Holding Their Own:

Smallholder Production, Marketing and Women Issues in Philippine Agroforestry

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A Collection of Papers from the "Agroforestry and Sustainable Vegetable Production in SEA Watersheds Project"

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ISBN 978-971-528-021-1

The article "Health Consequences of Rural Women's
Productive Role in Agriculture in the Philippines
and Other Developing Countries" was originally published
in the *Journal of International Women's Studies*
Vol. 10 #4 May 2009 pp.95-110

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Foreword

The person I am right now has been significantly influenced by the excellent elementary and high school education I received from De La Salle University from 1964 to 1975. I count it a wonderful privilege to be a part of De La Salle University's Centennial celebration through this work of Dr. Ma. Elena Chiong-Javier.

I am an engineer and was completely unaware of gender inequity until 2005. I was "forced" to consider gender through a call for a proposal by the Sustainable Agriculture and Natural Resources Management (SANREM) Collaborative Support Research Program of the United States Agency for International Development (USAID) that required gender to be weaved into the proposal. It was through this SANREM endeavor that I got to know Ellen. She was the one who patiently taught and "argued" with me about gender inequity through countless instant messaging, email, phone call, and face-to-face interactions. I became conscious of this issue and became an "engineer" observer. My conscience was pricked as I observed, case after case, how women are unjustly mistreated. I recognized this mistreatment in the screaming of a wife being battered by her husband in a rural community in the Philippines; in the formal training that rural women will not have a chance to attend because training schedules conflict with home responsibilities; in women's not being given a share or say in spending household income; in seeing rural men drunk, leaving behind women to cook, wash clothes and take care of kids, and still expecting their wives to provide time to do agricultural labor; in subconsciously developing a research team only composed of men; in witnessing my first research team meeting in Vietnam, where all of the researchers attending were men; in attending my first farmers meeting in Indonesia, wherein all the attendees were men; in seeing the research magazine covers of my own university, wherein all the scientists featured were men; in the many machines that are intrinsically tailored for men; in my current research in Cambodia, wherein all researchers and field technicians that were hired are men, probably because we can't find any trained women or still lack the backbone to deliberately search for women partners; in seeing lip service paid to women in proposals and when implemented morsels are given to women just to satisfy gender equity requirements. The list could go on.

As a convert, I am therefore convinced that gender equity, agricultural development and research projects must intentionally, deliberately, and

almost exclusively target women. For women to be empowered, they must be the intentional, deliberate, and the almost exclusive target of innovation. We need to "disrupt" the current approach and not just aspire for gender equality, but for women exclusivity, because unless this is done, the men in most cases will overpower the women. There must be an affirmative action for women program.

It is in this context that I am so excited about this book written by Dr. Chiong-Javier and published by the DLSU Social Development Research Center. It is the University that will serve the Philippines for the next 100 years with greater determination for gender equity, knowing that it began as an exclusive male school. In this book Ellen shows the detrimental impacts of agricultural production practices on rural women, such as exposure to harmful chemicals especially when pregnant, use of machines designed for men, nutritional deficiencies due to poverty and overwork, and farm-related accidents and injuries. She offers an example of a women-friendly production technology deliberately researched and developed for women, which is vermiculture. Afterwards she shows how effective and gifted women are in marketing vegetables, advocating that women must be provided by government and society with avenues like post-harvest infrastructure and training, organized market information, better transport facilities to effectively market vegetables, and market policies redesigned with a bias to and for women. Small-scale marketing must be redesigned for women and be a means to empower women in rural communities.

With this foreword I would also like to thank Dr. Keith Moore and Dr. Maria Elisa Christie for the time they have spent educating me on gender, which has buttressed my conversations with Ellen. Thanks also to Dr. Theo Dillaha, who mentored and encouraged me and exemplary managed SANREM from 2004 to 2010. Lastly, thanks to Dr. S.K. Dedatta, for his focused and unflinching leadership.

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Preface

Studies have long shown that the most resource-poor populations in the Philippines and other developing countries in Southeast Asia are found extensively in the upland watersheds. In this environment people face a continuing daily grind to survive amidst changing socioeconomic and political conditions, fast dwindling resources and increasing environmental deterioration. Dependent on smallholder production farms, women and men farmers cope with poverty by switching from subsistence to high value cash crops and engaging in market exchange. Grown in degraded watersheds, intensively cultivated commercialized vegetables replace agroforestry crops and threaten the ecosystem.

In order to assist small-scale farmers–particularly women–to improve their lives through sustainable livelihood and resource management options, the "Agroforestry and Sustainable Vegetable Production in Southeast Asian Watersheds Project" was developed under the "Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program" managed by Virginia Tech with support from the United States Agency for International Development. Led by the North Carolina Agricultural and Technical State University, the project brought together a multi-country research partnership that included international organizations and academic institutions from Vietnam, Indonesia and the Philippines.

The Social Development Research Center (SDRC) of De La Salle University in Manila was one of the research partners in the Philippine component. A study team carried out various activities that addressed two (of six) major project objectives, namely marketing and gender. The research methodologies and findings are described in the six papers that were compiled for this volume. Because the papers are predominantly about women, this is undeniably a women's book. The earliest paper, published in the *Journal for International Women's Studies* (JIWS), set the direction as it analyzed the health consequences of rural women's productive role in agriculture. We are grateful to JIWS for granting us permission to reprint the article.

Although there are but four contributors to the writing of the papers in this book, in reality many individuals and groups were critical in making our SDRC

marketing and gender research undertakings a truly collective effort during the four-year (2006-2010) project duration. At Virginia Tech, we acknowledge the inspiring leadership of Dr. Theo Dillaha, then SANREM Program Director; Dr. Keith Moore, Associate SANREM Director; and Dr. Maria Elisa Christie, Women in International Development Program Director. Maria Elisa was instrumental in our access to additional funding for the gender networks study. I thank both Keith and Maria Elisa for rigorously reviewing the gender networks manuscript, sharing valuable theoretical insights and analysis.

The NCA&T, most especially former Dean Alton Thompson and Dr. Manuel (Manny) R. Reyes (one of the contributors) provided staunch emotional support to the SDRC team in addition to funding access. We have been most fortunate to work with a lively scientist and project leader like Manny who, even in trying times, never lost his positive perspective nor failed to infuse us all with his humor. He inspired us with his untiring quest to understand gender analysis and women's status in Philippine rural communities.

We were privileged to have learned so much from stimulating interactions with multi-disciplinary partner scientists, especially country colleagues from the World Agroforestry Centre/ICRAF Philippines Office. Dr. Delia Catacutan, now a social scientist based at the ICRAF Nairobi headquarters, was a key partner during the stakeholder consultation in preparation for the project. I was quite fortunate to have spent lengthy discussions with her on research analyses, policy implications of findings and general project concerns. Her warm friendship and open camaraderie were important for a researcher away from home. Dr. Agustin Mercado Jr. and Caroline Duque-Piñon (both contributors to this book) were also invaluable ICRAF partners in our women's vermicomposting study. Together with Delia, they introduced us to many of their institutional contacts in local government units, national line agencies, and nongovernment and peoples organizations. At the University of the Philippines Los Baños, we thank Dr. Maria Victoria O. Espaldon and fellow gender researcher Dr. Jean A. Saludadez for their intellectual stimulation.

At SDRC, we acknowledge with much gratitude the contributions of Cristina A. Rodriguez who obtained significant women's data from a gender survey. The backbone of the research work was handled by field researchers Kay Katherine Zabala, Desiree Concepcion Garganian-Aragones, Xyle Fe Adiong-

Verbal, and Euca Bolingot. Without their collective hard work, commitment and Cebuano language facility, the bulk of the quantitative and qualitative data we required would not have been successfully collected and collated for analysis. We also thank the valuable support provided by the late Administrative Assistant Aurora Esquejo, our editor Connie Jan Maraan, our layout artist Maria Catherine Dacillo- Domingo who also liaised with the printers, Lyndia Navarro, Lolita Rosell, and Reynaldo Porsuelo. The current SDRC Director Dr. Dennis Trinidad deserves our special thanks for his moral support and encouragement for the book's publication.

Our deepest appreciation goes to the Barangay officials and Talaandig leaders of Songco who were extremely accommodating, and to the numerous small women and men farmers who welcomed our presence in their homes as well as in the farms and markets where they worked. If not for their enthusiastic and patient response to our questions, sometimes repetitive as we tried to grasp their realities, we would not have succeeded in achieving our research objectives. We owe a special debt of gratitude to the leaders–notably Perla Binahon and Eulalia Cardente who served as local research guides–and members of formal and informal women organizations in the village and the women *biyahidors* and market informants with whom we spent countless hours observing and discussing their reproductive and productive roles to discern the current challenges they face as women in our society.

Ma. Elena Chiong-Javier, Ph.D.
SDRC Project Leader

Snapshots from the Project

Project Team and International Colleagues

3rd SANREM Global Annual Meeting

TMPEGS Gender Researchers

Gender Researchers with Women Farmers

Vermicomposting Women Trainees

TMPEGS Philippines Researchers

Linking Smallholders to Urban Markets: Implications for Vegetable-Agroforestry Intervention

Ma. Elena Chiong-Javier

ABSTRACT

Philippine upland watersheds are dotted with smallholder production farms that have shifted to growing more cash crops such as high value vegetables for urban markets. Development efforts aimed at poverty alleviation among these smallholders may not prosper unless they are effectively linked to the lowland consumers of their products. Responding to this challenge, a market study was undertaken in Songco, an upland village in Lantapan Municipality, Bukidnon Province, where traditional agroforestry systems have been transformed by the introduction of commercially-viable vegetable crops. The study sought to understand local marketing channels, practices or strategies, constraints and opportunities, in order to recommend appropriate program interventions. Data were gathered through literature review, participant observation, focus group discussions, and key informant interviews. Findings revealed that the marketing of tree crops is economically unreliable and undeveloped compared to that of vegetables; therefore smallholders focus their efforts on vegetable marketing. The vegetable supply chain shows that smallholders are connected to urban wet markets by multi-tiered channels characterized by small intermediaries at the upstream who are bound by informal transactions, but are distanced from end consumers. Women in many farm households are increasingly bringing their produce to the market or becoming biyahidors/traders in order to get more profits. Market roles are gender-differentiated as women figure prominently in small enterprises while men are in larger marketing endeavors. The major marketing constraints for both farmers and biyahidors include lack of access to organized market information (which affects farm production and marketing decisions), inability to maintain product quality and control market pricing, high cost of farm-to-market delivery, and poor transport facilities. Program interventions should build marketing collectives that are directly linked with institutional buyers, enhance farmers' knowledge about the demand-driven side of the market, and integrate market and gender concerns in technology development programs.

Keywords: *Supply chains, vegetable marketing, market constraints, women traders.*

INTRODUCTION

The Philippines continues to possess an agriculture-driven economy on which about two-thirds of the population and three-fourths of the poor are dependent for survival (Johnson, Weinberger and Wu 2008, Briones 2002). Smallholders represented by resource-poor women and men farmers tilling an average of 2.04 hectares–whether owned or not–comprise a significant segment of the farming population (NSO Census of Agriculture 2002). These small-scale farmers are mostly engaged in vegetable production in the country today (Macabasco 2008). Smallholder production farms that dot the upland watersheds of the country are fast being converted to commercial vegetable production systems that are market-oriented. On the upper slopes of the Manupali watershed located in Bukidnon Province of Northern Mindanao, this phenomenon was noted over 10 years ago in the study of Poudel, Nissen and Midmore (1999). The study found that fallow periods used to regenerate land are shortened and land management changes when crops are cultivated under high-return production systems such as vegetable farming; these result in a pessimistic scenario in which forest area shrinks with agricultural expansion, the reliability and recharging capacity of streams are lessened with increased water use for irrigation, and other problems such as soil erosion, pesticide poisoning, and poorer health ensue, all contributing to economic and environmental backlash in the short term (Ibid. 1999:41).

Smallholder farming in the mountainous highlands and upland watersheds of the country are among the most vulnerable to rapidly changing economic, social, political and environmental conditions (WAC 2008, LWR et al. 2004). Over the past three decades, many development

researches on smallholders have concentrated on eliciting and understanding the factors influencing their poverty and marginalization, while corresponding development initiatives have focused on addressing their socioeconomic condition (Gonsalves and Queblatin 2003, Scherr et al. 2001). In recent years, these initiatives have been interlinked with efforts to arrest environmental degradation through locally sustainable natural resource management. Socio-political and technological innovations coupled with sound resource use and management practices have been found to provide a wide margin of opportunities for improving the lives and conserving the environmental resources of the rural poor in degraded watersheds. However, development efforts aimed at poverty alleviation among smallholder farming populations may not prosper unless they are effectively linked to the lowland consumers of their products.

A current research and development effort to attain such development goals is the 4-year (2006-2010) project entitled "Agroforestry and Sustainable Vegetable Production in Southeast Asian Watersheds." This project was launched in 2006 under an umbrella program called the Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program (SANREM CRSP) managed by Virginia Tech in the U.S.A. with funding support from the United States Agency for International Development (USAID). The project involves a collaborative research partnership between the North Carolina Agricultural and Technical State University (lead institution), some international research organizations, and multiple academic institutions from the three countries of Vietnam, Indonesia, and the Philippines in the Southeast Asian Region (Reyes and TMPEGS 2005).

The overarching goal of the project is to reduce poverty, food scarcity, and environmental degradation in the region by combining economically-viable and resource-conserving technologies and gender friendly socio-economic policies that will benefit and reward stakeholders in a watershed, especially small-scale women and men farmers. It is hypothesized that integrating vegetable

production in the agroforestry system on small farms will help to alleviate poverty and enhance environmental protection, sustainability, and ecosystem biodiversity in SEA watersheds and vice versa. The project has six specific objectives corresponding to these key themes: technology, marketing, policy, environmental and socioeconomic impacts, gender, and scaling-up (TMPEGS). To realize each of these objectives, different studies were simultaneously and sequentially conducted by collaborating institutions in the three countries, with inputs made by technical experts from western academic institutions and international research centers.

In the Philippine case, the market and gender studies were undertaken by the Social Development Research Center (SDRC) of De La Salle University (DLSU) in Manila. This paper is limited to a discussion of salient findings in relation to the market research component. A description of the market research objectives, methodology, and profile of the project site precedes the discussion.

Market Research Objectives and Methodology

Objectives. The rationale of the project's market research component stemmed from an expected major project output–that is, the development of appropriate technologies for integrating vegetable production and agroforestry (VAF) practices on small farms. Since the success of this endeavor was contingent on small farmers' adoption of integrated VAF technologies, it became necessary to ensure that their adoption would turn out to be economically viable. It was believed that unless they could obtain a higher financial return from the sale of vegetables and trees grown in the VAF system, they would not be spurred to combine both crops under one farm setting. Some studies had already shown that in order to realize this financial incentive, there was a need to improve farmers' individual and collective linkages with VAF markets. This would essentially be done through better knowledge and access to market supply-and-demand information and transportation (ANRMP 2006, LWR et al.

2004, Ali 2000, FAO 1996). It had also been pointed out that current policies of governments in many parts of the world favor market-led growth as the key to development and poverty reduction, and that improving the low income producers' access to markets for their products is the "critical route out of poverty" (Kanji, MacGregor and Tacoli 2005).

The market research therefore had the following objectives: (1) to identify and analyze the marketable products and their supply chains, (2) to determine the women and men farmers' marketing practices, constraints and opportunities, and (3) to recommend policy or program interventions for overcoming market constraints and utilizing market opportunities.

Methodology. Four qualitative methods were utilized to gather data, namely literature review, participant observation, focus group discussions, and key informant interviews. The literature review covered published studies and unpublished documents/records from government and other sources. It provided an understanding of the context within which the project would be conducted, including concepts, roles, practices, and issues relevant to VAF marketing in the uplands. It also provided information for constructing a research site profile, guided the formulation of the research tools, and yielded secondary statistics that could be updated.

Participant observation (PO) was used to familiarize the researchers with the VAF supply chains and to acquire an in-depth understanding of gendered farming and marketing roles and practices. In the PO process, field researchers mingled and conversed informally with farm household members and various market intermediaries operating from the upstream (farm) to downstream (urban marketplaces and shipping yard) levels. Farmers' harvesting and post-harvesting activities or practices were observed at the farms and at weighing and loading stations along the barangay road and at market storage/warehouse facilities called *bodegas*. The researchers also rode with farmers and their vegetable commodities, as these were transported by hired trucks or public utility vehicles

to the markets in Malaybalay, Valencia, and Cagayan de Oro Cities, and they observed market transactions.

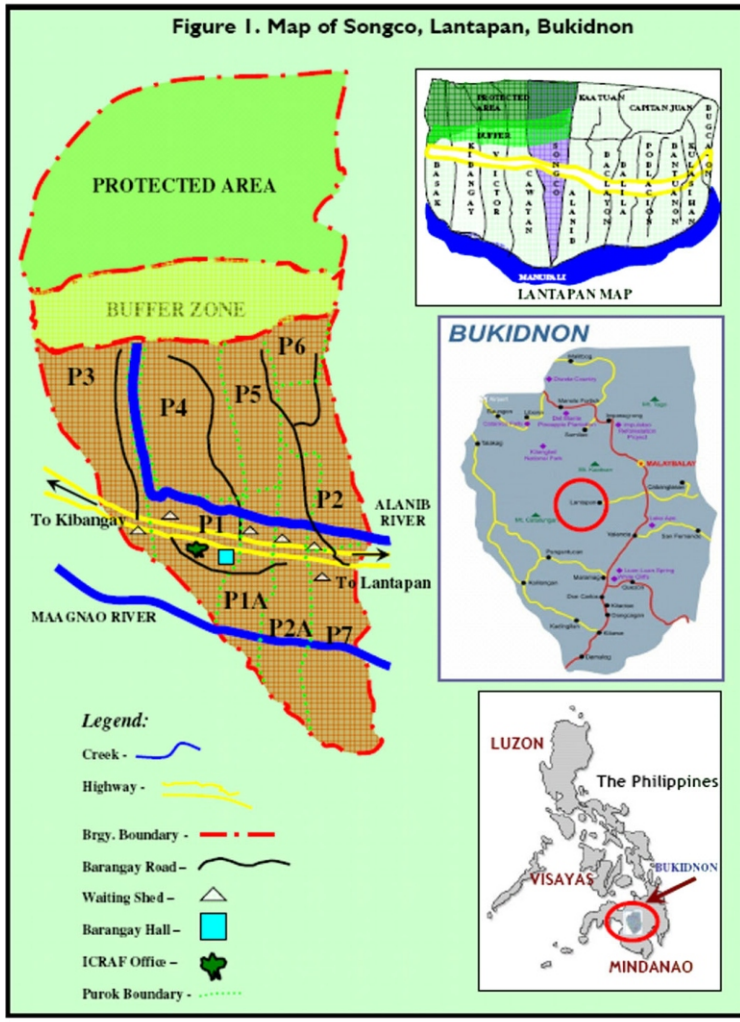
Two focus group discussions (FGDs) were conducted with the use of an FGD guide. The groups were homogeneous (either all-female or all-male) and involved a total of 15 participants, although more were invited. The discussions were directed at eliciting farmers' marketing perceptions and preferences as well as pressing marketing issues.

Lastly, interviews with key informants (KIs), or persons in the project site considered most knowledgeable about various market-related topics being studied, were done following an interview guide. A total of 46 KIs were chosen through purposive and snowball sampling–that is, the interviews started with some key leaders (also mostly farmers themselves), older community residents, and well-known traders. The subsequent KIs–especially those belonging to the categories of biyahidors, bodega owners, and truckers–were derived from earlier informants' responses or their referrals.

The Study Site

The study site is Barangay Songco, one of 14 barangays in the municipality of Lantapan in Bukidnon Province, Northern Mindanao (Figure 1). Lantapan is noted as a vegetable-producing town in southern Philippines and is situated in the Manupali Watershed. This watershed comprises a substantial part of Mt. Kitanglad Range Natural Park (MKRNP), a protected area in the country, and is a major water resource in the locality.

Songco lies at the foot of the Kitanglad Park and is located 12 kilometers away from Lantapan Proper. Older residents said it used to be called "Segovia" by the original settlers who came sometime in the 1800s in search of productive farmlands and peaceful settlement. Eighty percent of Songco was previously



forest land, and teeming with wildlife like monkeys, wild pigs, and birds of different kinds like *kalaw* and *kulasisi*. But the forest and its animal life reportedly dwindled as the settlers acquired land parcels for cultivation through the *kaingin* (slash-and-burn) system. The entry of logging operations in the 1950s allegedly hastened forest destruction and in-migration speeded up forest and land use conversion.

According to available barangay records (Songco Local Government 2002), the total land area occupied by the barangay is 4,304 hectares, of which 63% are timber lands and 37% are alienable and disposable (A&D) lands. It has an average altitude of 800 meters above sea level (masl), but the part traversing Kitangland Park has a maximum elevation of 2,928 masl; hence the climate is generally cool. Songco has a lengthier rainy season (May to December) than dry season (January to April). Its terrain is generally rolling and steep, with 70-80% having quarter slopes– hence the erosion potential is mostly moderate to severe. The soil types are Adtuyon and Kidapawan Clay, which are classified as first class soil suitable for agriculture. Two major rivers– Alanib (in Purok 4) and Maagnao (in Purok 3)– run through Songco. There are also eight springs, five waterfalls, and many creeks traversing the barangay.

The main roads in Songco are unpaved and gravelly or stoney; they are dusty in the dry season but muddy, slippery, and overrun with potholes during the rainy months. Smaller and narrower secondary roads and foot trails radiate from the main roads and connect clusters of village houses in nine puroks or sitios. Purok 1 is the center ("Centro") of the barangay. Most villagers are considered lowlanders who are Visayan speakers. Among the indigenous groups residing in Songco, the most predominant is the Talaandig who cluster in Purok 2A (or Sitio Tulugan). Based on 2002 data, Songco has a population size of 2,947 individuals (54% males and 46% females) and a total number of 568 households. In September 2006, the research updated the list of households and this yielded a total population size of 629 households engaged in farming and non-farming activities; only 427 (68%) of them were confirmed to be actual residents of Songco.

Over the years, the barangay has been a recipient of development efforts from various government and nongovernment organizations. These efforts have generally focused on the introduction of modern agricultural technology and natural resource conservation. Among the assisting institutions, the World Agroforestry Centre (WAC, formerly International Centre for Research in Agroforestry or ICRAF) stood out in farmer accounts as being primarily responsible for introducing the concept and encouraging the practices of agroforestry and conservation farming. WAC was also noted for organizing the Lantapan Land Care Association (LLCA), a municipal-wide farmers' organization that has been helping in disseminating agroforestry and conservation technologies among smallholders in the area.

