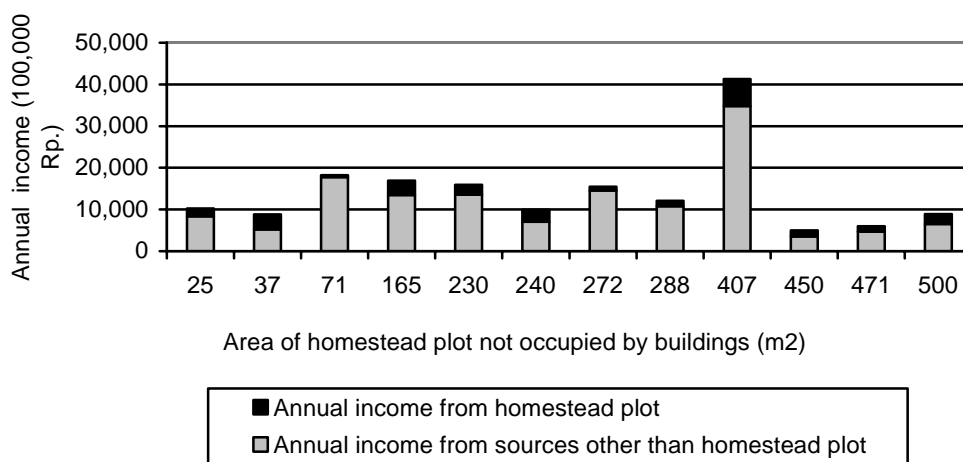


As compared to poultry and fish, livestock are less common on the sampled homestead plots. Livestock are raised by only five of 12 households, and consist of two horses, four cows and two goats. Both horses are used as draft animals, and the other livestock are kept for meat and breeding stock.

C. Homestead plot contribution to family income

Sale of plants and animals from homestead plot. The reported average annual household income of the sample is Rp. 11,662,500 (range Rp. 5,171,304 - 34,800,000). Sale of plants and animals from the homestead plots provide an average of Rp. 2,386,262 annual income to each household in the sample (range Rp. 475,000 to 3,626,000). The distribution of income from homestead production and other sources is illustrated in Chart 6.

Chart 6. Annual income from homestead production and other sources



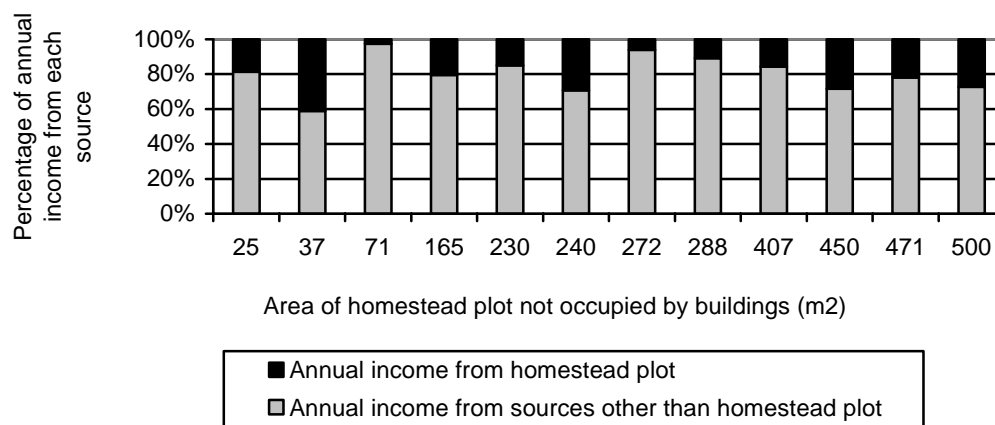
Calculated household by household, the cash income from sale of products from the homestead plots represents an average of 20 percent of total household income from all sources, including wages, pensions, farming and trading activities. Sale of homestead plot production provides a range of 2.6 to 41.2 percent of total household income, as shown in Chart 7. Considered another way, the homestead plots increased the cash income of the surveyed households by an average of 25 percent, and increased the cash income of one household by 67 percent.

It is important to note that Charts 6 and 7 do not take into account the fact that each household is also saving money by consuming food produced on the homestead plot. If the cash value of this savings were considered, then the economic benefit derived from the homestead plot would be even greater for each household.

These plots are producing a significant amount of income for these families, even when compared to what appear to be relatively high wages and other income earned by this sample of households. For this sample, sale of homestead plot production appears to equal the equivalent of roughly half the annual wages and other income that a household worker earns from work outside the homestead.

Given the fact that the household income of the sample is essentially equal to the average income of all households in the village, if a comparable income from sale of homestead products was obtained by a poorer household in the village, the income earned from the homestead plot would presumably equal a good deal more than the equivalent of one-half the income of a household worker.

Chart 7. Sources of annual income from homestead production and other sources



D. Homestead plot contribution to family diet

We have not yet completed quantitative analysis of the data collected with regard to homestead plot plant and animal products consumed by the households included in the sample. The analysis is made more difficult by the fact that households reported consumption using different measures – for example, using either weight of fruit consumed or number of fruits consumed. Although we have not quantified the consumption data, the tabulation in Annex 1 illustrates the range and weekly frequency of household consumption from the homestead plots.