Most Preferred and Marketable VAF Crops

The principal cash crops of a majority of Songco farmers who are largely smallholders are high-value vegetables adapted to semi-temperate climates. Vegetable crops are mainly grown on monoculture farms (popularly known as "gardens"–hence farmers are also called "gardeners") on the lower slopes of the barangay that can be plowed, especially those closer to the roads, for sale to urban markets. In many cases, the common indications that vegetable farms were once agroforestry farms are the trees, banana plants and/or rootcrops that continue to demarcate their contours or boundaries. Presently, patches of agroforestry farms that combine the production of trees and food crops are mostly located on the upper slopes or steep areas (called *bakilid*). Food crops such as corn, banana, rootcrops (like sweet potato, yam or taro and cassava), fruit-bearing trees (such

as coffee, coconut, jackfruit and mango) and indigenous vegetables are grown primarily for household consumption. Some of these crops are also planted in backyard plots. Surplus food crops and tree crops, such as certain timber species raised for commerce in small tree plantations by a handful of farmers, are marketed in limited quantities.

Most preferred crops for planting. In terms of vegetables, the crops most preferred for planting are tomato, cabbage, Wong bok (*umbok* or Chinese cabbage), beans, bell pepper *(atsal)*, carrot, chayote (*sayote)*, sweet peas, and eggplant. Potato is an additional preference among the male farmers' most-mentioned choices. Three of their choices– tomato, cabbage, and eggplant– are actually included among the Philippines' nine major vegetables or banner crops as identified by the Bureau of Agricultural Statistics (BAS); while four others– umbok, bell pepper, carrot, and potato– are considered to be among the region's 16 priority crops (cited in Macabasco 2008). The major vegetables reportedly accounted for 67% of the total of about 4.8 million tons of vegetables grown on an area of over 600,000 hectares in 2007; priority vegetables followed with 26% of the total output (Ibid.).

Comparative BAS statistics in October 2009 on cabbage and tomato production in the country provide interesting insights on the status of these two crops in Northern Mindanao, where Songco is located. (Data for other vegetables were unavailable.) Table 1 shows only the five regions with the largest shares in the country's total volume of cabbage and tomato production for three consecutive years. As indicated, the top producer of cabbage is the Cordillera Administrative Region (CAR), but for tomato, it is Central Luzon. Although Northern Mindanao may have initially lagged among the top five producers for

Table 1. Volume of production of Cabbage and Tomato by the top five contributing regions, Philippines, January-June, 2007-2009 (in mt)

Vegetable/Region	January – June (1st half of the year)		
	2007	2008	2009 (prelim)
Cabbage			
PHILIPPINES	44,319	47,353	47,897
CAR	34,181 (1)[a]	36,610 (1)	37,094 (1)
Cagayan Valley	968 (3)	965 (3)	993 (4)
CALABARZON	666 (4)	639 (5)	463 (5)
Central Visayas	2,431 (2)	2,411 (2)	2,698 (2)
Northern Mindanao	474 (5)	941 (4)	1,215 (3)
Tomato			
PHILIPPINES	138,063	138,150	141,314
Cagayan Valley	12,361 (3)	11,258 (4)	9,572 (4)
Central Luzon	19,465 (1)	18,876 (1)	19,183 (1)
CALABARZON	14,016 (2)	14,229 (2)	12,584 (3)
Bicol Region	3,292 (5)	3,135 (5)	3,184 (5)
Northern Mindanao	11,582 (4)	13,659 (3)	13,892 (2)

Source: BAS 2009

[a] Ranking based on the proportion contributed by the region to the overall volume of production in the country.

both cabbage and tomato, it has consistently improved its rank over the 3-year period. Regarding cabbage production, Northern Mindanao went from the fifth rank in 2007 to the third rank in 2009. The same trend persists for tomato production, where it went from the fourth rank in 2007 to the second highest producer in 2009. This can only mean that either the predominantly small vegetable farmers in Northern Mindanao, including Songco, have been expanding their cabbage and tomato production, or the number of those farmers engaged in this production has been increasing. Further insights on this phenomenon follow.

Among the most preferred crops for planting, umbok is the Songco farmers' top favorite because it is cheap, very easy to grow the whole year round, and harvestable within a short span of time. In contrast, tomato and cabbage are reportedly the most expensive crops to produce, for they require intensive inputs yet farmers continue growing them. Although tomato is costly to raise, the popular notion that it can bring in a "jackpot" (which occurs when the tomato yield and market price are both coincidentally high and exceed normal expectations) sustains the farmers' production desire. Stories that circulate about how tomato jackpots were able to redeem farmers' previous production failures fuel this desire. Cabbage is a desirable product because its harvest can be timed to occur when the household is in much need of cash income. The months when cabbage is in great demand due to social festivities are May, when fiesta celebrations abound and market earnings come in time for children's school tuition, matriculation and other educational expenses in June; and December, because of the Christmas season. Potato is likewise considered an expensive crop because the seeds alone cost about P1000/box (or about $20.83 at P48/dollar), but it is generally the men who prefer it for its longer shelf life.

On most preferred agroforestry crops for planting, findings show some gender differences in farmer preferences. The list drawn up by male farmers included abaca, coffee, falcata, eucalyptus, and gmelina because these are sources of additional income. On the other hand, female farmers preferred to grow subsistence crops that may be also sold for cash, particularly corn (a staple food that can be stored), banana, and such rootcrops as taro or gabi, cassava, camote (sweet potato) and lutya. Cassava and camote are vegetables listed under the country's major or banner crops, while gabi is under regional priority crops (Bureau of Agricultural Statistics cited in Macabasco 2008). In 2007, cassava was

the leading vegetable, as it accounted for 39% of the 4.8 million tons of vegetables produced in the country. This was bought mainly by manufacturers of beer products, flour and starch; camote followed with 12% of the total output, while gabi accounted for 2% (Ibid.). Interestingly, these three agroforestry crops alone made up over half (53%) of the total volume of vegetables produced in the country for that year. In addition to growing rootcrops for their cash value, the women said they also raise marketable high-value flowers–notably calla lilies–in their homes or backyard gardens.

Most marketable crops. Based on key informants' overall ranking (both genders combined), the top five most marketable vegetables consist of (in descending order) cabbage, umbok, potato, carrot, and tomato (Table 2). But as the table reveals, there are some distinct differences in the gender ranking of vegetables. Women gave Ranks 1 and 2 to umbok and cabbage, respectively, but the men's ranking turned out to be the opposite of this. While carrot ranked as the 3rd most marketable vegetable in the case of women, it was not among the men's top five ranked. The men also rated tomato much higher than women. Both genders only agreed on the ranking for potato.

Concerning the most marketable agroforestry crops, the farmers' responses showed that the top three rankings were for the following timber trees: eucalyptus, followed by gmelina and falcata (Table 2). Eucalyptus was considered a most versatile crop because its seeds, seedlings, and timber were all marketable. The last two rankings were for fruits trees, namely jackfruit and lanzones. Sale of the products from both timber and fruit trees was seasonal. Fruit trees are not a desired source of market income reportedly because the fruits are not exceptional in taste and appearance–thus, these are better consumed by the family.

How do farmers know which crops are most marketable? Regarding vegetables, key informants explained that farmers who directly sell their own produce learn about marketability from first hand observations on the law of supply and

Table 2. Gendered ranking of five most marketable VAF products by key informants

Type of Commodity	Ranking by Gender		Overall Ranking
	Female	Male	
Vegetables	(n=14)	(n=15)	(N=29)[b]
Cabbage	2	1	1
Umbok	1	2	2
Potato	3.5	3.5	3
Carrot	3.5	-[a]	4
Tomato	5	3.5	5
Agroforestry	(n=4)	(n=11)	(N=15)[c]
Eucalyptus	1.5	1	1
Gmelina	1.5	2	2
Falcata	3.5	4	3.5
Jackfruit	3.5	3	3.5
Lanzones	5	5	5

[a] For the men, broccoli and beans tied at Rank 4; carrot obtained a much lower ranking than 5.
[b] Total number of key informants.
[c] The rest of the key informants gave no response or considered the item not to be applicable to them.

demand operating in the market. Marketability was determined by how highly priced the commodity was in the latest market transaction, how fast the stocks of a commodity moved out of the bodegas, or how undersupplied the market was with a particular commodity. These observations determined a farmer's decision about which crop to plant next. Farmers' usual sources of information on market demand for vegetables in other parts of the country were the owners of bodegas as well as other middlemen-buyers. For farmers who depended on an intermediary to sell their produce, information was obtained by word of mouth from *suki* (regular partner) traders or biyahidors who regularly buy their goods, other transient buyers, financiers or input suppliers, operators of transport trucks, as well as from fellow farmers. Concerning timber and other tree products, information on marketability was derived from the buyers themselves or the middlemen who come inquiring about available supplies.

VAF Supply Chains and Market Intermediaries

All products, according to Woods (2004), reach their consumers through a supply chain. The concept of "supply chain" emerged in the 1980s and was popularized in the 1990s in relation to the phrase "supply chain management" (SCM), which was then a new integrative philosophy for managing the total flow of goods from suppliers to the ultimate users (Feller, Shunk and Callarman 2006, Ibid.). Since then, "supply chain" has been variedly defined in the literature, but over the last decade it has been associated mainly with the management of agribusiness, particularly concerning horticultural and other food products (Slee and Kirwan 2007, Kanji, MacGregor and Tacoli 2005, Wheatley, et al. 2004, Woods 2004). It is also increasingly used in describing the marketing of vegetables (Concepcion and Digal 2007, Murray-Prior et al. 2005, Concepcion et al. 2004).

"Supply chain" is simply defined by Feller, Shunk and Callarman (2006) as "a downstream flow of goods and supplies from the source to the customer," or "the flow of supply." They contend that supply chain, which flows in one direction, is being confused with "value chain" or "demand chain," which flows in the opposite direction. In the value or demand chain, the customer is the source of value, and value flows in the form of demand from customer to supplier–hence the opposite flow. The primary focus of both chains differs (Ibid.). In the case of supply chain, the emphasis is on the costs and efficiencies of supply, and the flow of materials or goods from their various sources to their final destinations. On the other hand, value chain emphasizes the benefits accruing to customers, the interdependent processes generating value, and the resulting demand and fund flows created. Thus the end results of both chains

also vary significantly: an efficient supply chain reduces costs, whereas an effective value chain generates profits. Both types of chains are, however, said to be complementary, and they overlay the same network of providers of goods or supplies. To be profitable, there must be an alignment between what the customer wants (value or demand chain) and what is produced via the supply chain (Ibid.).

Both supply chain analysis (SCA) and value chain analysis (VCA) are seen as variants (along with other concepts like integrated chain and trade chain) but useful methodologies for understanding how a market operates for a particular commodity (Kanji, MacGregor and Tacoli 2005). On the one hand, value chain analysis examines a set of value-adding activities through which a product passes from its initial production to final delivery to the consumer (Kaplinsky 2000). Moreover, it highlights the increasing worth of the commodity at every stage–as processing, packaging, transport or alteration transforms its value (Kanji, MacGregor and Tacoli 2005)–and focuses on transactions between firms operating within the chain (Gereffi 1994). On the other hand, supply chain analysis investigates the network of facilities and distribution channels that includes the procurement of materials, production and assembly, and delivery of the product or service to the customer. It is not intended to obtain or map out the distribution of values accruing to different actors in the chain (Kanji, MacGregor and Tacoli 2005).

The supply chains of VAF commodities from Songco producers to lowland urban consumers may be viewed as being composed of tiers and networks of market middlemen or intermediaries who facilitate distribution. Vegetables and agroforestry products are only locally distributed, according to informants. For vegetables, urban wet markets in the region are the main distribution channels;

they are located in the cities of Malaybalay and Valencia in Bukidnon, Cagayan de Oro in Misamis Oriental, and Metropolitan Davao. Sales are transacted in these wet markets by local buyers or representatives of institutional buyers before the commodities are delivered to their destinations in other parts of Mindanao (especially the cities of Zamboanga, Pagadian, Dipolog, Surigao, and Butuan) and shipped across the sea to urban centers in Visayas and Luzon. The number of tiers and type of channels through which vegetable and agroforestry (particularly timber) crops are taken en route to their consumers differ.

Vegetable supply chain. The major vegetable supply chain flows from the upstream Songco farms to the downstream consumers through Agora Market, a major wet market in Cagayan de Oro City that has a strategically located seaport. Because Agora Market is close to the port, it has become a popular distribution channel in Northern Mindanao. The vegetable supply chain going through this market is informal and marked by a complex set of multi-tiered channels (Figure 2). In the chain there are six known types of middlemen or handlers involved between the farmer-producers and urban consumers from bigger cities and metropolises. They are as follows:

1. Biyahidors– In Songco, the term *biyahidor* generally denotes a person who engages in the trade or business of buying-and-selling vegetables as an occupation. A majority of the biyahidors are women and their volume of trade is usually small, i.e., with capitalization of P1000 to P6000 ($20.83-$125) to buy a few sacks or boxes of produce for sale to the market at any one time. The cultural expectation of women as co-providers of family

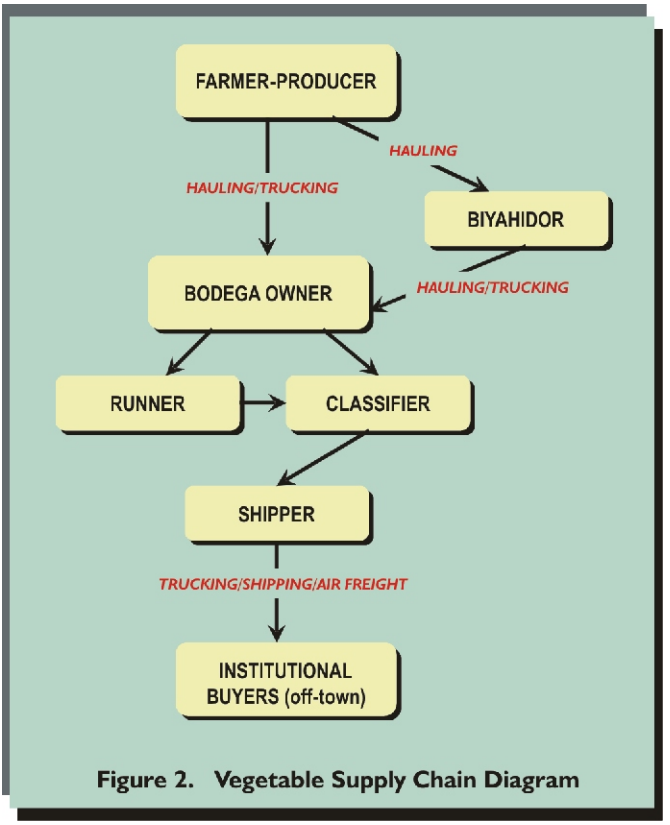


Figure 2. Vegetable Supply Chain Diagram

needs and popular perception that women are better economic managers have motivated many farmers' wives to venture into business as vegetable traders. Big biyahidors, though few, tend to be males who deliver goods by the truckload to the market, in some cases with the use of their own trucks. Biyahidors are responsible for making arrangements for hauling (P5/sack or receptacle) and trucking (P35/sack or receptacle) the commodities acquired. While many further utilize the marketing services offered by bodegas, a significant number of small scale women biyahidors are themselves engaged in micro-vending enterprises as stallholders-wholesalers in nearby city markets. A case study of an informal core group of six women biyahidors

reveals that they spend an average of as many as 20 years in this kind of vending (Chiong-Javier 2009). The ranks of professional biyahidors have recently swelled with the increasing participation of predominantly women farmers who take their own household produce to the wet markets. Encouraged by family, kinfolks, friends and neighbors, the wives have assumed the biyahidors' role instead of marketing through middlemen. Informal and personal ties marked by regularity of transactions usually bind the biyahidors to their suppliers and other market players in the downstream chain.

2. Bodega owners– Bodegas are city market stalls with a warehouse function; these serve as temporary storage facilities for vegetables awaiting sale. In Songco, there are four known bodega owners (three of whom are women) who operate bodegas located in Cagayan de Oro's Agora Market. They used to be farmers and biyahidors before they ventured into the warehousing business. Their clients/customers are farmers and biyahidors who mostly hail from the same community; over two-thirds of these clients are reportedly women. Bodega owners also provide their farmer clients with credit or financing loans for the purchase of seeds, fertilizers and other chemical inputs, or payment of hired farm labor. They serve as a conduit to vegetable buyers who come to their bodega for bulk purchases; thus, they also negotiate prices with buyers on the clients' behalf. While negotiation services are done for free, clients are charged a standard storage fee (P5/sack or receptacle) for use of the facility in addition to hauling and trucking fees, if applicable. On behalf of clients, bodega owners accept payments from buyers and remit net sales to farmers and traders after deducting the applicable fees and/or loan repayment. One of the women bodega owners is a successful entrepreneur

who now owns three trucks (she only had two trucks when the research began); her husband and male siblings are the truckers. She employs hired hands to facilitate hauling and trucking activities. She offers incentives to customers for patronizing her bodega, such as free passage to the city market on board the truck, free overnight lodging and meals, and access to recreational facilities (television and karaoke/juke box). Many bodega patrons are relatives, friends or acquaintances of the owners, and those who have built mutual trust over the years may send their goods (especially when the volume of harvest is small) over to the bodega and simply wait for the bodega owner to remit the sales in return. Nevertheless, certain unscrupulous practices have been attributed to bodega owners, including possession of faulty weighing scales, inaccurate computation, and downgrading of goods for quick disposal to buyers.

3. Runners– This is a term given to bulk buyers who represent chains of supermarkets, restaurants, hotels and other institutional buyers from the metropolises and urban centers in or outside the region. They negotiate with bodega owners to close the sale for bulk purchases. For this reason, farmers and bodega owners consider runners to be a crucial link in the supply chain. Runners for non-local institutional buyers only transact business in Agora Market during four days of the week– Monday, Wednesday, Thursday and Friday. But others who represent corporate buyers from Cagayan de Oro City and nearby areas like Misamis Oriental and Iligan make daily purchases.

4. Classifiers– They work in tandem with the runners. The main task of classifiers is to canvass or scout for the best quality vegetables at the lowest cost from the many bodegas in the market. They put together a list of prices for preferred vegetables and the bodega sources. They also handle the shipping and trucking needs of the runners.

5. Shippers– In most cases, they "ship" or "truck" out the goods from Agora Market to institutional and bulk buyers in metropolitan and small cities outside

Cagayan de Oro City. Often representing a shipping or trucking company, they provide access to refrigerated vans, especially for highly perishable vegetables. They may also handle air freights for vegetables.

6. Institutional buyers– These are the bulk buyers outside Cagayan de Oro City. They comprise supermarket chains, hotels, restaurants, fast food chains, and entertainment establishments in metropolises (Manila, Cebu and Davao) and other cities of the country.

Agroforestry supply chain. The agroforestry supply chain is simpler than the vegetable supply chain. As shown in Figure 3, on-farm sale of timber, seedlings, and seeds as well as other agroforestry farm products like corn and rootcrops is made directly by farmer-producers to individual consumers or buyers. In some cases, timber and fruits (especially bananas) are sold through middlemen who negotiate the sale for institutional buyers like an electric cooperative or a wholesale fruit dealer. The volume of harvest involving agroforestry crops is reportedly small as these crops are often grown for household subsistence, consumption or use. Moreover, there is little incentive for growing fruit or timber trees. Fruit trees are either unproductive or bear poor quality fruits in

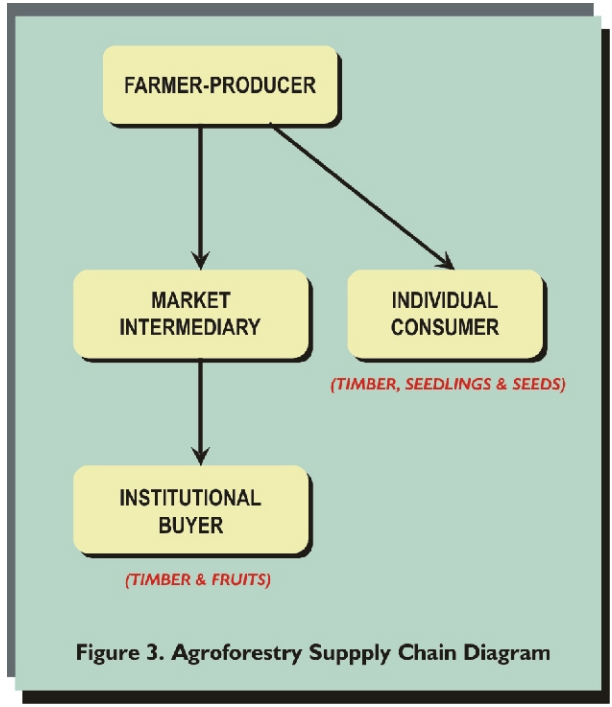


Figure 3. Agroforestry Suppply Chain Diagram

highland areas where the agroforestry farms are located. Timber production, on the other hand, does not yield immediate returns, and marketing is difficult given the existing practices concerning the issuance of legal permits and regulatory monitoring at check points enforced by government agencies.

Opportunities and Constraints for VAF Marketing

In general, the study's findings reveal that there are more of both opportunities and constraints in vegetable marketing compared to agroforestry or tree marketing. In spite of the informal structure of the vegetable supply chain, greater opportunities exist for marketing vegetables because production is directly linked to the market, ensuring that there are buyers of supplies. Demand for particular vegetables may vary, but it is always there. Moreover, vegetable marketing presents an income generation option for farm people with limited education and resources, and it does not discriminate between genders as women are most welcome to make a living from it.

In the literature, a major explanation for the existence of market demand for vegetables is the changing consumption patterns in developed and developing countries. Studies on the Philippines and other developing societies have shown that three factors are strongly correlated with higher vegetable consumption (see Johnson, Weinberger and Wu 2008, Digal and Montemayor 2007, Von Braun 2005). One is the size of the urban population: more vegetables are consumed by a rapidly expanding urban populace. The second is a current social preoccupation with healthy living: people eat vegetables because these are healthy foods that keep them free from sickness and can lengthen their lives. As a result, vegetable salads have become a popular fare even among young urbanites. The third is related to the increasing purchasing power and growing preference for convenience among dual-income households in the city. Because of increased incomes, more Filipino families in which both husbands and wives work are shopping from the supermarket (rather than at the wet market), more

are consuming ready-to-eat or processed foods, and more are flocking to fastfood outlets. There is therefore a growing demand for high quality, fresh vegetables in the urban institutional markets and food outlets.

In the midst of these opportunities, the small vegetable producers from Songco are evidently still unable to harness them because they are being weighed by many marketing constraints. While some constraints are brought about by the inherent perishability of vegetables, most others are due to the following challenges:

1. *Lack of access to organized market information*. Small farmers and traders depend on each other as well as on truckers and bodega owners to relay information about prevailing or changing market supply or demand and pricing for their vegetable commodities. The information itself passes through informal and personalized channels characterized by trustworthy kinship, friendship, and suki (regular partnership) alliances. Use of cellular phones, particularly the texting device, eases the communication of desired market information. However, information is not usually screened for accuracy, and perceptions are mixed with facts and figures. Thus the resulting disorganized nature of the information that reaches farmers and traders create a negative effect on farm production and marketing decisions.

2. *Inability to maintain product quality.* Farmers and traders understand that the quality of their goods influences pricing. Hence, they observe simple and practical quality assurance techniques during post-harvest handling, such as keeping the vegetables dry (like turning the cabbage upside down to let the water drip out), storing newly harvested vegetables in cool and shaded areas, and retaining as much of the outer layers to cushion the vegetable. Sorting and grading are also value-adding techniques. However, in the process of hauling and transporting or trucking goods to the market, the quality of vegetables is compromised and their perishability is heightened. The use of cheap but substandard packing materials– such as thin jute sacks instead of plastic sacks,

recycled cigarette cardboard boxes instead of wooden crates, or newspaper instead of soft tissue paper to wrap cauliflower or broccoli–contributes to the perception that the vegetables are of poor quality. The trucker's practice of allowing free human passage or letting passengers ride on top of a truckload of goods further compounds the problem, as it leads to deterioration of quality. Storage conditions in the bodegas, which are dark, dank, airless, and crowded, likewise hasten deterioration of perishables. Farmers who do not engage in trading themselves but sell to biyahidors are most disadvantaged by the latter's practice of shaving off around 25% from the per unit farm gate price of vegetables to cover up for anticipated business losses due to spoilage.

3. *Inability to control market prices.* Farmers and traders have no command and control over the prices of commodities they bring to the market. Prices are dictated by the availability or non-availability of supplies. Hence, what is feared most is the entry in Agora Market of truckloads of particular vegetables from other production areas in Northern Mindanao, as this can immediately cause a glut or oversupply and overstocking in bodegas, which brings down prices. Oversupply and low prices reportedly create a situation called "backload," which means the unsold goods are returned to the farms or left unclaimed in the bodegas and eventually discarded or thrown away. Farmers and traders are further excluded from any say over pricing because they are not party to the price negotiation between the bodega owners and prospective buyers. Bodega owners have a better sense of prevailing market prices since they employ scouts who monitor price stabilization and fluctuation.

4. *High cost of farm-to-market delivery.* For every sack or receptacle of vegetables, the farmers or biyahidors spend a total of P45 for hauling, trucking, and storage in the bodega. This amount is felt very acutely by farmer producers when the prices are low and they have to deduct not only the cost of production inputs but also hauling, trucking and storage expenses from the gross sales.

5. *Poor transportation and road facilities*. Even with the latest addition of two new trucks by a bodega owner, old and dilapidated vehicles continue to be used to ferry vegetable commodities to the city market. On the way, these vehicles suffer breakdowns, mostly broken axles and blown tires, which delay transport and delivery. The poor state of the roads from farms to market especially during the rainy season makes marketing a hazardous activity for farmers and biyahidors. Bad roads have reportedly not only caused damage to vegetable goods, but also resulted in higher hauling and trucking fees. Farmers have repeatedly clamored for their local government to improve or asphalt the main roads in the municipality that are used by the delivery trucks, but their clamor has yet to be heard or attended to by local executives. It has been jokingly stated that a Songco resident must first be elected as a Mayor of the municipality in order for the main barangay roads to be improved and paved.

In comparison, opportunities are fewer in marketing agroforestry (particularly rootcrops) or tree crops, mainly owing to an undeveloped market. This has created a chicken-and-egg situation where the lack of market opportunities discourages production; moreover, since supplies are not available in commercial quantities, the market continues to remain small. In fact, very few farmers in Songco make a livelihood out of producing and marketing tree crops. One of them has set up an agroforestry farm to demonstrate and advocate the economic and environmental benefits from an integrated agroforestry-vegetable system. He has become known for his personal agroforestry advocacy and efforts to disseminate agroforestry technologies. Although he has successfully diversified production, he is sought after for the timber and fruit tree seedlings his farm produces. Other challenges faced by timber marketing include: (a) difficulty in obtaining a cutting permit from the concerned government agency, (b) poor quality of lumber due to tree damages made by forest fires and other reasons, and (c) confiscations of illegally sawn lumber or logs.

Implications and Recommendations

The study's findings reveal that there are more of both opportunities as well as constraints involved in marketing vegetables than in marketing agroforestry or tree crops. This is mainly due to the fact that there is a greater and more established demand for vegetables than there is for tree-based products. The market for vegetables is also more expansive, as the supplies reach urban consumers not only in other areas of Mindanao but also as far as in Visayas and Luzon, whereas that for tree-based products is quite localized.

There are other reasons that favor vegetable marketing. First it is an "open access" livelihood source that earns immediate cash income for smallholders. Farmers' sight is therefore set on bringing their goods to urban markets in the nearest city where sale is ensured and where warehouses (bodegas), trucking and shipping facilities are available for wider distribution. Urban markets like Agora in Cagayan de Oro City offer small producers and women an unparalleled opportunity for selling vegetables without the additional layer of biyahidors. Secondly, marketing vegetables offers a comparative advantage to women in the community in which this task is culturally sanctioned–that is, women are popularly regarded and especially esteemed for their business acumen and trading skills, as well as for being wise and prudent in spending income from market sales. Thirdly, vegetable goods move through informal albeit established channels that are dominated by influential market intermediaries like bodega owners who facilitate direct contact with bulk buyers. These bodega owners also provide a number of other necessary services including access to hauling, trucking and storage for a fee, and freebies (such as passage aboard the truck, eating and availing of sleeping

quarters while awaiting sale, cooked viands, and use of recreational facilities), in order to "sweeten" the business partnership.

The challenges faced by small producers in Songco pertain mainly to the following. Because farmers view and practice vegetable marketing as an individual household endeavor, they lack the acumen required for market participation. As a result, they have become easy prey for unscrupulous middlemen; they are often entrapped in a partnership with bodega owners who stand to gain more from market transactions. They have grown dependent on agents or traders for marketing services like information on pricing, customer preferences, or corporate buyer requirements. Farmers are also marginalized as a result of the inaccuracy or unreliability of the market information they receive, their inability to maintain product quality or add value to the marketing chain, and their overall powerlessness over fluctuating market demands and prices, increasing farm-to-market transactional costs, and poor transport and infrastructure facilities. The marketing of agroforestry or tree-based products is another major challenge since it is an undeveloped industry. Small farmers are not motivated to produce for the market because of unfavorable soil conditions that affect production and government policy disincentives for timber marketing.

What then are the implications of the study's findings for VAF technology development or intervention? The major implications are as follows.

1. Unless some change is introduced in the existing informal supply or trade chain, the improvement of vegetable production technologies in the project area may compound the farmer-experienced problem of market oversupply. Therefore, new market chains must be sought and organized in order to absorb the increased productivity of technology adoptors, utilizing the concept of cluster marketing for the purpose of establishing a direct link with institutional markets. The literature is very informative on two models of cluster marketing provided by: (1) the Northern Mindanao Vegetable Producers Association or Norminveggies (see Digal and Montemayor 2007)

and (2) the Maragusan Valley vegetable cluster that was assisted by the Catholic Relief Services (ANRMP 2006). Both are also hailed as supply chain management models that assured their markets of reliable quality, supply regularity and reasonable pricing. These models should first be studied, however, for the lessons they are able to impart. Several better-off farmers in Songco were reported to have once joined Norminveggies but encountered some difficulties in sustaining their participation. One of two mentioned difficulties was the inability of Norminveggies to pay its cluster farmers on time and in cash because goods were bought on consignment and paid for in checks by the institutional buyers. This implies that in order for cluster marketing to succeed among small farmers, there must be a micro-financing mechanism in place to provide credit for value-addition practices such as the use of superior seeds and better packaging materials, and for farmers to draw advance payment while awaiting for check releases or clearances from the buyers. Cluster marketing interventions should also target women farmers who are mostly and increasingly involved in vegetable marketing.

2. Findings indicate that small farmers are lacking in quality assurance/control standards that can give their products a competitive boost in the market and enable them to satisfy their downstream customers. In fact, another challenge encountered by the few Songco farmers who attempted to join Norminveggies was their failure to conform to specified quality assurance practices, which led to goods being returned. Farmers' not practicing quality assurance, as determined in another study on Kapatagan farmers in Southern Mindanao (Concepcion et al. 2004), is brought about by their misconceptions about quality and customers' preferences. This Kapatagan study found that both farmers and their downstream customers place foremost importance on freshness as a quality attribute of vegetables. But farmers generally equate quality with physical attributes like weight, size, shape, cleanliness, right maturity, and freedom from pest damage, all of which have an effect on their earnings. On the other hand, the customers who resell the goods to other downstream buyers are more concerned about mechanical injuries to vegetables, availability and consistency of supply, timely delivery, and

competitive prices as quality considerations. The findings from both studies indicate the need for interventions to raise farmers' awareness about product quality needs and perceptions of the market. Farmers must be reoriented in order for their concepts of value to fit the specifications preferred by their institutional buyers. They could learn many lessons from the experiences of cluster marketing groups like the Norminveggies.

3. Marketing interventions for vegetables and agroforestry crops must be made integral to VAF technology development programs in order to sustain the benefits of higher productivity in the lives of small farmers, particularly women. Women should be especially targeted for vegetable marketing interventions; they should take an active part in assessing their marketing needs, designing the components of their training and education, and exploring ways to address marketing issues and convert market knowledge into actions. Marketing interventions may also be directed at setting up a network of farmers' groups or associations for sharing market information and tracking market supply and demand as well as pricing. Farmers' networks can be utilized to engage smallholders in assessing the problems and prospects in the VAF supply chain (through participatory market assessment) to elicit new market opportunities and develop ways to improve current supply chains. Smallholders will benefit from adding value to the chain through organic farming that utilizes vermicast from women's vermicomposting activities in Songco.

4. Vegetable-agroforestry complementarity should be pushed as a means to deal with the fast conversion of agroforestry farms into monocropped vegetable gardens. The results of the VAF complementation studies by ICRAF must be popularized and disseminated to farmers. The vegetables to be experimented in complementation plots should include cabbage, tomatoes, and cassava which enjoy a great market demand in the country. To boost farmers' adoption of complementation technologies, this should be addressed by government programs, and incorporated in an incentive package along with micro-financing and rehabilitation of farm-to-market roads.

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Dualistic Vegetable Supply Chain: Opportunities and Constraints for Bukidnon Highland Growers

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March 17, 2010

ABSTRACT

The concept of dualism has been used to describe the juxtaposition of traditional (informal) and modern (formal) markets characterizing the transforming economies of southern countries like the Philippines. It is recently applied to describe the country's vegetable supply chain where goods from the source flow down to end consumers through two coexisting sectors: the largely unorganized wet markets; and the highly institutionalized corporate markets such as processing companies, supermarkets, fast food establishments, hotels, and restaurants. Based on a review of the literature and field data from a market study conducted in a highland village in Bukidnon Province, this paper outlines the opportunities as well as the constraints faced by vegetable growers participating in a dualistic vegetable supply chain. Findings reveal that the opportunities for improving small growers' farm income are driven by an upward trend in vegetable consumption due to growing urban populations, preoccupation with a healthy and convenient lifestyle, and demand for safe and quality foods as a result of increasing incomes. The constraints are manifold and stem from poor post-harvest facilities, inadequate infrastructure support, high transportation costs, lack of organized marketing groups among producers, and low access to market information. Small growers' involvement in the wet market system renders them dependent on market intermediaries that link wet market supplies to lucrative institutional market consumers and makes them oblivious to certain values and standard of goods demanded by these consumers. Policies and programs addressing these challenges from a dualistic vegetable supply chain are needed to connect small growers to lucrative markets.

Keywords: *Dualism, Vegetable Supply Chain, Market Opportunities and Constraints, Small Growers*

INTRODUCTION

Most of the world's farmers who possess small landholdings are located in Asia, according to the 2000 World Census of Agriculture. This census surveyed 144 countries and included the Philippines among the 12 Asian countries covered. The fact that most smallholders are found in Asia led the United Nations' Food and Agriculture Organization (2009) to declare that "Asia has [the] world's smallest farm size." Estimated at about a hectare, the average Asian farm holding is hardly a fifth of the world average of 5.5 hectares; it is not only small but also fragmented into 3.2 parcels on the average (WCA 2000). In the Philippines' case, the average farm size as of 2002 is 2.04 hectares (NSO Census of Agriculture), which is just over a third of the world standard. The small and marginal farmers comprise the majority of agricultural producers in Asia and the Pacific. While they play a vital role in securing food for their families and communities, they also ironically constitute the bulk of people in the region who are themselves without food security (FAO 2009:4).

The global agricultural trade liberalization policies of the 1990s have affected small food producers in various ways. At the macro-level, trade liberalization has substantially reduced not only a range of institutional barriers to trade between countries, but also trading blocks beneficial for transitioning or developing economies (Murray-Prior et al. 2005). Its effects are said to be largely adverse for small vegetable farmers here in the Philippines. As revealed in case studies prepared by a group of nongovernment organizations and funding agencies (LWR et al. 2004), these effects include the following: (a) escalation of prices for farm production inputs such as seeds, fertilizers, pesticides and other chemicals that are brought into the country through importation; (b) farmers' inability to expand vegetable production and engage in crop diversification because of high production cost and lack of access to farm credit; (c) inability of locally produced goods to compete with cheaper imported vegetable commodities that flood the market; (d) declining and unstable purchasing prices of farmers' traditional crops, owing to influx of cheaper imports; and (e) farmers' lack of knowledge and skills

to negotiate with and access modern markets, causing them to rely on more capable but exploitative middlemen and traders.

Because trade liberalization has opened domestic food markets to international competition, it has drawn small-scale farmers to participate in complex agricultural supply chains, so much so that they are now said to form the "bedrock for global agrifood supply" (Vorley, Lundy and MacGregor 2008). While this has provided new and expanded markets for agricultural goods, the many smallholders who lack the wherewithal to access them are left out as they persist in dealing only with traditional, local chains. Moreover, global food supply chains that are powered by technological improvements and influenced by concepts of economic efficiency are taking over from and modifying these local food supply chains (Murray-Prior et al. 2005). Innovations in information, logistics and food technologies have resulted in improved speed and quality of information flow, rapid and efficient distribution of perishable products, and extension of product shelf life (Ibid.). In the last two decades, therefore, domestic markets have become characterized by a rapid but uneven modernization that is driven by investments from large national and transnational food manufacturing, processing, and retailing organizations; an increasing urbanization trend; and changes in consumer preferences and purchasing power (Vorley, Lundy and MacGregor 2008, Reardon and Huang 2008). Evidently, our small farmers must catch up with domestic market changes in order to benefit from these.

Modernizing food supply chains in the Philippines and other developing countries inevitably combine both traditional and modern features, resulting in what is termed a dualistic supply chain. Small food producers such as the multitude of vegetable growers in Bukidnon Province of Northern Mindanao participate in such a chain. Thus, this paper seeks to (1) describe the dualistic vegetable supply chain that has engaged these small farmers; (2) identify the opportunities and constraints encountered by farmer-participants in a dualistic supply chain; and (3) draw out implications from findings for agricultural policies and programs

beneficial for small farmers. Data for this paper were obtained from a review of the literature and field studies conducted for the Social Development Research Center (SDRC)'s collaborative project with the North Carolina Agricultural and Technical State University (NCA&T). The project was supported by the United States Agency for International Development (USAID) through the Sustainable Agricultural and Natural Resource Management Collaborative Research Support Program (SANREM-CRSP) managed by Virginia Polytechnic Institute and State University (Virginia Tech).

Dualistic Vegetable Supply Chain

The concept of dualism is an exploration of the "opposites" that are usually expressed as ideal but polar type categories (see Slee and Kirwan 2007). The opposites are said to complement each other (Borgstrom n.d.) or are bound by a dependency relationship (Hodson and Kaufman 1982). Dualism was first applied in economics during the 1930s by Julius Herman Boeke, a Dutch scholar who challenged the classical economic thought by suggesting another theoretical approach to explain the challenges encountered by non-western economies (see Wertheim et al. 1966). The concept of dualism at that time was used to understand the cleavage in "colonial" societies. Based on his deep understanding of post-colonial Indonesia, Boeke called this cleavage "dualistic" (cited in Ibid.). He found the Indonesian society and economy to possess a dual nature manifested in the presence of a broad indigenous base (i.e., natives) that was supported by a narrow but dominant non-indigenous superstructure (i.e., Europeans). The natives provided the labor that was needed in plantations owned and managed by the Europeans, who profited much more from plantation exports. Boeke thus posited that the dualistic theory is more appropriate for studying the economic problems of former Asian colonies such as Indonesia, as it distinguishes between the "economic needs" that fuel western economics, and the "social needs" that guide tropical or colonial economics. His radical ideas launched many critical debates and arguments for and against the

dualistic theory engaged in by Dutch economists and other scholars in and outside of Indonesia (Ibid.).

Then, in the 1960s, the dual perspective became a popular alternative framework for understanding the transforming economies of what was collectively referred to as the underdeveloped, Third World countries, which included the Philippines. The agriculturally-based economies of these countries had been undergoing rapid changes with the influx of westernized or modern market systems and technologies from industrialized nations, and the social policy issues that emerged in the wake of these changes provided much of the motivation for the dual theoretical perspective (Cain 1976). But the major driving force for taking this view, according to Hodson and Kaufman (1982), stemmed from a desire to understand the persistence of poverty and racial and gender inequalities amidst the rapid expansion of educational and training opportunities.

Whatever their motivation was, subsequent scholars focused attention on different facets of dualism, particularly as applied to Third World economies and their implications for development. In Southeast Asia, for example, Yeung's report on the role of hawkers and vendors in the marketing system in Southeast Asia (1975) revealed that a significant feature of many developing societies was the presence of two co-existing but disparate economic subsystems that were juxtaposed with minimal linkage effects between them. Economic dualism was the underlying framework for several hawker studies in major Asian cities such as Malacca, Kuala Lumpur and Petaling Jaya in Malaysia (Lam Thim Fook 1974), Jakarta in Indonesia (McGee 1974), and Manila and Baguio in the Philippines (Guerrero 1975). In the case of Geertz (1963), the dualistic framework was utilized in differentiating the internal city distribution system in Indonesia into the firm (formal) sector and the bazaar (informal) sector. Similarly, Dewey (1962) noted that economic modernization in Indonesia placed the traditional subsistence economy side-by-side with the modern cash-driven economy. To date, economic or market studies have explained the dual feature using such dichotomies as modern and traditional, capitalistic and pre-capitalistic, formal

and informal, market exchange and subsistence, industrial and pre-industrial, commercialized and non-commercialized, and center and periphery (Yeung 1975, Phillips 1965, Hodson and Kaufman 1982, Karaan and Kirsten 2008). Regardless of type of dichotomies used, however, only one segment of the dualism (that which bears western or modern traits) appears to be more advantageous, and always works better or profits more than the other segment (which has opposite traits).

Recently, dualism has been applied in describing the food supply chains in transforming or developing Asian countries. Supply chain is the way by which all products reach their consumers (Woods 2004). It is defined by Feller, Shunk, and Callarman (2006) as "a downstream flow of goods and supplies from the source to the customer" or simply "the flow of supply." The concept of supply chain emerged in the 1980s and was popularized in the 1990s in relation to the phrase "supply chain management" (SCM), which was then a new integrative philosophy for managing the total flow of goods from suppliers to the ultimate users (Ibid., Woods 2004). Since then, supply chain has been variedly defined in the literature, but over the last decade it has been associated mainly with the management of agribusiness, particularly that concerning horticultural and other food products (Slee and Kirwan 2007, Kanji, MacGregor and Tacoli 2005, Wheatley, et al. 2004, Woods 2004). It is also increasingly used in describing the marketing of vegetables (Concepcion and Digal 2007, Murray-Prior et al. 2005, Concepcion et al. 2004).

Asian food markets, according to Heilbron and Larkin (1995), are dualistic in the following sense: On the one hand, there are traditional wet markets that distribute goods to the bulk of the population through a variety of small retailers. This chain is characterized by multiple levels, fragmentation, highly variable standards and poor infrastructure and logistical support. Parallel to it are large western style retailers such as supermarkets that provide global standard goods and services to a better-off segment of the population–the elite and middle classes (Ibid.). Similarly, dualism also characterizes the food markets or

agribusiness system in Kapatagan, Mindanao, where price-driven wet markets operate side-by-side with value-driven supermarkets (Murray-Prior et al. 2005). In the price-driven system, products are little differentiated and do not conform to agreed standards of quality or safety, but their prices are highly competitive. However in the value-driven system, quality and safety standards are employed, as these are part of the food attributes sought by consumers with a strong purchasing power.

The vegetable supply chain utilized by small farmers from Songco, a highland village in Bukidnon, may likewise be described as dualistic (see Chiong-Javier 2010). The principal cash crops of a majority of farmers are a range of high-value vegetables adapted to the semi-temperate climate. Vegetable crops are mainly grown in monoculture farms referred to as "gardens" that are located on the lower slopes of the community and are closer to the roads– their target market is urban consumers. The most preferred crops are tomato, cabbage, Wong bok (*umbok* or Chinese cabbage), beans, bell pepper (*atsal)*, carrot, chayote (*sayote)*, sweet peas, potato, and eggplant. Vegetable commodities from Songco producers to lowland urban consumers pass through several tiers and networks of market middlemen or intermediaries, who facilitate distribution (Figure 1). Urban wet markets in the region are the main distribution channels; these are located in the cities of Malaybalay and Valencia in Bukidnon, Cagayan de Oro in Misamis Oriental, and Metropolitan Davao. Sales are usually transacted in the vegetable warehouses (*bodegas*) of the wet markets by local buyers or representatives of

institutional buyers before the commodities are transported to their destinations in other parts of Mindanao (especially the cities of Zamboanga, Pagadian, Dipolog, Surigao, and Butuan) and shipped across the sea to urban centers in Visayas and Luzon.