E. Role of women

Of 53 household members in the sample, 15 are married women and 14 are unmarried women. At least 12 women are married to the head of a household.²² The sample reports that 6 wives and 1 daughter earn non-agricultural income and only 1 wife earns agricultural income. Of the 24 household members reporting employment outside the home (including farming on other land owned or rented in by the household), 10 are women. The average wage of the 10 women working outside the home is Rp. 5,600,393, which exceeds the average wage of Rp. 4,000,281 earned by the 14 men working outside the home. The range of income for women in the sample is Rp. 1,750,000 to 15,600,000, while the range of income for men is Rp. 1,560,000 to 19,200,000. It thus appears that the income of women working outside the home is a significant source of family income.

Of a total of 15 plots of 10,917 m² of sawah, tegalan and fishpond owned by the sample households (and measuring a total of 10,917 m²), women owned only two plots – a plot of tegalan and a fishpond measuring 1382 m².²³ Of the 12 homestead plots, three are owned by the wife of a head of household, eight are owned by the male head of household and one is owned by the father of the wife. In this village at least, women are recognized as owners of real property, although they appear to own only a modest fraction of such property.

Essentially all planting on the homestead plot is done by the male head of household. Only one of 12 households reports that women plant anything on the houseplot. When asked about the care and harvesting of plant products from plants grown on the homestead plot, six of the 12 households report that women are involved in either caretaking or harvesting of plants, and two other

²² All families are Muslim and we did not inquire whether any male head of household had more than one wife.

²³ A total of 3,703 m² of the sawah is owned by the village, but is granted in indefinite use to the head of the household (all males in this sample) who hold village office. The use of the land is granted as compensation in lieu of salary.

households report that household members other than the head of household harvest plants. In four households, only the head of household cares for and harvests plants from the homestead plot. When asked directly regarding the role of women in caring for plants, seven heads of household report that women participate only in caring for plants, two report that women both care for and harvest plants, two report that women play no role in caring for or harvesting plants, and one gave no answer. Women are responsible for marketing plants from the homestead plots of three households in the sample, while in a fourth household, women are responsible for finding and contacting buyers. In the other eight households, women play no role in marketing plants and plant products produced on the homestead plot.

Women are more involved in caring for animals on the homestead plot. All but one household reports that women are involved in feeding and caring for homestead plot animals. Women are less involved than men in marketing animals and animal products. Of the 12 households, five report that women sell animals or animal products, one reports that the wife of the head of household “gathers information” (presumably to assist with marketing of animals), and six report that women play no role in marketing animals and animal products.

It thus appears that in this village, women do not make the majority of decisions regarding plants and animals produced on the homestead plot. The role of women in homestead plot production might best be characterized as a shared role with the male head of household, but that in many cases the male head of household makes more decisions regarding homestead plot production and sales. This is not surprising in light of the importance of the income earned outside the home by women in the sample, which implies a high opportunity cost for work on the homestead plot.

F. Other findings

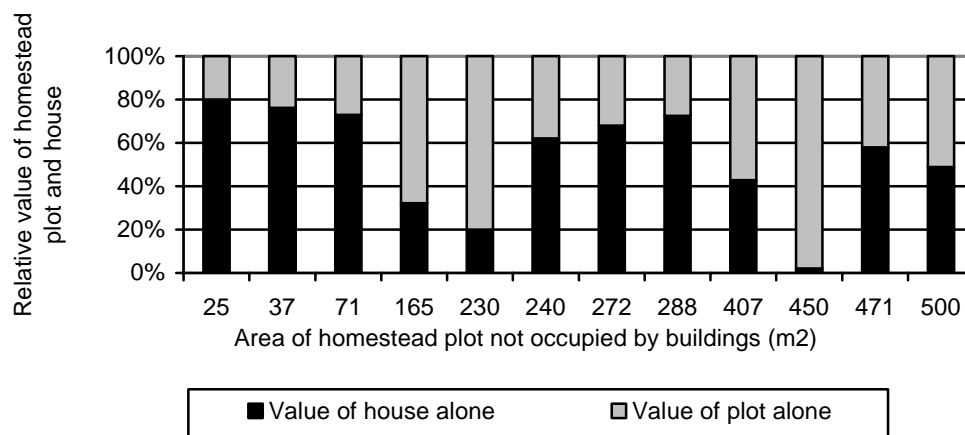
We asked the heads of household to estimate the value of the homestead plot and the house on the plot. When expressed in terms of price per m² of the homestead plot, the average estimated values for the homestead plots and houses are worth an average of Rp. 80,900 per m², with a range of Rp. 39,344 to 146,607 per m². We also asked the households to estimate that the value of the homestead plot alone. When expressed in terms of price per m² of the homestead plot, the average reported value is Rp. 37,884 per m², with a range of Rp. 30,000 to 60,606 per m². The range of values per m² for the homestead plot alone is much narrower than the range of values per m² reported for the homestead plot and house together.