As shown in Figure 1, there are two major supply chains through which vegetable commodities can flow from the upstream Songco farms to downstream household consumers. In the first chain, vegetable supplies move initially through the biyahidors and traders, most of whom are women who engage in small buy-and-sell businesses and handle all marketing arrangements. The big traders are generally men who own delivery trucks. Biyahidors take their goods to the traditional wet markets mostly to resell to stallholders and other retailers, such as itinerant vendors from whom household consumers make purchases. The first supply chain is informal and unorganized; the network of sellers and buyers in the chain are often bound by personalistic ties marked by regularity of transactions.

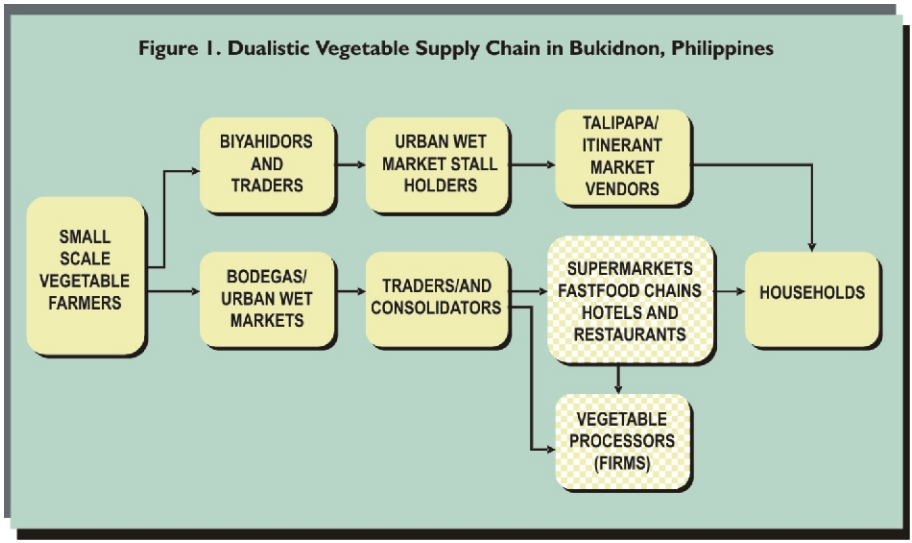


Figure 1. Dualistic Vegetable Supply Chain in Bukidnon, Philippines

The second supply chain is more complex than the first, as goods pass through both traditional wet markets and modern institutional markets before they reach the ultimate household consumers. At the outset, Songco farmers–most of whom are wives–personally transport their vegetable products to bodegas in urban wet markets, the most favored of which is Agora Market in Cagayan de Oro City because it is located close to the seaport. Bodegas are market stalls that function as warehouse facilities; vegetables awaiting sale are temporarily stored here. Farmers accompany their goods on the truck until they reach the wet market, but have nothing more to do with the goods once these enter the bodegas. In return for charging storage fees for the goods, bodega owners render a free service of negotiating prices and transacting sales with bulk buyers on farmers' behalf. Hence it is imperative for farmers to know and trust the bodega owners who handle marketing for them. They generally patronize the four bodegas in Agora that are owned by individuals from their own village. Three of the four bodega owners who hail from Songco are women, just like most of their farmer clients. Farmers are usually bound to bodega owners by kinship, friendship and/or neighborly ties. Their patronage is encouraged by bodega owners through provision of the following: easy access to trucking and hauling services for a fixed cost; credit or loans to finance crop production or labor cost deductible from market sales; and free services, including passage to the city market for self and kin on board the bodega's truck, overnight lodging and meals at the bodega, and use of recreational facilities (television and karaoke/juke box). Notwithstanding their patronage, farmers are still vulnerable to certain unscrupulous bodega practices such as the use of faulty weighing scales, inaccuracy in sales computation, and downgrading of goods for quick disposal to buyers.

At the bodegas, vegetable commodities exchange hands as these are bought by wholesale traders or consolidators, known in Agora Market as "runners." Usually representing big institutional or corporate buyers found in or outside the region, the runners make bulk purchases from one or more bodegas, so both farmers and bodega owners view them as a crucial link in the supply chain. Another form of middleman called "classifiers" work in tandem with runners, mainly to canvass or scout for the best quality vegetables at the lowest cost from the many bodegas in the market. Their job entails assembling a list of prices for preferred vegetables and the bodega sources for the runners' use. They also handle the shipping and trucking needs of runners. The final type of wet market intermediary consists of "shippers," who transport the goods from Agora Market to their out-of-town destinations. Often representing a shipping or trucking company, they provide access to refrigerated vans, especially for highly perishable vegetables. They may also handle air freight for perishables.

At the downstream end of the supply chain are the institutional buyers of vegetables from Songco, composed of chains of supermarkets, hotels, restaurants, fast foods, and entertainment establishments, as well as food processing companies. These institutional or corporate buyers are found mostly in the metropolises (i.e., Manila, Cebu, and Davao) and other cities close to Cagayan de Oro City. An important component of their business practices is adding value to the vegetables procured from Songco by upholding food quality (viz., freshness, appearance or taste), food safety (viz., cleanliness or sanitation), and other standards like ease of food preparation. These attributes of value are attractive to the urban households who are their end consumers.

As described, the second vegetable supply chain exhibits dualism because it combines both traditional and modern market sectors in the chain. Vegetable commodities are distributed to the consuming population first through informal mechanisms characterizing the traditional wet markets located at the upstream, and subsequently through the formal procedures of modern institutional markets found at the downstream. Traditional markets are trader-dependent as the goods are handled by many market intermediaries; commodities retain much of their original state or are hardly differentiated because little value is infused in the course of their exchange; selling prices are low yet are very competitive because supply often exceeds demand. By comparison, institutional markets operate based on highly organized, formal or corporate business systems that are more sensitive to market demands and changing consumer preferences. Product attributes desired by their customers are incorporated into the chain. Hence they tend to be value-driven and to deliver differentiated products in order to satisfy various segments of the buying public, especially high-end consumers. The two sectors in the chain are distinct from one another, yet they are complementary and interdependent.

Opportunities and Constraints for Small Vegetable Farmers

In the literature, external drivers are responsible for the opportunities that can accrue to our small vegetable farmers in the country. A major explanation for the existence of a global market demand for vegetables is the changing consumption patterns in both developed and developing nations. Studies on the Philippines

and other developing societies have shown that three factors are strongly correlated with higher vegetable consumption (see Johnson, Weinberger and Wu 2008, Digal and Montemayor 2007, Von Braun 2005). One is the size of the urban population: more vegetables are consumed by a rapidly expanding urban populace. The second is a current social preoccupation for healthy living: people eat vegetables for these are considered healthy foods that keep one free from sickness and help to lengthen one's life. As a result, vegetable salads have become a popular fare even among the young urbanites. The third is related to the increasing purchasing power and growing preference for convenience among dual-income households in the city. Because of increased incomes, more Filipino families where both husbands and wives work are shopping from the supermarket (rather than at the wet market), more are consuming ready-to-eat or processed foods, and more are flocking to fastfood outlets. There is therefore a growing demand for high quality, fresh vegetables in the urban institutional markets and food outlets.

Findings from the SDRC study (Chiong-Javier 2010) comparing the markets for vegetables and agroforestry products in Songco have revealed that greater opportunities exist for vegetable marketing because production is directly linked to the market, ensuring that there are buyers of supplies. In other words, farmers engage in vegetable production with the end in view of marketing their products. Although the demand for a particular vegetable may fluctuate, it is nevertheless always there. Moreover, the traditional wet market appears expandable and does not seem to discriminate on the gender and other qualifications of market players. It accommodates as many of these players who are willing to earn a market-related livelihood, so farm women and those with limited education and resources are all welcome to do so.

In the midst of these opportunities, the small vegetable producers from Songco are evidently still unable to harness them because they are being weighed by many marketing constraints. While some constraints are brought about by the inherent perishability of vegetables, most others are due to the following challenges:

1. *Lack of access to organized market information*. Small farmers and traders depend on each other as well as on truckers and bodega owners to relay information about prevailing or changing market supply or demand and pricing for their vegetable commodities. The information itself passes through informal and personalized channels characterized by trustworthy kinship, friendship, and suki (regular partnership) alliances. Use of cellular phones, particularly the texting device, eases the communication of desired market information. However, information is not usually screened for accuracy, and perceptions get mixed up with the facts and figures. Thus the resulting disorganized nature of the information that reaches farmers and traders unfavorably affects farm production and marketing decisions.

2. *Inability to maintain product quality.* Farmers and traders understand that the quality of their goods influences pricing. Hence, they observe simple and practical quality assurance techniques during post-harvest handling, such as keeping the vegetables dry (like turning the cabbage upside down to let the water drip out), storing newly harvested vegetables in cool and shaded areas, and retaining as much of the outer layers to cushion the vegetable. Sorting and grading are also value-adding techniques. However, in the process of hauling and transporting or trucking goods to the market, the quality of vegetables is compromised and their perishability is heightened. The use of cheap but substandard packing materials–like thin jute sacks instead of plastic sacks, recycled cigarette cardboard boxes instead of wooden crates, or newspaper instead of soft tissue paper to wrap cauliflower or broccoli–contributes to perception of poor quality. But the trucker's practice of allowing free human passage or letting passengers ride on top of a truckload of goods compounds the problem as it

leads to deterioration of quality. Storage conditions in the bodegas that are dark, dank, airless, and crowded likewise hasten deterioration of perishables. Farmers who do not engage in trading themselves but sell to biyahidors are most disadvantaged by the latter's practice of shaving off around 25% from the per unit farm gate price of vegetables to cover up for anticipated business losses due to spoilage.

3. *Inability to control market prices.* Farmers and traders have no command and control over the prices of commodities they bring to the market. Prices are dictated by the availability or non-availability of supplies. Hence what is feared most is the entry in Agora Market of truckloads of particular vegetables from other production areas in Northern Mindanao as this can immediately cause a glut or oversupply and overstocking in bodegas that bring down prices. Oversupply and low prices reportedly create a situation called "backload" which means the unsold goods are returned to the farms or left unclaimed in the bodegas and eventually discarded or thrown away. Farmers and traders are further removed from any say regarding pricing because they are not party to the price negotiation between the bodega owners and prospective buyers. Bodega owners have a better sense of prevailing market prices for they employ scouts who monitor price stabilization and fluctuation.

4. *High cost of farm-to-market delivery.* For every sack or receptacle of vegetables, the farmers or biyahidors spend a total of P45 for hauling, trucking, and storage in the bodega. This amount is felt very acutely by farmer producers when the prices are low and they have to deduct from the gross sales not only the cost of production inputs but also these hauling, trucking and storage expenses.

5. *Poor transportation and road facilities.* Even with the latest addition of two new trucks by a bodega owner, old and dilapidated vehicles continue to be used to ferry vegetable commodities to the city market. On the way, these

vehicles would suffer breakdowns, mostly broken axles and blown tires that delay transport and delivery. The poor state of the roads from farms to market especially during the rainy season makes marketing a hazardous activity for farmers and biyahidors. Bad roads have reportedly caused not only damage to vegetable goods, but also higher hauling and trucking fees. Farmers have repeatedly clamored for their local government to improve or asphalt the main roads in the municipality that are used by the delivery trucks but their clamor has yet to be heard or attended to by local executives.

Conclusion and Recommendations

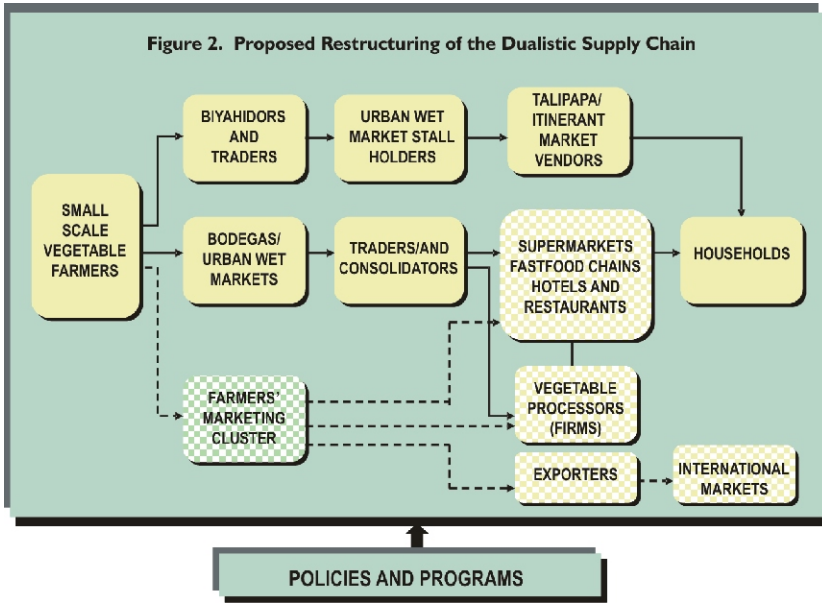
In this paper we have seen that participation in the dualistic vegetable supply chain may be the means by which small producers can be linked to the urban consumers of their products despite their distance from the latter. We have also seen that while their participation in the dual chain opens certain economic opportunities, it is also beset with so many challenges that have to be successfully hurdled in order to maximize benefits from the chain. The findings I have discussed in this paper suggest that the following issues be considered for policy and program interventions to address the needs of our small vegetable producers in Bukidnon and possibly also elsewhere in the country.

1. The chasm existing between small suppliers and the bulk buyers of their products must be bridged. What now stands in between them are tiers of market intermediaries. The literature suggests that one way to reduce the number of middlemen in the chain is for farmers to get organized and for their organizations to create a direct link to the institutional markets that buy and process their goods. The concept of cluster marketing has been recently developed for this purpose. The literature is very informative on two models of cluster marketing provided by: (1) the Northern Mindanao Vegetable Producers Association or Norminveggies (see Digal and Montemayor 2007) and (2) the Maragusan Valley vegetable cluster that was assisted by the

Catholic Relief Services (ANRMP 2006). Both are also hailed as supply chain management models that assured their markets of reliable quality, supply regularity and reasonable pricing. These models should first be studied however for the lessons they are able to impart. It is known in Songco that several better-off farmers had once joined Norminveggies but they had some difficulties in sustaining their participation. One of two mentioned difficulties was the inability of Norminveggies to pay its cluster farmers on time and in cash because goods were bought on consignment and paid in checks by the institutional buyers. These are some challenges of participating in modern business systems. They imply that for cluster marketing to succeed among small farmers, there must be a micro-financing mechanism in place to provide credit for value-addition practices like use of superior seeds and better packaging materials, and for farmers to draw advance payment while waiting for check releases or clearances from the buyers. Cluster marketing interventions should also target women farmers who are mostly and increasingly involved in vegetable marketing.

The adoption of a cluster marketing approach may lead to a restructuring of the current dualistic supply chain in Songco and will result in the creation of a third chain (Figure 2). As Figure 2 indicates, farmers' clusters can take over the jobs of middlemen and can even expand their reach among the various possible institutional markets including exporters that cater to foreign buyers and consumers. Restructuring should be supported by appropriate policies and programs.

2. Small farmers must learn to be value-driven to integrate successfully in the modern sector of the supply chain. Findings indicate that vegetable suppliers are lacking in quality assurance/control standards that can give their products a competitive boost in the market and enable them to satisfy their downstream customers. In fact, another challenge encountered by the few Songco farmers who attempted to join Norminveggies was their failure to conform to specified quality assurance practices that led to returned goods.



Farmers' lack of quality assurance, as determined in another study on Kapatagan farmers in Southern Mindanao (Concepcion et al. 2004), are brought about by their misconceptions about quality and customers' preferences. This Kapatagan study found that farmers and their downstream customers both give foremost importance to freshness as a quality attribute of vegetables. But farmers generally equate quality with physical attributes like weight, size, shape, cleanliness, right maturity, and freedom from pest damage that have an effect on their earnings. On the other hand, the customers who resell the goods to other downstream buyers are more concerned about mechanical injuries to vegetables, availability and consistency of supply, timely delivery, and competitive prices as quality considerations. The findings from both studies indicate the need for interventions to raise farmers' awareness about product quality needs and perceptions of the market. Farmers' concepts of value must be reoriented to fit the specifications preferred by their institutional buyers. They could learn many lessons from the experiences of cluster marketing groups like the Norminveggies.

3. Marketing interventions for vegetables and other horticultural crops must be made integral to agricultural technology development policies and programs. Marketing interventions may be directed at setting up a network of farmers' groups or associations for sharing market information and tracking market supply and demand as well as pricing. Farmers' networks can be utilized to engage smallholders in assessing the problems and prospects in the dualistic supply chain (through participatory market assessment) to elicit new market opportunities and develop ways to improve current supply chains that engage their participation. The benefits of improved marketing policies and programs should be gender fair and must especially target women farmers who generally assume marketing tasks for agricultural households in the country. These women should take an active part in assessing their marketing needs, designing the components of their training and education, and exploring ways to address marketing issues and convert market knowledge into actions.

4. Finally, and this is an oft-repeated issue that continues to be ignored, agricultural incentive packages must be accompanied by improved infrastructure (road networks and bridges) to connect the farms to the markets. In Bukidnon as well as in other rural areas of the country, farm-to-market roads are literally riddled with stones or potholes that make transporting goods not only difficult but also hazardous especially in the rainy season. Bad roads have also been cited as a cause for hastening the perishability of vegetables and for high transportation costs. There is little doubt what good infrastructure can do to advance the marketing efforts and psychosocial wellbeing of our small agricultural producers.

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Gendered Networks, Social Capital, and Farm Women's Market Participation in Southern Philippines

Ma. Elena Chiong-Javier

ABSTRACT

Networking is an integral facet of social life, as it links individuals and groups in a complex web that delineates the individuals' social capital. In the Philippine agricultural sector where women's active market involvement is culturally sanctioned, farm women have cultivated networks with different genders along the marketing path. Using qualitative methods, this study investigated the personal networks formed by a group of women producers who market high-value vegetables from a watershed community noted for vegetable production in Southern Philippines. It sought to determine how gendered the networks are and how networks impact on women's market participation and household status. Findings underscore that (1) women's market networks are varied in size, informal, and established mostly with individuals located strategically along the vegetable supply chain; (2) networks dominated by female nodes are larger compared to male-dominated ones; (3) networks are sustained by trust or dependability that is founded on kinship, enduring friendship or neighborly ties, and regularity of transactions; and (4) through networks women gain access to farm and marketing capital/credit, sources of additional stocks, trucking services, warehousing facilities, wholesale buyers, and updated information on market pricing, supply and demand. The social capital generated through market networks not only provides direct and indirect benefits but also masks certain costs to women.

Key words: *Women farmers; social networks; social capital; market participation; Philippines*

INTRODUCTION

Households in the Philippines are typically described as "pooling households," where married women share control over household resources with their husbands but hold their own in managing independent income-generating activities that benefit both their families and themselves.[1] Studies on agricultural communities have documented and established that women are not only extensively engaged in farm work but are also actively involved in the marketing, trading, or buy-and-sell of agricultural crops particularly vegetables, fish catch, home-industry crafts, and a variety of foodstuffs and household commodities.[2] Recent reports have continued to note that the rising commercialization of agriculture in the country propels rural women to play increasingly dominant roles as market entrepreneurs while actively assisting spouses in farm production and management and performing their reproductive or domestic functions at home.[3]

To succeed in market participation, women farmers draw on their social networks to access markets outside their communities, especially those in urban areas.[4] A social network, as defined by Freeman, is a "social structure made of nodes that are generally individuals or organizations that are tied by one or more specific types of interdependency, such as values, visions, ideas, financial exchange, friendship, kinship, dislike, conflict or trade."[5] Networks are regarded as critical for the accumulation of social capital, as these facilitate communication, coordination, and the provision of information on the trustworthiness of individuals, as well as create reciprocal expectations and obligations that generate trust, norms, and common understanding.[6] Hence, networks are often studied today in relation to "structural" social capital.[7]

Despite the apparent importance of market-oriented networks, the question of how the composition and operation of such networks impact on farm women's market participation and household status has scarcely been addressed in the Philippine development literature. This question has prompted an investigation

on the gendered nature and functions of social networks linking women vegetable producers from a highland village to lowland urban markets in the Philippines. The investigation was part of a larger Sustainable Agriculture and Natural Resources Management (SANREM) Phase III research framework aimed at understanding, among others, the gender roles and statuses and the marketing opportunities and constraints of small-scale women and men farmers, in order to improve the quality of life under a vegetable-agroforestry production system.[8] Findings on gendered networks are presented in this paper, which starts with a review of relevant literature on social network, social capital and gender to situate succeeding discussions.

Social Networks, Social Capital and Gender

Discourses in the literature about social networks invariably connect this concept to social capital, and vice versa. The dominant view suggests that these two concepts are closely interwoven with social networks considered to be a consistent ingredient and a source of social capital. In the definition of social capital popularized by the American political scientist Robert D. Putnam, the term "networks" is mentioned as one of the "features of social organization" along with trust and norms "that can improve the efficiency of society by facilitating coordinated actions."[9] In a later discernment, Putnam gives prominence to networks in his refined meaning of social capital as "connections among individuals, social networks and the norms of reciprocity and trustworthiness that arise from them," which allow people to advance their individual and collective gains.[10] The emphasis given to "networks and norms" as dual components in the social capital concept is echoed by Michael Woolcock and Deepa Narayan[11] and again by the Filipino sociologist Ricardo Abad, who concluded after reviewing social capital in the Philippines that networks represent one of "two major notions of social capital" along with trust.[12] John Field has also placed networks at the heart of social capital, but cited the "set of shared values" possessed by members of networks as the other component in place of norms or trust.[13]

The idea that social networks are central to social capital but that capital emanates from networks resonates in the works of many social capital scholars. The sociologist Pierre Bourdieu has referred to social capital as the "capital of social relationships."[14] In the case of Alejandro Portes, "social capital inheres in the structure of their relationships" and "to possess social capital, a person must be related to others, and it is those others, not himself, who are the actual source of his or her advantage."[15] For Michael Woolcock, social capital means "information, trust, and norms of reciprocity" inherent in people's networks.[16] However, Bebbington et al. defines it as the sum total of resources including "tips, reputations and credit" or the "electricity" that flows through a network.[17] Similarly, Nan Lin calls it resources embedded in social networks that can be accessed or mobilized by actors through ties in the networks.[18]

Putnam has succinctly advanced the centrality of the network concept by acknowledging that "the core idea of social capital theory is that social networks have value."[19] His primary focus, according to Bebbington, Guggenheim and Woolcock, is "on the nature and extent of the network structure itself" or the "wires."[20] The value of social networks, as John Field puts it, lies in the fact that networks provide a basis for social cohesion that enables people to cooperate for mutual advantage.[21] He sums up the central thesis of social capital in two words– "relationships matter": relationships are formed when people connect through a series of networks whose members are bound by common values, and once these networks constitute a resource, social capital develops.[22] Evidently, there can be no social capital and the wherewithal for personal or collective development without social relationships, ties or networks.

Although intertwined with the meaning of social capital, the social network concept has been independently researched. Studies about the importance of social relationships or ties antedate those of social capital so much so that Field says "the idea that social networks matter, along with the norms that hold them together, is hardly a novelty."[23] In the Philippines, for instance, Abad has found an abundance of studies in the last five or more decades that dealt with three

prevailing types of social networks: "kin-based" which focuses on families and households and is most documented, "non-kin-based" which includes friendships, organization-based, and economic or work-based relations, and "alliance system" which combines kin and non-kin members in a network.[24]

Networks may be informal or formal. Informal networks tend to be formed between individuals as these are more personalized and trust-based, whereas formal networks are usually established with groups that observe contractual norms like payment of membership fees or holding of meetings.[25] Networks may be "horizontal" or "vertical," possessing what Abad calls a "directional dimension."[26] Horizontal networks are made between people of comparable social status and power, while vertical networks are formed by persons with disparate societal niches. Horizontal networks build either a "bonding" or "bridging" form of social capital; vertical networks create the "linking" form.[27] Bonding ties are close, tight and strong such as those shared by immediate kin, friends, and neighbors, but bridging ties are distant, loose and weak for these assemble persons who come from different ethnic, geographical, and occupational backgrounds although they may have similar economic status and political influence. Linking ties are likewise weak, but these are established with influential persons like those in formal organizations for the purpose of leveraging resources outside one's social circle.[28]

Moreover, networks may be inclusive or exclusive. Field contends that inclusive networks enable, but those that exclude, deny.[29] Inclusive networks allow people to access resources or free them from certain constraints through their connections; they are synonymous to the "bridging" and "linking" forms of social capital. In contrast, exclusive networks limit or block people's options by the kind of resources they can get hold of through their connections; they maintain homogeneity and are also known as "bonding" social capital.[30] As Moore sees it, however, the key issue between the two concepts has to do with the open or closed nature of the network or group.[31] Drawing on Coleman's illustrations,

exclusive networks exhibit closed structures, whereas inclusive networks possess open ones.[32] There are both costs and benefits to being either open or closed networks.

The realization that social networks are gendered has been recently gaining ground as more studies attempt to examine the effects of societal gendered norms, roles, and power relations on women's and men's network participation and on the social capital that they are able to respectively generate. Dikito-Wachtmeister has pointed out that women are generally drawn to link with other women in as much as men also tend to ally with other men, implying that networks operate on gender lines.[33] This pattern is described by Abad as following the "principle of homogamy" in his analysis of national survey data in the Philippines on choice of a best friend.[34] His findings indicate that female respondents are 96% of the time more likely to have best friends who are females, and the same holds true for male respondents though the figure is lower (91%). Gender has also been shown by Godquin and Quisumbing to influence membership and participation in formal networks or organizations that are conduits for socioeconomic development programs and services in that the men join production groups (considered economically significant) while women enter civic groups.[35] Similarly, being male has been found by Field and Howard to significantly increase the likelihood of participation in more organizations, thereby providing broader male access to outside resources.[36] This suggests that men's networks are more inclusive and beneficial than women's networks.

While empirical information is still lacking on the effects of gendered social networks on women themselves, at least three studies have thus far been instructive. Renzulli, et al.'s study reveals that women entrepreneurs, compared to men, relied more on kin as network members and formed more homogeneous networks that had a relatively narrow quality which proved disadvantageous, as it restricted the range of women's access to sources of information.[37] Dikito-Wachtmeister's study points out that a consequence of the gendered power dynamics between women and men in society is women's

propensity to not belong to the same networks as men. Thus while women established their own groups to exclusively manage projects that ensured women's participation and developed their self-confidence, their networks exercised less clout compared to men's.[38]

Moreover, Silvey and Elmhirst's study draws attention to the costs, "disbenefits" or "downsides" of rural-urban networks and gendered social capital to women migrants in Indonesia.[39] Gender-specific demands and pressures placed on women's network participation have brought about (1) unwelcome claims on women's labor and remittances such that women workers in the network continue to be double burdened with domestic chores, while unemployed males "just sit around, talking and smoking," and working women are required more than working men to remit earnings that support male leisurely life; (2) normative constraints on women through their embeddedness in bonding networks–thus rural-based families exert moral social pressures on daughters to return home, observe sexual piety before marriage, and regulate spending behavior advantageous to future husbands; and (3) women's exclusion from more potentially powerful networks like those of labor activism that can bridge them to broader sources of social and political support.[40]

Objectives and Methodology of the Study

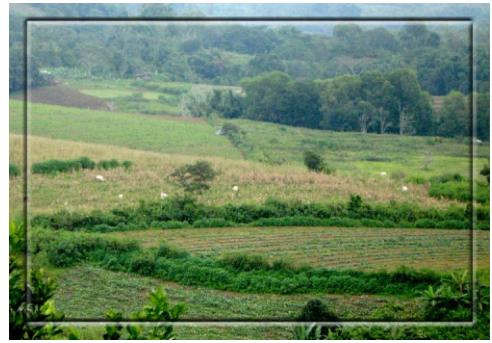
To make social capital work for women's development and empowerment, we need to understand better how gender issues affect the structure and functions of women's social networks. It is likewise important to highlight the factors in women's networks that enhance as well as undermine their personal and common good. Because the research literature on social capital tends to be gender-neutral[41] if not gender-blind, the downsides of women's participation in social networks that generate this capital are particularly overlooked. It has been argued that attention to specific network circumstances is imperative, for both provide distinct advantages and exert unique demands on women in various

contexts.[42] One context that needs addressing is the gendered nature of market networks established and maintained by agricultural women to advance their socioeconomic welfare in Philippine society, because in spite of their important contributions to household and village economy they generally persist as a poor, disempowered, and vulnerable group.[43]

This study therefore seeks to bridge the research gap by investigating the gendered nature of social networks that enable women vegetable producers to access and participate in the urban markets. Specifically, it aims to: (1) identify the nodes/actors and the nature of the ties in the women's personal market networks, (2) determine the benefits derived from the ties or relationships that bond or bridge the women to different nodes, and (3) elicit the impacts of networks on women's socioeconomic well-being. My underlying hypothesis is that women's networks, especially those comprised primarily of women, increase their options to access markets and this impacts favorably on their earning and bargaining capacities in the household.

Study Site and Women Subjects

My study site is a highland *barangay* (village) of a noted vegetable-producing town that is situated in the Manupali watershed in Northern Mindanao, Philippines. Although the terrain is generally rolling and steep, the soil types and abundant water sources in the village are quite suitable for agriculture, hence the introduction of high value vegetables in recent decades. This introduction has consequently transformed the landscape, as intensively cultivated vegetable farms increasingly replaced the more sustainable agroforestry lands combining trees



and food crops.[44] The top five commercial vegetables considered to be most marketable by farmers are cabbage, *umbok* (Chinese cabbage), potatoes, carrots and tomatoes, although beans, *atsal* (bell pepper), chayote, sweetpeas, broccoli, cauliflower, and eggplants are also popular crops.[45]

The subjects of the study are 10 women farmers who were selected purposively from the lists of women respondents in the gender survey and of women key informants in the market study conducted during earlier phases of the larger SANREM III research. Two criteria guided the selection, namely involvement in both farming and marketing of commercial vegetables as a main source of livelihood, and membership in a women's organization. At the time of the study, there was only one formally registered women's organization (a small-sized, multi-purpose cooperative) in the village, and I expected that its members would have an edge in networking over other women in their category. As the study progressed, however, it became evident that the organization was not actively functioning, and that organization leaders would revive it to access perceived economic opportunities. For this reason, organizational membership was not regarded by the women subjects as a factor that influenced their market networks.

The women subjects who chose the pseudonyms that identify them in this report have the following profile: They are between the ages of 33 and 57 years, averaging 47 years old. They possess low educational attainment, with most having some primary education or completed the elementary grades, are married or were once married to vegetable farmers like themselves, and have large families, with the number of ever living children ranging from 4 to 11 or with a median of 7 children. While most subjects report that they have been with the women's cooperative for a few months to a few years, four women cannot recall the duration of their membership. In their farm households, the women subjects share many productive tasks with their male counterparts. In general, however, men engage in work viewed as "hard labor" especially land preparation, fertilizer and pesticide application, watering of crops, sacking and

hauling; women meanwhile prepare lunch on the farm and take charge of marketing–hence they also actively handle the purchase of planting materials/seeds and farm inputs, as well as hiring and payment of farm laborers numbering as many as 6-8 persons.

Data Gathering Methods

The study utilized the qualitative methods of participatory network mapping, key informant interview, and participatory focus group discussion (FGD) to gather data from the women subjects. Initially, with guidance from a researcher, the women individually mapped and defined their vegetable market network nodes and ties or the rudiments of their network structure and diversity. Immediately after the mapping exercise, they were interviewed in-depth to obtain detailed explanations and descriptions of gender preferences in the marketing partners, nature of interrelationships, perceptions as well as experiences about opportunities and constraints of tying up with same- or opposite-gender nodes, and how these affect market information exchange and household bargaining status. At a later date, all 10 women subjects were convened for the participatory focused discussion to address knowledge gaps and also validate the data earlier collected. In addition, two small group workshops were held, each with five subjects, to enable the women to check their respective network diagrams.

A female community leader who heads the women's cooperative served as our local facilitator; she helped to establish contact with the subjects and smoothed

the way for data collection and validation. Another woman farmer served as translator or interpreter and assisted in disseminating and validating the results in workshops and community gatherings. Both local assistants provided a valuable emic or insider's perspective to our networks research. The personal views and experiences of the women subjects are communicated in this report through English- translated quotes or terms in the local language.

Nodes and Ties in Women's Market Networks

Marketing of high value, commercial vegetables is an "open access" livelihood source that yields immediate cash income for the majority of small farmers, especially women, in the study site. In fact, marketing and market participation offer a comparative advantage to small-scale women farmer-entrepreneurs because in the community, the wives are popularly regarded today for their business acumen and trading skills. Both the women and men farmers whom I approached for the earlier market and gender studies share the prevailing belief that wives can be trusted to bring the market sales home intact, and can be depended upon to exercise prudence in spending this income. Even in the presence of male spouses, many subjects disclose these collective sentiments:

> "Most of our husbands cannot avoid getting drunk (*palahubog)* when they go out with friends while at the market. They cannot control themselves when they hold our earnings from marketing. They squander money on 'good time' (meaning drinking alcohol, eating, and singing at karaoke or *videoke* bars). By the time they arrive home, there is not much money left for family necessities. Men are also either shy or lazy because they fail to take advantage of the free meal offered by the warehouse owner while waiting for the goods to be sold. Imagine that, all they have to do is cook. But no, they prefer to spend money at the *carinderia* (food stall)! We women volunteer the cooking so we can save on expenses while in the city market."

It has thus reportedly become an acceptable and common practice for village women including the study's subjects to handle and control vegetable marketing for the household. "My husband realizes the advantages of my doing the marketing," a subject relates, "and is content to wait for me to bring home our market earnings and to give him his personal allowance." To augment meager farm produce, some women go to the extent of buying-and-selling vegetables acquired from neighboring suppliers.

To further explain the presence of more enterprising farm women, a few women say it is due to the recent advancement in transport system or the expanded number of vehicles available for ferrying goods to the market. Others believe that this phenomenon is the result of having better educated village women who are thus more knowledgeable and less fearful to do business in a market-oriented economy.

The nodes and ties that enable a woman farmer to accomplish her household's marketing venture constitute her market network. In the local language, "network" is referred to as "*pagkutay*" (attachment) or "*pagsumpay-sumpay*" (linkage). During the focus group discussion, an interesting analogy drawn from their agricultural world view also emerged from the women. The network, as they perceive it, is comparable to the growth of taro (*gabi*) where the main rootcrop (called *punuan* or head) is linked (*gaway*) to secondary rootcrops (*gaway puno*) like a kind of web. They regard themselves as the *punuan* which lies at the heart of the web because, having established the network, they are the lead character. The different people belonging to their network are compared to the various *gaway puno* that surround the *punuan*.

The nodes in the women's networks are predominantly composed of singular individuals. However, in almost all networks, there is at least one plural node made up of two to seven persons who are lumped together according to their relationship with the women (e.g., sons, brothers, female kins, friends or neighbors) or the functions they serve (e.g., sacking and hauling, helping with

Table 1. Number of female and male nodes in women's market networks

Type of network/ Name of Subjects (N=10)	No. of Females	No. of Males	Total No. of Nodes
Female-dominated (n=6)	15	6	21
1.Nilda	13	6	19
2.Neneng	12	5	17
3.Irene	8	6	14
4.Ga	7	2	9
5.Diding	3	1	4
6.Lin			
Median	10	5.5	15.5
Male-dominated (n=4)	4	16	20
1.Mely	4	7	11
2.Jo	1	8	9
3.Jen	2	6	8
4.Ising			
Median	3	7.5	10

trucking). None of the subjects has cited their women's organization as a network node.

All market networks contain both female and male nodes. Based on the gender composition of the nodes, the networks may be categorized as either female-dominated or male-dominated. In most cases (6 of 10), the women's networks are female-dominated, i.e., over two-thirds are female nodes (Table 1). The number of nodes in this type ranges from 4 to 21, while that in male-dominated networks ranges from 8 to 20. According to their median values, female-dominated networks are larger in size or density than male-dominated ones (15.5 nodes vis-a-vis 10 nodes).

What kinds of ties bind the women to the nodes in their networks? As indicated in Table 2, these consist of different categories of kinship, friendship or

Table 2. Classification of women's ties to the nodes in their respective market networks

Women Subjects	Spouse	Children	Extended family	Friends/ neighbors	*Suki*	Total no. of nodes
1. Nilda	-	4	5	8	4	21
2. Neneng	-	3	5	9	2	19
3. Irene	1	1	-	10	5	17
4. Ga	-	6	4	4	-	14
5. Diding	-	-	3	6	-	9
6. Lin	-	-	4	-	-	4
7. Mely	1	3	10	5	1	20
8. Jo	1	-	5	5	-	11
9. Jen	1	-	-	8	-	9
10. Ising	-	1	3	4	-	8
Total	**4**	**18**	**39**	**59**	**13**	**133**

neighborly ties and *suki* relations. Out of a total of 133 nodes in all 10 networks, 61 (46%) represent kinsmen–including husbands, some children and/or children's spouses, and consanguineal or affinal relatives who make up the extended family. But it is interesting to note that only four of 10 women claimed that their husband is a part of their market network. Friends who are mostly long-term neighbors comprise the next largest grouping (59 or 44% of 133), while the rest (10%) are the so-called *suki* or regular trading partners with whom the women have cultivated *suki* relations.

Although generally satisfied with existing nodes, the women farmers nevertheless surfaced desirable nodes to be added to their network. These are nodes that could link them to information and technology on packaging and quality assurance to be able to demand better prices for vegetables. The women further expressed a need to have pertinent local government personnel in their

network that can disseminate timely and regular reports on vegetable pricing, supply and demand/buyers' preferences as well as create effective links between the vegetable producers and the buyers.

Gendered Analysis of Network Benefits

Functional Links

Women's networks facilitate the farm-to-market flow of their vegetable harvest; hence most nodes serve a direct function in the vegetable supply chain. Vegetables bound for the market are initially handled by sacking and hauling nodes, then by trucking nodes and lastly by warehousing nodes before they reach the buyer nodes. Sackers, haulers and truckers are always male nodes; warehouse owners and buyers may be female or male nodes but females predominate. Except for buyer nodes that appear distant and unknown, all the rest are bound to the women by close, face-to-face, and trustworthy personal ties. The dependability of the nodes to keep functioning in the supply chain further determines whether the women shall continue maintaining ties with the nodes in their market networks in the long run.

Neneng, for example, has a female-dominated network of 19 nodes. Among the nodes are two sons and two brothers who sack and haul for her; a nephew who owns and drives a truck that picks up and transports her goods to the big city market; and a niece-in-law (married to the trucker-nephew) who owns and manages a *bodega* (warehouse) in the city market and has direct access to

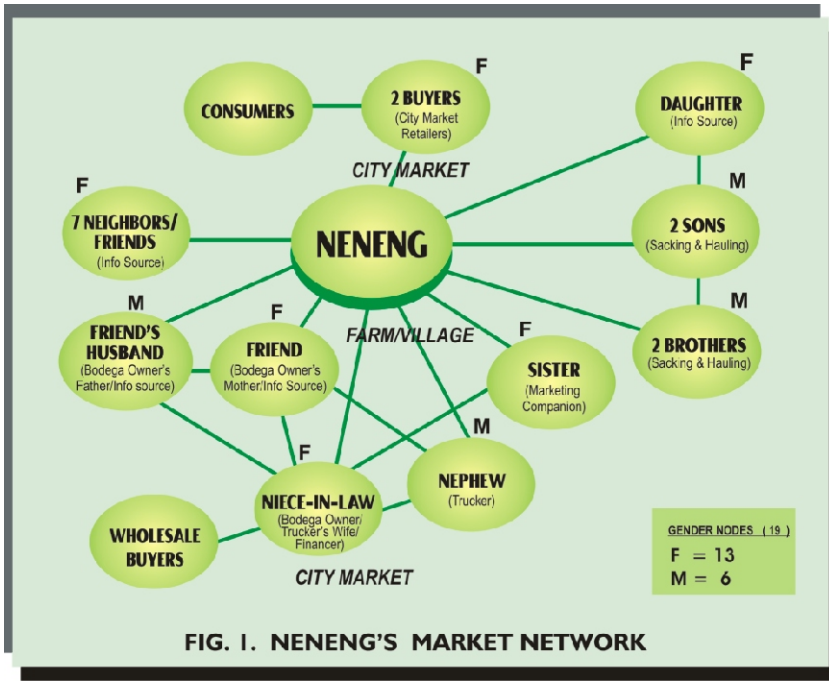


FIG. 1. NENENG'S MARKET NETWORK

wholesale buyers or agents of corporate buyers from major cities in the country (Figure 1). As a hands-on marketer, Neneng often takes a ride on top of the load of vegetables in the truck, along with her sister Ga who is a constant marketing companion. One of her daughters and nine of her friends and neighbors, including the parents of the *bodega* owner, are nodes that provide market report, information or analysis. When the harvest is small, Neneng skips the truck and instead takes her goods to two *suki* vegetable retailers in the nearby town or city market who in turn sell to household consumers.

On the other hand, Mely has a male-dominated network of 20 nodes that includes her husband, a son, and eight nephews who handle her sacking and hauling needs (Figure 2). Her vegetables are brought to the roadside to be trucked by a nephew who is assisted by 5 hired male helpers, all of whom are also her neighbors. These goods are then brought to the big city market *bodega*

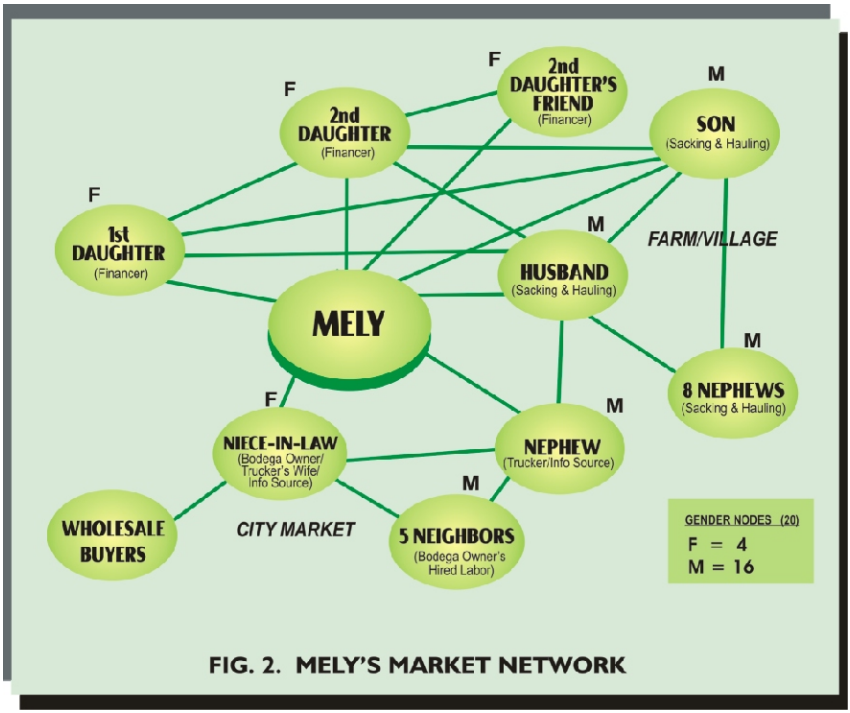


FIG. 2. MELY'S MARKET NETWORK

where the wholesale buyers await. The *bodega* is owned by the nephew's wife (the husband-and-wife nodes are the same ones mentioned in Neneng's network). Along with her son, the trucker, *bodega* owner and their hired hands are Mely's sources of market information. Two daughters and one of their friends occupy nodes that provide financing and/or marketing advice.

In the context of market networks, trustworthiness is interestingly equated with the depth of kinship and/or friendship (i.e., the number of years the bond has endured), which in turn determines the strength of the woman's bond with her node. "My cousin is my best friend and I trust her to take my goods to the market for me and to return with my market earnings," according to one woman farmer, "and if my cousin can no longer help me with marketing, she will not cease to be close to me, but maybe I will find another one I can trust to replace her in my market group." Trust is built when the node proves to be reliable in serving its

function. Often it is measured by the node's honesty in transacting goods and money for the woman farmer. Hence the trucker and bodega owner who are related to most of the women subjects are also cited as trustworthy nodes. "My goods are not lost when I cannot go with the truck; the sales and deductions are properly accounted for; and I get my net earnings on time when the truck comes home to the village." Having the same gender somehow facilitates the extension of trust between women and their network partners, perhaps because in keeping constant company with women they are able to nurture the bonds that easily lead to trust.