The heads of household also report that the average price of sawah in village is Rp. 42,273 (with a range of estimates from Rp. 35,000 to 50,000 per m²) and report

that the average price of tegalan in the village is Rp. Rp. 29,750 (with a range of estimates from Rp. 22,500 to 40,000 per m²). These estimates are several times higher than estimates for sawah that we found in interviews of other Javanese villagers during 2001 and 2002. Although it is possible that land values have increased dramatically in the last two years, we are concerned that the sample may not be representative of sawah values throughout Java. Part of the explanation for the high reported values may be that the villagers overstated land values when answering questions posed by an outsider. Another explanation may be that the reduction of the area of sawah in the village in recent years – a reduction caused by the flooding of some land as the result of damming a nearby river to produce hydroelectric power – may have inflated the price of sawah in the village.

Based on the estimated values reported by the 12 households, the value of homestead plot land alone appears to be somewhat less per m² than the value of sawah and a bit more than the value of tegalan. It appears that, on average, the households believe the homestead plot represents 45 percent of the combined value of the homestead plot and house.

Chart 8. Estimated relative value of homestead plot and house



V. Conclusions

The research in this Central Javan village reveals that sale of animals and plants produced on homestead plots with unbuilt areas even as small as 25 m² can provide substantial supplement to household incomes. This is true even for rural households that earn their primary income from sources other than agriculture, as was the case in 11 of 12 households in our sample.

This research also revealed that even relatively well-off households—those earning well above the average household income of the village—rely upon

homestead plots to supplement their household consumption and household cash income. In this sample, homestead plots increased household cash income by an average of 25 percent, and one household's homestead plot increased the household's cash income by 67 percent.

This measure of the income-producing effect reflects only the supplemental cash income generated by sales of homestead plot production. This measure does not take into account the value of the food produced on the homestead plot and consumed by the household. Consumption of homestead production reduces the amount that the household must spend in the market to purchase food, resulting in a net savings to the household budget. If this income effect is considered, the homestead plots would presumably contribute even more to the household budget.

Given that the sample includes several relatively well-off families, we find no evidence of social stigma associated with the use of homestead plots to supplement household diet and household income in this village. We would expect to find that where poor households make similar intensive use of homestead plots to supplement household diet and household income, the homestead plot might increase household cash income by even more than the 25 percent average we found here.

The research also reveals that there is no single model for using the homestead plot to generate food and income for the household. Even among 12 households we found a wide range of uses. Some households concentrate on growing trees, others grow a variety of annual and perennial plants. Some household keep large numbers of fish, while other households keep large numbers of chickens and ducks.

With respect to the role of women in homestead plot production, we conclude that homestead plot production in Central Java might best be characterized as a joint work of men and women rather the exclusive domain of either gender. In this sample, women earned as much or more than their husbands from employment outside the home, which we believe may reduce the tendency, seen in some societies, for women to assume a greater role in producing plants and animals on the homestead plot and marketing the production.

Annex 1

Weekly household consumption of
homestead plot production in the studied village (Central Java)

Household ID	Number of persons	Plant products consumed weekly	Animal products consumed weekly
I	5	Banana (1 bunch) Breadfruit (0.25) Tomato (2) Spinach	Mujair fish (3)
II	3	Coconut (1) Jambu (1 kg) Mango (0.5 kg) Jackfruit (0.25)	Chicken (0.5) Duck (0.04) Goat (0.04) Mujair fish (1.4)
III	4	Banana (0.4 bunch) Coconut (0.2) Rambutan (0.1 kg)	Chicken (0.08) Calf (0.04)
IV	6	Banana (1 bunch) Coconut (0.5) Mango (0.5 kg)	Chicken (0.075)
V	3	Cassava Banana (0.5 bunch) Mango (0.2 kg) Rambutan (0.1 kg) Jambu (0.04 kg)	Chicken (0.6)
VI	4	Coffee (0.025 kg) Pineapple (2) Jackfruit Coconut (1)	Duck egg (10) Chicken (0.1) Mujair fish (1)
VII	5	Cassava Banana (0.5 bunch) Rambutan (0.2 kg) Salak Pondoh (0.25 kg) Orange (0.5) Coconut (0.6) Jackfruit (.08) Taro (10)	Chicken egg (2) Gurame fish (0.5 kg)
VIII	6	Rambutan 0.1 kg) Banana (0.3 bunch)	Chicken (0.01) Mujair fish (1)
IX	5	Papaya (0.25 kg) Sawo (0.4 kg) Rambutan (0.2 kg)	Mujair fish (0.1 kg) Nagri fish (0.04 kg) Catfish (0.1 kg)
X	2	Banana (0.1 stem) Jackfruit (0.1) Guava (0.06 kg) Duku (0.06) Coconut (0.5) Cassava (0.2kg) Papaya (0.2 kg)	Mujair fish (0.25 kg)

XI	3	Banana (0.25 bunch) Salak (0.35 kg) Rambutan (0.1 kg) Jackfruit (0.2 kg)	Chicken (0.04) Mujair fish (0.5 kg)
XII	7	Cassava (0.25 kg) Banana (0.25 bunch) Rambutan (0.3 kg) Coconut (0.5) Jackfruit (0.5)	

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