Advantages of Same-Gender Ties

The functions of the gendered nodes in the women's market networks reflect the prevailing gender roles in Philippine culture that ascribe heavier load (*bug-at nga trabaho*) to men and lighter work to women. Cultural norms underpinning gender role ascriptions and expectations support why women gravitate more towards same-gender networks. These norms restrict lengthy, constant or recurring heterosexual social relations leading husbands to frown on ties between their wives and other unrelated men, and making wives feel uncomfortable (*mataha*) about engaging socially with unrelated males. In the words of a woman farmer, "it is always wise to keep one's distance from men especially if they do not come from your family or else you may wind up the topic of village gossip!" If it becomes necessary for women to contact the opposite gender for a reason such as to explore the possibility of obtaining financing, they call in their husband to initiate the contact. However, there is no limitation to networking with males if they are one's relatives and if the requirement is a "man's job."

Interviews with women possessing both female-dominated and male-dominated nodes reveal that it was a largely unconscious but natural choice for them to align with other women in their midst. But the normative constraints operating between genders in Filipino society are very evident as they explained:

> "We women share the same feelings as other women so it is very easy to understand each other (*magkasinabot*). We do not feel embarrassed (*di makaulaw*) to deal with fellow women. We can hug spontaneously or link arms and shoulders (*makaakbay*) like siblings and the onlookers will not question our behavior. While riding the truck to and from the market, we women choose a safe area to occupy on the *topload* (local term for pile of goods in the truck). But the men riders are different for they sit on the edges, or like to stand and feel the wind on their bodies as the truck moves."

There are also many social benefits to same-gender market networking. Women understand their own gender predispositions and concerns better; hence it is easy for them to strike informal conversations (*chika*) about personal, family, farming, or marketing matters while riding the truck together, shop for children's educational needs after the vegetables are sold, pass on whispered tips about pricing or financing strategies while in the process of hugging another, and to come to some agreement after a serious dialogue. Trust is mutual; sharing is spontaneous and reciprocal. Because they perceive the female gender as being naturally gregarious, they respond positively to a smiling woman and do not shirk from initiating social discourse or sharing female friends and contacts at the market.

Furthermore, women members within the network easily share the "highs" (good returns on investment) and help each other to cushion the shocks during the "lows" in their marketing experiences. As revealed by one subject, "when I hit the 'jackpot' (i.e., selling vegetables like tomatoes when the price happens to be unexpectedly very lucrative), I do not think twice about sharing a bit of my good fortune to relatives or friends in my marketing circle. Besides, when they hear of it, they come anyway. I do not mind because we are close and I also get to benefit when it is their time to hit the jackpot." This reciprocity is likewise demonstrated during hard times through extension of moral and financial

support via small loans to help a marketing partner hurdle an "OD" (overdraft, i.e., when the sales are not enough to cover the various marketing costs). The camaraderie built between women nodes can be so tight that they would even time their planting or harvesting period so that they could market the crops together.

In the case of male nodes, unless they serve a marketing function in one's network, they are generally not desirable. As articulated by one woman farmer, "Men do not make good network pals because they are usually loud and rowdy; their favorite pastime is drinking and getting drunk."

Economic Benefits

As expected, the foremost benefits derived and valued by women farmers from their market networks are economic-related and largely seen in terms of direct access to the following needs:

1. Marketing services and facilities including:
   a. Post-harvest (i.e., sacking and hauling) and trucking services to transport vegetable goods from farm to market, and
   b. Warehousing or storage facilities for goods awaiting sale at the marketplace

2. Market reports, observations or information about the prevailing or fluctuating prices of vegetable products, the volume of available vegetable supplies arriving daily at the warehouses as well as their sources, and the buyers' demand for specific products

3. Market analysis on the saleability of particular vegetables at particular periods upon which farming decisions on what to plant next and when to time the harvest rest

4. Vegetable buyers especially wholesalers and representatives/purchasing agents of institutional or corporate buyers like grocery and hotel chains in leading cities and metropolises of the country

5. Sources/providers of farm capital, financing or credit, planting materials or seeds, fertilizers and other necessary chemical inputs like pesticides

Interestingly, in all cases control over the access route to most of these benefits rests in only one female node. She is a relative by blood or marriage, or a local girl in the neighborhood whom the women subjects all saw grow up, have a family, and successfully build a business out of managing a *bodega* in the city market. In just over a few years, the women reportedly witnessed her meteoric rise from small vegetable trader to influential *bodega* owner, from operating one to two warehouses now, and from having no vegetable transport vehicle to owning three trucks today. The trucks are stationed in her parents' residential compound which is located along the main village road. The *bodega* owner's husband runs the trucking side of her business with the help of her brothers, their relatives and friends. As *bodega* operator, she and her trucking crews are strategically located in the marketplace to provide women farmers access to updated market reports and analyses. Moreover, she links them to bulk buyers who seek supplies from her *bodega* because she personally transacts with buyers on behalf of the farmers. Because she is home-grown and known to the women farmers since birth, they trust her implicitly with their goods and the proceeds of the sale.

The female *bodega* owner is described as possessing great "people" skills, which women farmers attribute to her being a woman and therefore approachable, consultative, and knowledgeable in dealing with them. She has reportedly used these skills to devise innovative business strategies that draw farmer clients to patronize her warehouse facility, such as providing jute sacks for goods that they bring to her *bodega*, giving free snacks or *viands* (i.e., meat, fish or vegetable courses in a meal) provided that they do the cooking, offering free sleeping/resting quarters at the upper floor of her second *bodega* for those

awaiting the sale of their goods, and meeting particularly the male farmers' penchant for recreation by installing a karaoke jukebox at the ground floor. The first warehouse is older but it is located in a central area of the market; this is where farmers' goods are stored and also where both women and men farmers congregate during the day to wait for buyers. The second warehouse is actually a two-story apartment situated some distance away at the market fringe, so farmer clients retire to this place at night for rest and/or recreation.

The same social skills are likewise applied by the bodega owner to transactions with buyers who are also mostly women; hence the stocks in her warehouse are sold quickly. She has also diversified to lending farm capital and financing farm inputs like fertilizers, chemicals, and seeds, all of which are deductible from vegetable sales. Hauling, trucking and storage charges are likewise delayed until after the sale is undertaken.[46]

Impacts of Networks on Women's Welfare

Findings indicate that gender-specific role expectations, behaviors and relations have influenced the women farmers' particular preference for female nodes in their market networks. Nonetheless, the market networks generally provide direct economic and social advantages to women farmers, boosting their ability and potential for continued active market involvement as micro vegetable entrepreneurs in the urban milieu. These networks both enable and support women's productive role in the household. Indirectly, they impact on women's welfare in the following ways.

1. ***Sustained capacity to generate household cash income from market transactions.*** Networks facilitate farm women's market participation, which generates immediate cash earnings for the household. Gender role expectations confer on women the right to hold the household's purse and by extension, the role of marketing and bringing the proceeds home. The

women's proven ability to safeguard the money through judicious spending has earned for them spousal approval and sustained their marketing role. Disbursements from market proceeds are also an important component of this role, but they are made usually with the husband's prior knowledge and agreement. The two major expenses that women make immediately after market transaction and before returning on the truck to the village pertain to farming necessities (e.g., planting materials, fertilizer and other agrochemicals) and children's educational needs (e.g., school uniforms, books, and supplies).

2. ***Enhanced household bargaining position.*** In the domestic sphere, household decisions are claimed to be a shared function between husband and wife, although the wife usually decides on household concerns involving food, clothing, health, and education while the husband dominates in decisions involving large sums of money and farming, particularly repair of farm equipment.

   This pattern has been changing because as wives accumulate knowledge and experiences from network and market participation, their perceptions, opinions and advice become valuable to the household. Women know more about the ins and outs of marketing vegetables, they have established the contacts that lead them to buyers and financing, and they know where to source cheaper agricultural requirements and other purchases in the big city. Consequently women report that husbands have developed a high regard for their inputs to decision-making since they became market entrepreneurs. In informal conversations, several husbands agreed with this observation, noting that "the wife should know more since she is always in the market." Husbands now seek and listen to women's analyses of trends, practices, and technology for improved vegetable production and marketing. They take great pride in talking to people about their wives' marketing knowledge, skills, and accomplishments.

The household's cash income often comes in lump sum from women's vegetable marketing activities, and wives are the first to handle the big amounts from where major farm-related purchases are made. While wives consult their spouses on these purchases before a market transaction, they may deviate anytime from pre-agreed decisions if they deem it necessary. Because of their exposure to market supply and demand, women's word or decision about what crops or which inputs to invest in next carries greater weight at the bargaining table.[47] This influence spills over even to decisions such as how much personal money the husband should get for recreational purposes.

3. ***Enhanced feelings of personal empowerment.*** The women farmers are equally proud of abilities to venture into marketing or trading, take risks as market actors, and access network resources to succeed in their marketing activities. The more experienced marketers feel happy to give marketing tips or share their knowledge and practices with others. Social and household acknowledgement of their prominence in marketing contributes to their feelings of self-satisfaction, builds their self-confidence, and increases their self-esteem.

Conclusion

In the agricultural marketing sector, networks are proving to be indispensable social assets critical for the continued survival and sustainability of women farmers' vegetable marketing ventures, which benefit both their households and themselves. In the Philippine study, women's networks may be characterized as generally small, close, personalized, and informal. Network ties are horizontal and homogeneous, or established between similar-status individuals and exclusive to close kin and neighborhood friends. Kinship, friendship, and to a lesser extent, special *suki* relations and obligations are nurtured in the networks and further strengthened by the market-related functions they serve. Mutual

trust, dependability, and reciprocity sustain these ties. Although most networks are gendered with women farmers preferring same-gender nodes, there is some evidence of female reliance on male nodes who are largely close relatives for certain functions to achieve market goals.

The nature and quality of social capital emanating from the women's networks appear to affect their market access very favorably but mask a number of negative consequences or costs. Homogeneity and exclusivity in network relations indeed account for internal strength as they promote close bonding based on mutual trust in the partners. But the resources available to women outside of their households are limited to only those found within the tight-knit circle of family and friends. Bonding capital is inadequate for extending women's networks and bridging them to improved sources of market knowledge, information, and services. The lack of diversity and density in the networks has kept their vegetable production and marketing ventures small, and expansion may not be a viable choice with the kinds of practical, commonsense observations filtered from market sources or of financing options available to women. Moreover, the lack of options has rendered women vulnerable to a strategic female node in their network that monopolizes access to necessary elements such as services in the vegetable supply chain, information on market pricing, financing or credit sources, and contacts with buyers. Gender norms have further worked to unwittingly resign women to accept such a controlling female node.

Insights drawn from examining the market networks and social capital of small-scale farm women entrepreneurs suggest the need to develop and strengthen their bridging and linking capital. The women are themselves cognizant of this need, for they have expressed the desire to establish additional nodes in their networks that can respond to specialized market requirements such as packaging information and technology, quality assurance, buyers' preferences, dependable market reports, and direct links with corporate buyers. They are aware that these requirements will increase their chances of succeeding as

actors in a modern market economy. They also know that their current network partners cannot fulfill these requirements. Since formal organizations and institutions bear an important role in meeting such a need, these should be included in the women's expanded network. It will be helpful to determine if the women's cooperative in the village can be activated and reorganized for the purpose through local government assistance.

Although there are merits to investigating individual insular marketing networks with strong internal ties but poor external linkages, further research should be conducted on the broad network that operates for vegetable marketing in the city. This is to define, plot, and characterize the entire network in order to be better able to situate the actual roles of various market actors, including our small women farmer-entrepreneurs and their network partners such as the female bodega owner, as well as place their insular networks in the larger constellation. The resulting knowledge and understanding can inform agricultural development policies and programs for the rural poor, especially farm women.

In studies of social networks, it is becoming important to examine the role of social capital in the current attempts at poverty alleviation of resource-poor groups like rural women vegetable marketers or traders in urban settings.[48] Especially where women groups are concerned, rather than continue to be gender neutral, it is crucial to use a gender lens, perspective, or approach in obtaining and analyzing the data. An "engendered" picture and understanding of social capital is more appropriate and relevant for designing and recommending strategies for women's development or empowerment.

Notes

I gratefully acknowledge the contributions of my women subjects, field research assistants Apol Garganian and Graeme Armecin, local facilitator Perla Binahon, and illustrator Cathy Dacillo-Domingo. I deeply appreciate the insights and comments from Dr. Maria Elisa Christie and Dr. Keith Moore of Virginia Polytechnic Institute and State University (Virginia Tech), as well as the encouragement of Dr. Manuel Reyes of North Carolina Agricultural and Technical State University (NCA&T). This paper is dedicated to my daughter, Essie, who is a budding entrepreneur.

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47. Farm inputs usually required and purchased by women after their market transaction include the following: (a) 1-2 sacks of inorganic fertilizers per load at P1,900/sack (or $40.43 at P47/dollar) plus a trucking fee of P25/sack ($0.53); (b) chicken dung as organic fertilizer at P105/sack ($2.23) including trucking charges, but as many as 15 to 30 sacks per load; and (c) bottles of chemical pesticides in costs ranging from P400-1000/bottle ($8.51-21.27).

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Market Networking and Trading: A Case of Transforming Village Women's Lives

Ma. Elena Chiong-Javier

ABSTRACT

An informal group of rural women residing in a Southern Philippine watershed community demonstrates that networking and market participation are viable means for self-transformation amidst limited opportunities. Based on network analysis and qualitative interviews, this article delineates the women's marketing ties and experiences as vegetable biyahidors (traders) who hurdle constraints such as capital shortage, losses incurred from grading and transporting perishables, increasing market competition, and lack of organized response to problem solving. These challenges are addressed through marketing practices established individually as well as collectively. The article underscores the necessity of institutional support through responsive market policies and programs to ensure the sustainability of the women's entrepreneurial endeavors.

Keywords: Rural women, market network, trading, Philippines

INTRODUCTION

Studies often point out that rural women in developing tropical countries suffer from many gender-based inequalities and world trade policies. These circumstances adversely affect the women's rights and control over natural and productive resources, as well as their access to educational or training opportunities, agricultural financing and extension services, technologies, and commodity markets (Holmes and Slater, 2008; Chiong-Javier, 2007; AsiaDHRRA 2007; Derrien, 2004; Oliveros, 1997). These women are thus not only prevented from realizing their fundamental role of providing food security and ensuring the continued survival of their families, but also from addressing their overall personal well-being. Agricultural or farm women often have meager options for addressing their most basic concerns. However, for an increasing number, the most viable option to help negotiate their family's way out of hunger and poverty is to enter the domestic sphere of micro agricultural marketing (Garcia, 2004; PPI, 2004).

It has also been favorably noted that women tend to be more heavily represented in the local markets for food and perishable goods (Baden 2008). Particularly in Asia, women are said to play a predominant role in marketing (AsiaDHRRA 2007). In rural Philippines, married women have long engaged in independent income generation, so much so that "a long and distinguished tradition of empirical research attests to the prominent role of women in the household economy, both by direct involvement in income-earning activities and as managers of household economic resources" (Eder 2006).

Recent findings derived from the marketing and gender studies conducted by the De La Salle University-Social Development Research Center (DLSU-SDRC) in Songco, a vegetable-producing upland community located in the southern province of Bukidnon, provide additional evidence and explanations for women's active market involvement. These findings (Chiong-Javier 2008) reveal that the marketing of high-value vegetables was an "open access" livelihood

source that easily provided cash income to small farmers, especially women. This is because few or practically no families were barred from the chance to bring their vegetables to the urban markets.

Women in the community enjoyed a comparative advantage in marketing and market participation because the wives there were popularly regarded and especially esteemed for their business acumen and trading skills. Moreover, the male spouses generally trusted their wives to bring home the family's market earnings intact, or to wisely spend them only on farm and household necessities. The women's entry into vegetable marketing or trading was facilitated by the services offered by informal market channels dominated by different types of middlemen, particularly the owners of warehousing facilities (*bodegas*) who were themselves mostly women from the same community. However, engaging the services or help of middlemen diminished the women's net profits or limited their earnings from marketing activities.

The DLSU-SDRC studies further indicate that because socio-cultural perceptions favored women's marketing practices, many small women farmers in Songco were encouraged to become vegetable traders or *biyahidors*. Although engaged in individual trading operations, the women biyahidors were bound to a network of peers for support. In the study site, the biyahidor is anyone who engages in the business of buying-and-selling vegetables. Based on the volume of trade or business, there are two classes of biyahidors: (1) large-scale biyahidors who usually transport their goods to far-away markets and transact business through *bodegas* (literally, warehouses, but actually these are market stalls with a warehousing function and they serve as outlets mainly for

non-local wholesale buyers), and (2) small-scale biyahidors who tend to bring their goods to nearby markets for sale to other small traders or vendors and household consumers. Vegetable biyahidors are usually engaged in micro trading and vending enterprises, hence they belong to the second category. Coincidentally, most of these micro entrepreneurs are women.

This paper presents the case study of a social network of six women biyahidors in Songco. The objectives of the case study were to (1) understand why farm women turn to market trading, (2) describe the features and challenges of their micro-trading enterprise, and (3) determine the social benefits of their market alliance network. Data for the case study were gathered through two qualitative methods– that is, social network analysis and key informant interview. The social network analysis was also initially used to select the biyahidors who were to be included in the case study. This was done by asking all the biyahidors interviewed in the larger market study to identify who their partners were in the trading business. From the responses, the most mentioned partners were drawn and their network was plotted. The partnership or alliance had to be mutual: partners claimed by the biyahidors also had to own the biyahidors as partners. To identify the core network, one-sided or non-mutual alliances were excluded from the analysis (Figure 1).

Social Network of Women Biyahidors

A social network is a social structure comprising *nodes* or actors who may be either individuals or organizations, and *ties* or relationships between or among the actors that may involve different types of dependency such as kinship, friendship, financial exchange or trade, values, ideas and even dislike or conflict (Freeman 2006). It maps out all possible ties between the nodes being studied. Social networks operate on many levels; they result in a complex web of relationships; and they determine the social capital of the actor.

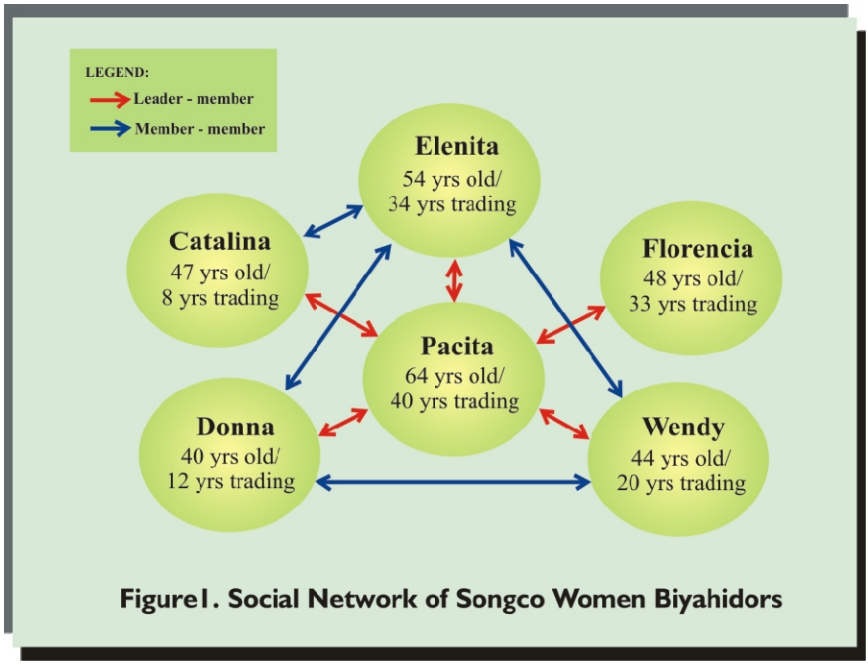

Figure1. Social Network of Songco Women Biyahidors

Based on the network analysis, the informal core of women biyahidors is composed of six members who congregate around Pacita, a central figure who has named the most number (five) of allies in the core group, which has acknowledged her in return. Elenita appears next in terms of popularity with four mutual allies, followed by Wendy and Donna who each have three mutual allies, and Catalina with two mutual allies. The last member, Florencia, is something of a social isolate in the analysis, as she has only one mutual ally in the person of Pacita.

Known to the biyahidors and other villagers as "Nanay" (Mother) Pacing, Pacita provides informal leadership in the group as the oldest and most experienced among them. At 64, Pacita is thrice widowed and has borne 10 children. Notwithstanding her limited formal education (elementary undergraduate), she has acquired the necessary skills to sustain over 40 years of vegetable trading experience. Although once married to a farmer, she has never owned farmland.

However, she takes pride in being the first in Songco to become a biyahidor, along with three women from different villages who are now retired. Today she is noted to be the most senior and seasoned vegetable trader not only in her own village but also in Loverslane Market, where she has been doing business for the last three decades.

Next in seniority of age and trading experience is Elenita, 54, who likewise completed some elementary schooling, was twice married, and is a mother of five children. She and her husband both tend a backyard garden planted to some vegetables and rootcrops mainly for subsistence use. Having started when she was just out of her teens, Elenita has been a small-scale vegetable entrepreneur for the past 34 years and has spent the last 15 years in Loverslane and in the company of the group. Unlike her peers, she brings goods to the market only once a week and stays for the business for half a week. Nevertheless, she manages to maintain a substantial stock of vegetables for sale and for augmenting the temporary shortages of fellow biyahidors.

Wendy, 44, is married to Florencia's brother, who earns a livelihood by driving a *habal-habal* (motorcycle for ferrying people). She stopped schooling while at the elementary level and entered the vegetable business when she was a mere teenager, needing to earn an income after her father had abandoned the family. To date, she has spent almost half her lifetime (20 years) in this occupation, which has helped her provide for her own eight children, the youngest of whom is just a year old. Her trading base for the past 15 years is Loverslane Market. Her family no longer possesses a farm since it was mortgaged (*prenda*) to meet the children's increasing financial requirements, including the college education for three of them. Until recently, Wendy's elder sister Nena was among the core group of Songco biyahidors but she had to quit owing to family circumstances.

Donna is married to Pacita's son, who cultivates farmland they rented. At 40, she is the youngest biyahidor in the group but the second to the youngest (12 years) in trading experience. She obtained 10 years of this experience in Loverslane

while in the company and under the tutelage of her mother-in-law, who was instrumental in her entry into vegetable trading. Pacita continues to be influential in Donna's business decisions and operations. Thus far Donna has the fewest number of children (four in all) among her fellow biyahidors, but this number could be expected to increase considering that she is still of reproductive age. Among her group mates, she is the only elementary graduate.

The most junior biyahidor is Catalina, with only a total of eight years of entrepreneurial work experience. In terms of age, however, she is at 47 just a year younger than Florencia. Like most biyahidors, Catalina was unable to complete her elementary education; she is likewise married and has six children. Her husband raises vegetables on the farm they both own. She and a younger sister named Hilda were initiated as biyahidors by their older sister Lucita who was an experienced small-scale vegetable trader in Loverslane long before they joined the business. Hilda is a good friend of Elenita.

The last member of the group is 48-year-old Florencia, also married and mother to a large brood of 10 children. Florencia ranks third in terms of age and seniority of experience (33 years) as small-scale vegetable trader in Songco and Loverslane. She claims to have been part of Pacita's group all this time and acknowledges the latter as their leader and the price-setter for their vegetable goods. She is no different from most of her fellow biyahidors in terms of educational attainment. But unlike them, Florencia sometimes engages in peddling fish from house to house for additional income. Her husband grows subsistence crops on rented farmland located in another village.

By their own account, these six women biyahidors have demonstrated individual grit and group strength as micro vegetable entrepreneurs. For several decades they have established themselves in one section of Loverslane, a marketplace in adjoining Valencia City, where the vegetable goods they procure from Songco farmers are resold to wholesale or retail buyers and household consumers. They have long confronted the challenges of survival by empowering themselves as

micro vegetable entrepreneurs in the village and market settings, and by forging a binding social capital among their kind. In Loverslane, the six women form a cohesive band of Songco biyahidors, each with her business partners but all sharing some common set of allies among the market's biyahidors. Although they operate individually and independently, as a group they are interdependent.

Motivations for Engaging in the Micro Enterprise

The women biyahidors, except for one, are presently or were once married to vegetable farmers who are popularly known as "gardeners" in Songco. As partners in the family endeavor of vegetable production or "gardening," they inevitably experienced failures in gardening which related mostly to lack of farm capitalization, poor harvest, slumps or fluctuations in market prices, and unprofitable income from a small farm. These disappointments have motivated and spurred them first to try selling their own produce in the marketplace before turning into small-time capitalists (biyahidors or *compradors*) who buy and market vegetables procured largely from the farms of friends, neighbors, and kinsmen. Moreover, engaging in the trading business seems to the women like a logical or natural alternative to gardening. Other motivating factors are the women's desire to augment their husbands' farm income, their need to meet their families' growing expenses, and the encouragement or assistance they received from siblings, in-laws, and/or friends who are engaged in the same micro enterprise.

The profitability of vegetable marketing is what sustains the biyahidors' involvement in this economic venture. Elenita articulated it best when she said:

"It is far better to trade in vegetables than to plant them because the economic return from trading is automatic once you have disposed of the goods. If you are into gardening, you cannot control the price of your produce but if you buy-and-sell, you can somehow dictate the price. If there is an oversupply of one type of produce and market demand for it is low, as a trader you can simply choose not to buy it while as the grower, you have no recourse but to sell at a loss. In the vending business, the risk of failure is minimal."

Features of Their Micro Trading Enterprise

Most of the women biyahidors carry four to five varieties of vegetables in their stocks. Chinese cabbage (*umbok*) and cabbage are everyone's favorite, followed by carrots and potatoes and to a far lesser extent tomatoes, cauliflower, eggplant, beans, bell pepper (*atsal*), chayote (*sayote*), broccoli, and squash. The biyahidors purchase their goods from an average of six regular (*suki*) farmer-suppliers. But while a third of them rely only on Songco farmers who are friends and/or neighbors (that include relatives), the majority depend on additional farmer-suppliers from two or more barangays apart from Songco. These suppliers often deliver the goods to the biyahidor's house. In some instances, goods are also acquired from fellow traders met in the course of business.

As a common practice, the biyahidors go to the suppliers' farms when the vegetables are being harvested to ensure that they have a choice in the quality

and handling of the procured goods. Proximity of the farms to their homes permits close and easy monitoring of suppliers' harvesting schedules. Even for distant suppliers who deliver goods to her doorstep, every once in a while the biyahidor visits the suppliers' farms to check on the quality of the procurement. However, in cases when there is a high demand for certain vegetables (like potatoes) that cannot be procured in the vicinity, the biyahidor travels to far away barangays and to Cagayan de Oro City to acquire them.

At the farm, the biyahidors help in sorting or classifying and in overseeing the packing or sacking of the vegetables they have chosen. To fail to be present during harvest time is tantamount to risk of losing potential stocks, as farmers eager to handle cash might decide to transact with other onsite traders instead, or bring the goods to the market themselves.

Goods are purchased at farmgate prices on a bi-weekly basis or every Sunday and Wednesday, except in the case of Elenita who purchases her goods only every Wednesday. These are immediately transported to the market on the morning of the following day–i.e., every Monday and Thursday, in time for the *tabu* (market day) every Tuesday and every Friday to Sunday of the week. Biyahidors stay in the market from Monday morning to Tuesday afternoon and from Thursday morning till Saturday afternoon. Elenita, however, resides in the market from Thursday morning till Sunday afternoon only.

The biyahidors' weekly revolving capital ranges from as low as P1000 more or less in the cases of Pacita and her daughter-in-law Donna, to as much as P6000 in Catalina's case. In one month, therefore, the smallest capital outlay is P4000 ($85 at P47/dollar) and the largest is P24000 ($511); on the average it is about P2500-

3000 ($53-64). For biyahidors, the capital is inclusive of the cost of the vegetables, hauling fee (P5/sack), trucking fee (P35/sack), and market stall rental (formerly P500/month; now P5/sack).

The actual volume of goods purchased and added on to existing stocks is normally small, averaging about 1-2 sacks per kind of vegetable per supplier, or roughly around 8-10 sacks for four to five types of vegetables. The weight of each sack varies with the type of vegetable. For example, *umbok* and cabbage weigh between 75 and 80 kilos/sack while carrots and potatoes vary from 60-70 kilos/sack, depending on the sizing standards. For *umbok* and cabbage only, the biyahidor is entitled to crop off reportedly "less than 25%" of the cost per kilo to account for spoilage after transporting, but the actual percentage is negotiated with the supplier.

The gross return on investment is generally almost 100% for lower priced vegetables (below P10/kilo) based on November 2006 price monitoring figures. To illustrate, *umbok* is purchased at a supplier's price of P6/kilo and sold by the biyahidor at P12/kilo, while cabbage is bought at P6/kilo and sold at P10/kilo. The purchasing prices for carrots range from P8-22/kilo (from extra small to small, medium, and big sizes) and their selling prices range from P16-30/kilo. This reveals that vegetables requiring larger capitalization do not generally earn as much profit as those with a lower price. Other examples are potatoes, which are bought at P30-45/kilo (small, medium, and big sizes) and sold at P35-50/kilo; cauliflower and *atsal* (buying prices of P25 and P20, respectively) each turn in a P10/kilo net of capital cost, whereas beans (P12/kilo) net only P4/kilo.

Business Problems and Strategies

Everyone agrees that vegetable trading is indeed a lucrative venture, although Pacita qualifies that "it is no longer a rare job because anyone with some capital can get in, making it tough and competitive to stay in business today." But having

enough capital, according to all biyahidors, is still the key to sustaining their small trade. In this regard, everyone's greatest difficulty is how to recover capital that has been extended as credit to *suki* buyers who are market retailers in Valencia. For instance, four suki-buyers of Catalina owed her from P1000 to P5000 ($21-106, averaging P2500 or $53). In Wendy's case, the buyers' indebtedness was smaller, from P250 ($5) to P1000 ($21), but their number was greater. Biyahidors avoid extending further credit to such buyers and are in a quandary as to how to collect the bad debts. Other difficulties encountered by micro entrepreneurs pertain to: (a) being forced to dispose of remaining stocks at a loss rather than have them spoil; (b) lack of capital and having to borrow from usurious lenders; (c) inability to increase prices owing to the lower "grade" or quality of their vegetables and presence of competition from non-Songco farmer-biyahidors who sell vegetables they produce at lower prices; (d) poorer quality of goods resulting from repeated loading and unloading, which happens when transport trucks resort to trip-cutting; and (e) incurring additional expenses at the marketsite for use of the toilet and bathroom.

To keep their small scale business afloat in spite of limited or small capitalization, the biyahidors observe the following strategies:

- Stretch one's capital by going to the supplier's farms to purchase at farm gate prices and to ensure that only the best quality of vegetables is bought.
- Buy in bulk and sell in bulk.
- Cultivate a *suki* relationship or regular trading partnership with both suppliers and buyers.
- Keep selling prices low to attract buyers.
- Choose cash buyers who pay promptly over those who buy on credit.

Social Benefits from the Network

Over so many years, the biyahidors have often traveled together to Loverslane Market while transporting their goods in the same jeepney or vehicle. At the marketplace, they eat together, chat during slack selling periods, exchange jokes and share problems. They enjoy each other's company and nurture a reciprocal relationship within the group. "Tulungan kami sa lahat ng bagay" (We help each other in all ways), they articulate. When one of the members has to leave her market stall (*pwesto*) for an errand somewhere or to eat out, she can count on another member to tend to her stall. This favor is likewise done in turn to any member in the future. Another social benefit enjoyed is "sharing" of buyers: This happens when a biyahidor cannot provide the goods required by her buyer and refers the buyer to groupmates who can. Or, in order not to lose face with buyers, a biyahidor can borrow goods from co-biyahidors to augment her stocks. Borrowing is also needed to be able to present a well-stocked stall that is attractive to customers.

Members of the group are bound by unwritten norms concerning the pricing of vegetable goods. Anyone with an oversupply of goods should sell to fellow traders at acquisition cost. Moreover, anyone who gets to Loverslane first and/or completes her display of stocks ahead of the others may set the standard prices. Among the biyahidors, Pacita often gets to set the prices of the group's goods because she is always early in the marketplace. For the sake of *pakikisama* (a Filipino value placing premium on willingness to be one with the group in its opinions and decisions, and to conform to group standards and expectations), the other biyahidors adopt the standardized prices. Anyone who attempts to deviate will be frowned upon, construed as selfish and "*walang* (no) *pakisama,*" and gossiped about by the group. Therefore, every biyahidor conforms to the norm to remain in the group's favor and to continue enjoying the benefits of interdependence.

Their Needs and Aspirations

All women biyahidors look forward to continuing their small scale vegetable marketing venture. Most of them feel that this would be better accomplished if they were formally organized or could join an organization that functioned to hear their problems, address their collective concerns, and mediate with proper authorities or external groups. Donna and Wendy wish that a defunct market association that once served the biyahidors could be revived, especially to provide micro financing for their business and counsel on how to collect the debts of delinquent buyers. Next to having an organization, some biyahidors have expressed their alleged collective desire for a *bodega* to be set up in Loverslane Market to function in much the same manner as those found in Cagayan de Oro City's market. The *bodega* would serve as their marketing outlet, a place for delivering their goods and attracting wholesale buyers. It is also envisioned to serve as their intermediary or another tier in marketing, as the *bodega* and not the biyahidors would directly transact sales with buyers. Only one member of the group wishes to have her own means of transport like a truck for marketing vegetables; this is expected to improve her efficiency as a biyahidor and free her from the woes of depending on public conveyances.

Summary and Conclusion

This particular group of Songco women biyahidors is not known by any collective name, but its members are distinguished by shared common traits. They are married, have a large family size, obtained a low level of formal education, turned to vegetable trading due to poor returns from vegetable production, and now possess a remarkably long track record of micro vegetable entrepreneurship. While members of the group operate their small trading businesses independently of one another and cultivate their own business partners, they are nevertheless linked in an informal web of socioeconomic ties that have flourished through the decades and amidst fluctuations in market demand for their goods. While there is no visible hierarchy in the group, members gravitate toward the eldest and most senior in business acumen and experience.

Immediate cash income from the trade has drawn the biyahidors to market rather than grow their vegetables. Earning it in an agricultural setting has propelled them to the position of major provider for the family, and gives them a greater voice in household decision making. The biyahidors' spouses show support but hardly interfere in the trade they have mastered. The closeness of suppliers' farms to their homes eases the procurement and pre-market transport and storage of goods. Hence, balancing the necessities of business and home care becomes convenient for the biyahidors.

Micro vegetable entrepreneurship has boosted the women's economic power at home and enhanced their social capital at work. Though it has not made them well off, they would not have the trade-offs for self and family any other way.

What is truly remarkable about the women is their tenacity in holding on to their trading business in spite of the many challenges they have encountered. Baden (2008) refers to trading as a "value addition opportunity" that can move women "up the value chain" into new, more profitable market sectors. With this tenacity, the Songco women biyahidors could accomplish far more if given the appropriate support from government agencies to strengthen their leadership and decision-making skills, enable them to learn about product quality assurance or consumer preferences, and to build a formal organization that could create direct links with bulk buyers and consumers from institutional markets to broaden their access to new markets. The case study findings imply that it becomes quite imperative for government to prioritize the support policies and program investments that could further empower the many women agricultural traders represented by the case study subjects. These policies and programs should be those that provide women traders access to credit or financing for their micro-enterprises, as well as to capability building or trainings on simple agribusiness strategies, managing finances (particularly recording and balancing income and expenditures), product packaging and quality control, organizational leadership and membership development, and the institutionalization of market alliances or networks.

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Women Farmers and "Angels of the Earth": Piloting Vermicomposting in a Vegetable-AF System

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ABSTRACT

Earthworms are known as "angels of the earth" in ancient China. In the last 40 years, the value of these earthworms to farming has been introduced in the Philippines through vermicomposting, a technology that uses them to convert biodegradable wastes into high quality compost to be applied to plants as organic fertilizer. The potentials of vermicomposting for managing solid wastes, improving soil fertility and safeguarding human health have been investigated. But how gender-responsive is this technology for women farmers in an integrated vegetable-agroforestry (VAF) system? Responding to the need of women farmers for cost-saving fertilizer inputs, a pilot vermicomposting project using African nightcrawler species (Eudrilus eugeniae) was started with 10 women farmers who produced commercial vegetables and agroforestry crops in an upland barangay of Lantapan, Bukidnon. Although the women received the same material inputs and most went through the same technical training, the results of their trial vermicomposting practices varied. Nevertheless, the following findings stood out. The technology was not only easy for women to adopt, but it had also been able to harness the interest and participation of male spouses and children. Replacing urea and chicken dung with vermicast had generated savings that women could channel to pay for other pressing household needs. Based on some initial sales of worms and cast, it promised to be a lucrative source of additional income that could be sustained on minimal capitalization. Moreover, women's scientific interest was aroused as they experimented on which combination of organic waste materials from VAF farms could yield the greatest worm and cast harvests. The major challenge lies in standardizing the women's vermicomposting practices to attain maximum potential gain for both women and the environment.

Keywords: *Women farmers, vermicomposting, sustainable technology, organic fertilizer*

INTRODUCTION

It is quite well known that agricultural women in developing societies play a foremost and active role in eliminating food insecurity and alleviating poverty in their households through their farm production and marketing or entrepreneurial activities. Ironically, women's importance to agricultural production is sidetracked as agricultural policy makers and program planners mainly target men for technology training and dissemination. This is because men are traditionally acknowledged as heads of households and they have access to critical resources (Upadhyay 2003). Rural extension and training are also directed at the formal commercial sector that is dominated by men rather than at the informal subsistence sector where the women are (Cahn and Liu 2008). Moreover, women are further constrained from benefiting from extension and training schemes owing to heavy reproductive and productive responsibilities attached to their gender roles and poorer literacy skills or lower educational levels compared to men (Ibid.). Technology development has therefore neither been gender neutral nor gender sensitive because of this male bias (Chiong-Javier 2009).

The Food and Agriculture Organization of the United Nations (2003) defines technology as comprising "hardware (such as seeds, vaccines or machinery), management practices and techniques (such as soil and water conservation practices, post-harvesting and crop mixes), and increases in knowledge (whether traditional, modern, or some combination of the two) that strengthen local capacity for experimentation, communication, and general resource management." Technologies are considered to be gender responsive if these meet four aspects: (1) pay due attention to gender-differentiated needs and constraints, (2) reduce drudgery among women, (3) allow women release time for engaging in alternative activities, and (4) promote women's labor efficiency and sustained household economic and welfare gains (Ibid.).

Providing access to technology can have dramatic life-changing effects on women, especially in societies where they are culturally marginalized by social

ascriptions and culturally-defined gender roles. Murthy et al. (2008) found that poor, young, unskilled women from landless, marginal and small farming households in Tamil Nadu, India who were trained in hybrid seed production were able to use their knowledge and skill to acquire economic assets (jewels and grinders) for themselves or to be used for their dowry (if unmarried), increase their mobility and confidence, and have a greater say in deciding on economic issues within the family. Though it would take more to empower the women, these benefits served as a beginning for many of them to later form self-help groups that obtained loans to engage in successful eco-friendly income generation programs. Ramaswamy and Sengupta (2002) noted that rural Nepalese women's exposure, use and/or ownership of treadle pumps for irrigation gave them a larger role in irrigation and created a new role in marketing. The technology enabled women to emerge as micro-entrepreneurs, thereby helping to alleviate their economic hardships and bring about marked shifts in their identities. In another study, Upadhyay (2003) observed that Nepalese Dalit women had undergone a change in their socioeconomic status in patriarchal communities after adopting drip irrigation in order to use scarce water more productively for vegetable production in hilly areas. Moreover, drip irrigation proved to be a gender sensitive technology as it was easy to operate and maintain, and required less labor on top of being cheap. With increased vegetable production, women gained control over their income, spent more on food, clothing, health and livestock, and enjoyed greater self-reliance and self-confidence. In Southern Negros, Philippines, a crop diversification programme consciously addressed the needs of women farmer participants and developed appropriate technologies that had positive impacts on women such as reduction of time spent in fuel collection and in cooking, choice of greater variety of foods for home consumption leading to food security and better family health, more and stable livelihood opportunities, and overall improved quality of life (PDG-REAP 2001).

Whether or not women have access to life-transforming agricultural technology has become a measure of gender equitable development. Of late, two closely-

related technologies known as vermiculture and vermicomposting are increasingly becoming associated with this form of development, for they target and bring changes in the status and welfare not only of men but also of women. Vermiculture refers to the science of breeding and propagation of earthworms for the purposes of sustainable solid waste management and sustainable agriculture or organic farming (Sinha et al. 2009; Aalok, Tripathi and Soni 2008; ARRPET n.d.). On the other hand, vermicomposting is the process by which earthworms convert organic wastes into humus-like material known as vermicompost, vermicast or vermicastings (Sinha et al. 2009; Munroe n.d.).

Vermicompost or vermicast is described in varied ways. Ruehr (n.d.) refers to it as "fecal pellets called earthworm castings" while Perilla, Alcantara and Violanta (2009) describe it as "an odorless, organic material excreted by earthworms that contains quantities of nitrogen (N), phosphorus (P) and potassium (K) as well as other micronutrients" that are essential for plant growth. It is similarly described by Sinha et al. (2009) as a "metabolic product of earthworms feeding on organic wastes" that is "proving to be highly nutritive organic fertilizer and miracle growth promoter rich in NPK, micronutrients, beneficial soil microbes, and plant growth hormones and enzymes." Hence vermicast can build up soil, restore soil fertility, sustain farm production, as well as deliver safe food to society (Ibid.).

Vermicomposting and Women

The value of earthworms in plant propagation has been recognized since the 10th century when an Indian scientist Surpala wrote about it in his book on the "Science of Tree Growing" (cited in Sinha et al., 2009). Much later in 1837, observations on the role of earthworms in renewing soil fertility led the English scientist Charles Darwin to refer to earthworms as "unheralded soldiers of mankind and farmer's friend working day and night under the soil," and his publication renewed scientific interest in vermiculture studies (Ibid.). The

valuable work of earthworms in agriculture must have been noted even among the olden Chinese whose ancient character for worm means "angels of the earth" in English (cited in Montesines 2007). In recent times, the earliest reported vermiculture study was undertaken in Connecticut in 1944 by Lunt and Jacobson (cited in Ruehr n.d.). However, it was not until 1970 that the first serious experiments for managing municipal or industrial waste through vermicomposting were established in Holland and subsequently in England and Canada (Sinha et al. 2009). Before long, vermiculture or vermicomposting studies and practices spread to the United States, Italy, the Philippines, Thailand, China, Korea, Japan , Brazil, France, Australia and Israel (Edwards 1998; Edwards and Bohlen 1996).

In the Philippines, vermiculture and vermicomposting have been in place in the last 30-40 years, although they gained popularity only in the last decade (Sinha et al. 2009; Aalok, Tripathi and Soni 2008; TOFIL n.d.). The person credited for pioneering the vermicomposting science and technology in the country and in Southeast Asia is Dr. Rafael Dineros Guerrero III, a multi-awardee and 2008 recipient of The Outstanding Filipino Award or TOFIL. Guerrero embarked on his first vermicomposting research in 1978 to seek alternative high-protein feeds for fish (Perilla, Alcantara and Violanta 2009). Based on his TOFIL profile, his work consisted of trying out the best suitable species of composting earthworms and earthworm meal production (vermimeal). The results of his research were presented in a prestigious international symposium where he was the only presentor from Southeast Asia; this eventually earned him the reputation of international vermiculture expert. At the symposium, Guerrero came to know the German scientist Dr. Otto Graf who introduced him to the African

Nightcrawler (*Eudrilus Eugeniea*) or ANC, a prolific composting species. In 1982, Guerrero in turn introduced the African Nightcrawler in the country for the commercial production of vermicompost. Dissemination of this technology was focused on boosting earthworm production for fishmeal but owing to its high capital outlay and the comparatively lesser cost of commercial fish feeds at the time, the vermicomposting industry collapsed two years later in 1984 (Tan 1985).

Concerns for sustainable agricultural development, organic farming and healthy living have brought back the popularity of vermicomposting. The rising costs of commercial fishmeal and chemical fertilizers have made the products (worm castings) of this technology an attractive alternative for fisherfolks and farmers alike. In 2006, the National Vermicompost and Vermimeal Production Program (N2V2P) was initiated with support from the Philippine Japan Program for Underprivileged Farmers of the National Economic Development Authority (NEDA) and coordinated by the Philippine Council for Aquatic and Marine Research and Development (PCAMRD) of the Department of Science and Technology (DOST; Agriculture Business Week, January 2009; TOFIL 2008). As of March 2009, about 16 regional vermicompost and vermimeal production centers based in state colleges and universities throughout the country have extended the transfer of technology to the countryside (Flores 2009). Guerrero (cited in TOFIL 2008) estimated that more than 20,000 farmers nationwide have adopted vermicomposting to date.

Analyses of the properties of vermicompost, especially its nutritive value for plants and beneficial uses for agriculture and the industries, appear to be well documented especially in India (Flores 2009; Sinha et al. 2009; Bhawalkar 1994; ARRPET n.d.) and manualized (see Munroe n.d.; Cruz n.d.). In agriculture, the end benefits to farmer practitioners and environment may be generally summed up in the following statements (Flores 2009; Sinha et al. 2009; Perilla, Alcantara and Violanta 2009; TOFIL 2008). Farm organic wastes are managed effectively as these are put to good use when converted by earthworms into vermicompost or vermicast from which vermitea (fermented water extract of vermicast that is

also known as vermiwash) can be obtained. Application of vermicast and vermitea improves soil fertility, increases crop yield, and induces biologiocal resistance to pests and diseases in plants. It also reduces and has been known to stop farmers' dependency on costly, petroleum-based chemical fertilizers.

However, only some piece-meal accounts have been found for review on the impacts of vermicomposting on small-scale farmers, particularly women farmers in Southeast Asia who have adopted the technology. The United Nations Development Programme (2008) reported how Nepalese women utilized the unmanaged waste of 165 private and park elephants in Sauraha, a popular tourist hub of Chitwan National Park that offers jungle safari and elephant polo adventures. The elephants produced a total of 21.5 metric tonnes of dung a day which were collected to dry in a dumpsite and eventually burned, posing a threat to the environment. With external assistance, 12 women produced in a common worm shade house an initial amount of 2 tonnes of organic manure (vermicast) from elephant dung and earned Rs.24,000 in the process. The worm shade house also turned out to be another tourist attraction. The group's economic success motivated 60 more women in the village to start vermicomposting in the vicinity of their own houses. The villagers felt that vermicomposting was a good start to replace the use of chemical fertilizers and help save on the cost of importing these.

A similar account was made by Prabu (2008) about how a group of three women farmers in Kerala, India became successful entrepreneurs due to vermiculture technology. These women hailed from poor smallholder families who are dependent on their husbands' limited income as daily agricultural laborers. In their search for an income generating opportunity that did not require any major investments and could be done during leisure hours, they ventured into vermicomposting with help from a research institute. Upon receiving the institute's advice, they formed a self-help group in order to avail of a Rs.5000 loan and other subsidies from the local Panchayat. The institute contributed the earthworms and the women's loan was used to construct a vemicomposting

unit– consisting of four tanks with ant wells around them and protective iron net frames on top–which was all housed under a temporary thatched shed located in the land of the woman leader. Kitchen and farm wastes along with cow dung were used for compost production. The women took turns in maintaining the composting unit and, after 60 days, made a first harvest of 200 kgs. of vermicast. Their success motivated them to start small-scale cultivation of vegetables, banana and others that were intercropped with coconut palms in their farms. Two women eventually relied completely on vermicompost for organic farming. Excess compost were sold and in two years the women realized a total income of Rs.53,514 from vermicompost alone. There was a high local demand for vermicompost, but the women's group could not produce enough to meet this demand.

Possibly because vermicomposting was becoming known for its potential to generate wealth from waste, the Forest Research Institute in Uttaranchal, India proposed a plan for a project that would generate income through vermicomposting for rural women in the area (Aalok, Tripathi, and Soni 2008). The project was expected to benefit at least 1000 women.

Though sparse in number, the foregoing accounts indicate the potential for vermicomposting to be a gender appropriate technology that is responsive to women farmers' needs. What is quite notable is the apparent paucity of local literature on the topic, a research gap that this paper about the pilot vermicomposting experiences of a small group of Filipino women farmers wishes to address. The paper also aims to discuss the benefits derived and the challenges encountered by these women.

Objective and Methodology of the Pilot Project

The pilot project is an offshoot of a larger collaborative research undertaking entitled "Agroforestry and Sustainable Vegetable Production in Southeast Asian

Watersheds," which involved local institutions in three countries (Indonesia, the Philippines and Vietnam) and US-based partners under the leadership of North Carolina Agricultural and Technical (NCA&T) State University. This research was supported by the United States Agency for International Development through the Sustainable Agriculture and Natural Resources Management Collaborative Research Support Program III (SANREM-CRSP) managed by Virginia Tech. It had six components, namely technology, market, policy, socioeconomic impacts, gender, and scaling up. Among several participating local institutions, the Social Development Research Center of De La Salle University in Manila was responsible for the market and gender studies of the Philippine research, while the World Agroforestry Centre (WAC) with its local office in Malaybalay, Bukidnon handled technology and policy studies.

The Philippine research site was Songco, an upland barangay in the municipality of Lantapan, Bukidnon Province. Lantapan was the focus of many years of agroforestry intervention programs of the WAC, but the introduction of vegetable cash crops caused the conversion of most agroforestry farms to monocropped farms. The municipality is now noted for the production of commercial or high value, temperate vegetables in the southern part of the country. Vegetable produce from Songco and other barangays in the town are brought to nearby urban markets and often trucked or shipped to institutional buyers like supermarkets, restaurants and hotels in metropolitan centres of the country. Most of the vegetable producers in Songco belong to poor smallholder households, where women are mainly responsible for marketing farm products and purchasing farm inputs like fertilizers and pesticides (Nguyen, de Mesa and Rola 2007; Rodriguez 2007).

In the course of SDRC's conduct of a focus group discussion among 10 women farmers to understand gendered market networks, their problems concerning the escalating cost of farm inputs particularly commercialized fertilizers (priced at P800-1500/sack) and the effects of inorganic inputs on the environment and human health were tackled. Though local farmers used chicken dung as a less

expensive organic fertilizer (at P100 for a 50-kg sack), this alternative was also becoming costly and hazardous to people's health as chicken dung smells badly and attracts a multitude of flies. The FGD participants' discussion on the means to address the high cost of fertilizers for vegetable production led them to consider vermicomposting as a win-win solution that could benefit both the women and their environment.

Vermicomposting in Songco has occurred sparingly and only in the last few years, according to farmers and technicians in the area. Evidence of this occurrence is reflected in a couple of signboards posted along the main barangay road that advertise the availability of vermicast for sale. Vermicomposting practices are reportedly private initiatives of individuals who have had access to training or information on the technology. Most of the FGD participants were thus only somewhat aware of the purposes and value of vermicomposting.

The SDRC, WAC and NCA&T became partners in conceptualizing the pilot vermicomposting project with the 10 women FGD participants of the SANREM III research. The main project goal was to provide the women farmers access to an inexpensive alternative to using chemical fertilizers in their vegetable farms through self production of vermicompost or vermicast. To realize this goal, the project would subsidize the women's training and demonstration on vermicomposting, as well as provide them with a starter kit composed of 2 kilos of earthworms and some canvass and netting for the vermibed. As their counterpart to the project, the women would provide the required vermibeds, substrates, and care and maintenance for composting.

In general, SDRC mobilized the resources needed by the pilot project and organized the women for the project activities. The technical training was conducted by WAC; it focused on the value of vermicomposting in agriculture and agroforestry environment, the nature of earthworms particularly the African nightcrawler variety, the appropriate types and mixes of substrates, care and maintenance of substrates, and harvesting method. WAC recommended a raised type of vermibed (on stilts) because the grounds were always wet due to the propensity for rain in the area. The training was followed up by a demonstration where a sample of the raised vermibed was established in the group leader's backyard and women were shown ready-to-use substrates for filling the vermibed and how to bed the earthworms. The project later requested assistance from the Municipal Agricultural Office and an agricultural technologist was sent to inspect their vermibeds and give advice on how to improve their vermicomposting practices. Both SDRC and WAC collaborated in documenting the women's practices.

Utilizing a small grant sourced from private donors at NCA&T, the project purchased canvass and netting materials that were distributed to the women. In turn, the women mobilized their households to establish the vermibeds in their back yards and prepared the substrates. When the vermibeds were ready, the project distributed 2 kilos of earthworms to each woman participant. The earthworm variety used in this pilot activity was the African nightcrawler or ANC. This was chosen for at least three reasons: (a) it is well adapted to local conditions, (b) it is locally available, and (c) it produces vermicast that is fine, odorless, and easy to apply as organic fertilizer. The literature in fact points to ANCs as "good composting worms" that "perform much better in

warmer climates" (ARRPET n.d.). The other reported attributes of ANC are: (1) enormous power of reproduction and rapid rate of multiplication, (2) sensitivity to light, cold and darkness, (3) ability to adapt to survive in harsh environment, (4) ability to rapidly degrade most organic wastes into nutritive vermicompost, (5) ability to reinforce decomposer microbes to promote rapid waste degradation, (7) ability to kill pathogens and disinfect their surroundings, (8) ability to bio-accumulate toxic chemicals and detoxify the medium in which they live, and (9) capacity to tolerate and reduce soil salinity (Sinha et al. 2009). As compost worms, the ANCs belong to the type known as *epigeic* (Greek for "upon the earth"), meaning they live in the surface litter, feed on decaying matter, and do not burrow deep into the soil (cited in Munroe n.d.).

Women's Vermicomposting Practices

The major activities of the women in relation to their practice of vermicomposting are establishment of the vermibed, preparation of the substrates, and care and maintenance of the vermibed during the culturing phase.

The women's vermibeds were constructed in their backyards, and often under the shade of a fruit tree or banana plants. Bamboo and tree poles were popular construction materials. The dimensions followed were not uniform but usually had a 1-meter width, 2- to 3-meter length, and around 1-meter depth. The vermibed was raised on stilts or poles so excess water could easily be drained. Canvass was used to line the sides and bottom of the bed to keep the earthworms inside, while netting covered the top

to protect the earthworms from predators like birds and chickens. To keep the vermibeds sufficiently dark, women would add a layer of banana leaves and palm fronds on top of the netting; they used another layer of old sacks and canvass sheets to shield the beds from the rain. In almost all cases, the vermibed was generally equally divided into two compartments with each one measuring about a square-meter–the first was stocked with substrates; the adjacent one was reserved for expansion. A woman's usual composting unit therefore consisted of a partitioned vermibed.

The substrates that the women prepared for earthworms to feed on were variable but could be classified under three types: (1) kitchen wastes like fruit and vegetable peelings, (2) farm wastes and vegetation including vegetable stalks, rotten crops and fruits, corn leaves, banana bracks, wild sunflower plants, and leaves from Madre de Cacao and Ipil-ipil trees, and (3) animal manure particularly from cows, carabaos, horses, and goats. Very few of the women measured the proportion of mixes in their substrates but were nevertheless able to say whether they put in more of vegetation or of manure. The substrates were sacked during the collection and the sacks were heavy so the women had to be helped by spouses and children. Freshly collected vegetation was allowed at least three weeks to decompose and decomposition was aided when these were kept in anaerobic condition like being packed in a plastic bag; livestock manure had to be dried first. Some women collected their substrates in a heap in the back yard and learned that this was not viable because some substrate types decayed faster than others.

After about three months wherein the women synchronized their establishment of vermibeds and preparation of substrates, the earthworms were distributed among them. The women themselves loaded or "planted" the earthworms in their own vermibeds. During the culturing phase, the women frequently checked on the beddings or substrates. Dry beddings attracted ants so they avoided this by periodic watering. At first they would check the moisture content of the substrates by pressing a fistful to draw out several drops of water. Later they could tell by looking if the bedding needed watering or not. Children were mobilized to help in this task. Because the women lived in close proximity to one another, they also usually inspected each other's composting units and shared or exchanged observations and lessons learned. When the project visited the women's composting units, they eagerly poked into the substrates of their vermibeds to show the size and appearance of the ANCs.

Harvesting was done when the substrates had converted to vermicast. One sign the women relied on was the migration of ANCs to the adjoining compartment in the vermibed, where more food from new substrates was available. The ANCs were also moved manually to the expansion box. Before harvesting, the women withheld water for a few days from the harvestable compartment so the substrates-turned-vermicast would be dry and manageable for harvesting.

Around five months after loading the earthworms, most of the women farmers (6 of 10) reported promising results which are presented in the following table.

As indicated in the table, the women's substrates consisted mainly of livestock manure. On the average, they had 2.3 harvests; this meant they had harvested

No. of Women	Main Substrate Used	No. of harvest	Total weight of earthworms (in kg)	Total weight of cast (in kg)	Usage of Cast
1	Cow manure	1	3.5	60	Farm
2	Horse manure	1	3.25	105	Farm
3	Sunflower, cow manure	5	30	284	Farm, sale
4	Cow manure	3	15	255	Farm, sale
5	Cow manure, vegetable	2	22	120	Backyard
6	wastes Vegetable wastes	2	8.8	180	garden Farm
Ave.		**2.3**	**13.7**	**167.3**	

from at least both compartments of their vermibed. The average weight of the ANCs they harvested was 13.7 kgs.; the average weight of the vermicast harvested was 167.3 kgs. (or 5.5 bags at 30kg./bag). If the women sold their average catch of earthworms, they would have realized P5,480 (at the current selling rate of P400/kg. of ANCs). In the case of vermicast, by selling their average harvest in 30-kg. bags, they would earn P1,512.50 in all (at the rate of P275 for a 30-kg. bag). But so far, only two women who had had 3-5 harvests ventured into selling. For most of them, the vermicast produced were for their farm use. They did not sell the ANCs because they were more interested in multiplying the earthworm biomass to increase the cast harvest.

Benefits from Vermicomposting

While it may not yet be currently possible to discuss the long-term benefits of women's adoption of vermicomposting, the study's findings have thus far revealed that the technology does indeed yield certain socioeconomic benefits for women farmers, to wit:

1. **Savings on fertilizer inputs –** Women have started applying the vermicast as organic fertilizer for vegetable crops instead of completely relying on expensive commercial ones like Urea (P1500/sack) and/or chicken dung (P100/50-kg sack) as organic substitute for Urea. Both types have to be purchased while vermicast can be produced by them with very minimal cost. One woman farmer recounted that she used to need one sack of Urea for her tomato production, but now she only utilizes less than half a sack because the vermicast she has been producing is able to fill in the rest of her fertilizer requirements. Savings on fertilizer inputs are used instead for buying other household necessities.

2. **Generation of additional cash income –** After about three months, at least two women tripled or quadrupled the volume of their earthworms and casts enough to venture into selling. The earthworms were sold at P400-500/kg. while the vermicasts were bagged and fetched P250-275/bag of 30 kgs.; their buyers were farmer-neighbors in the village. Those who have begun selling continue to eye the market for their earthworm/cast harvests. Their excitement over the prospects of earning cash income from vemicomposting is infectious, and it serves to motivate other project participants to do well in vermicomposting.

3. **Enhancement of household participation** – Through the women's leadership, entire households have been mobilized to cooperate in undertaking the different requirements of vermicomposting. The husband was initially tasked to construct the vermibed; this entailed obtaining local materials like wood and bamboo and providing labor for construction. In the case of one woman, a second vermibed was constructed in their farm vicinity by her husband, thereby expanding the household's vermicomposting practice. Normally, the wife headed the collection of substrates from the farm or surroundings of their house. Her husband and children, especially older sons, carried the heavy sacks of substrate (such as those containing sunflowers plants and livestock manure) to the backyard where the vermibed is located. Care and maintenance of the vermibed was mainly the responsibility of the wife, though children are asked to periodically water the substrate. She frequently checked on the conditions of the vermibed and the status of the earthworms. Sometimes helped by the husband, she also handled the harvesting of earthworms and/or cast.

4. **Increased knowledge through personal experimentation** – The women have improved on the knowledge they have gained from the training about appropriate substrates for vermicomposting through experimentation. Limited by the types of substrate available to them, they embarked on learning-by-doing and closely observed the effects of their options on the earthworms. For example, one woman found that there are advantages and disadvantages of mixing in the substrates spoiled or leftover and unchopped jackfruit from backyard trees. She said, "The earthworms loved to cluster and reproduce beneath large pieces of the rind where the conditions are

cool, moist and dark." But the resulting cast was littered with jackfruit rind and seeds that took longer to decay compared to other substrate mix; hence earthworms could not feed on them. Other women observed that banana bracks laid on top of the substrate have an effect on the earthworms similar to that of the jackfruit rind.

The woman farmer who had expanded her vermicomposting practice in the farm reportedly conducted her own field trial using primarily only their vermicast on 700 tomato plants. This was timed with her neighbor's tomato cropping activities. Both used the same seed variety; and where she only used vermicast with hardly any other fertilizer input throughout the cropping season, her neighbour applied the usual farm inputs (i.e., "complete" fertilizer, chicken dung and other agrochemical sprays). She noted that her tomato plants were more robust and the leaves were free from leaf curl (*kulot*); the fruits were also bigger in size and not worm-infested. Her neighbor's tomato plants were affected by pests and leaf curl disease which affected the yield. In the end, her harvest was bountiful though she failed to gain much from this mileage because of the drop in tomato prices at the market. She loved to retell her "success" story on the use of vermicast to her listeners. Women's continuing research initiatives are now triggered by their desire to determine the best combination of substrates to fatten the earthworms, hasten their reproduction, and increase the volume of cast production.

In addition, there are also two observed benefits of vermicomposting that accrue to the women's environment, as follows:

1. **Effective waste management** – In the practice of vermicomposting, women and household members collected farm, kitchen, and animal wastes to feed as substrates to the earthworms. The wastes were therefore put to good and productive use instead of left to rot or litter in surrounding environment and on the roads. These are now often sacked and stored in backyards in readiness for the next use.

2. **Improved soil fertility and plant quality** – Eager to try out the effectiveness of vermicast as a farm input, many women did not wait to produce a large quantity of cast before testing it on selected plants. The experience of the woman farmer who conducted her on-farm trial is a testimony to the benefits of vermicompost or vermicast for crop production. It is little wonder then that such experiences get recounted among the women. The accounts are influencing the locals' growing belief that vermicomposting is essential in improving soil quality and crop production, and this occurs without compromising their health or the well-being of their environment.

Challenges and their Implications

The foremost challenge appears to be related to the need for standardization of the women farmers' vermicomposting practices to maximize beneficial returns, particularly for increased production of earthworm biomass and vermicast. During their training, the women learned about the best practices regarding vermibed construction and maintenance, as well as substrate choice and preparation. Although the knowledge they received was uniform, findings revealed that there was a wide variance in the results of their pilot experiences and these are notable in their harvests of ANCs and vermicasts. What had caused such a wide variance in the results? What could have prevented women from adopting the best practices they learned about vermibed construction and substrate preparation? These are evidently some of the questions that must be included in investigating the factors that affected women farmers' actual vermicomposting

practices. The answers can be utilized in the design of vermicomposting training for farming women, especially in the vegetable-agroforestry setting.

In the literature, the type, mix (quality) and quantity of organic wastes appear to be quite significant in affecting the results from composting. As an example, in an analysis of substrates conducted by WAC, vermicast from the sole use of sunflower, goat manure and cow manure are the top three raters in terms of Nitrogen content (2.07 %, 1.87% and 1.65%, respectively). Among the combinations, the top three in Nitrogen content are 50% sunflower-50% cow manure (1.84% N), 50% sawdust-50% goat manure (1.76% N), and 50% sunflower-50% goat manure (1.70% N). Because the ANCs are voracious compost worms, what they feed on and how much food is available are crucial determinants of their reproductive rate and cast production. This implies a need for women to be more conscious about their substrate preparation because as practised, women collected what was only available to or convenient for them. Substrate preparation must be emphasized in their training.

Given the importance of substrates, attention should also be given to the location of the vermicomposting unit. As practised, the vermibeds were established in the women's back yard or home vicinity yet it was in the farm where organic wastes abounded. This vermibed location served to curtail the women's collection efforts for its distance from most sources of organic wastes meant carrying heavy sacks home and increasing the workload of household members.

In spite of these challenges, the overall findings of this study on the pilot project have proven very promising for vermicomposting as a gender-responsive technology for rural women farmers. The technology has indeed met women's social, economic and food security needs and has helped to boost their self-confidence and personal worth. Vermicomposting is also an appropriate venture for small scale farmers in general as the initial capital investment is quite low (less than P1000 for vermibed materials and 2 kgs. of starter worms), yet the beneficial returns are many and may be far reaching as these ultimately affect the welfare of both people and the environment.

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Health Consequences of Rural Women's Productive Role in Agriculture in the Philippines and Other Developing Countries

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Journal of International Women's Studies
Vol. 10 #4 May 2009 pp.95-110

ABSTRACT

Agriculture is central to developing countries like the Philippines and rural women contribute a substantial share of the labor that goes into this sector as food producers or agricultural workers. In the wake of numerous studies conducted worldwide about women since the United Nations' Decade for Women (1976-1984), data appear sparse on the relationship between women's work and women's health in the agricultural setting to enable policy makers and program implementors to adequately address their health needs. Thus this study aimed to determine the nature of available information in the gender literature to enable us to understand the link between women's productive farm work and their health status, and to elicit major implications for research to aid policy and program. The method used was a review and analysis of pertinent data in the research literature on agricultural women covering over two decades. Findings from the study reiterate the crucial role held by these women throughout the developing world in securing food for their families and communities, but then this role is not performed without adverse consequences to their health. The major consequences include female reproductive health risks owing particularly to women's use and exposure to hazardous agrochemicals, farm-related accidents or physical injuries, ergonomic problems resulting from women's use of tools or technology that are better suited to men, and nutritional deficiencies that are compounded by poverty and overwork. Other findings have surfaced two main research imperatives: the need for more updated and gender disaggregated national statistics on the status of agricultural women in developing societies, and the necessity for addressing various identified gaps in the women's work-and-health paradigm.

Keywords: Rural Women, Productive Role, Health Consequences, Philippines

INTRODUCTION

Women have long occupied a central place in agricultural production in developing countries, ensuring food security for their households and their communities. However, an initial analysis of the literature revealed that the importance of their role as food producers had received attention and support from both their national governments and international bodies only within the last 35 years. Scholarly interest in women was ushered in by various international activities which, spearheaded by the United Nations (UN), directed attention to the subject of women and food. Starting with the 1974 World Food Conference, women's contributions to the battle against world hunger was globally acknowledged. Through its declaration of 1976-1984 as the Decade for Women, the UN then introduced the concept of integrating women in development which subsequently became gender in development. The 1977 UN report "Women in Food Production, Food Handling and Nutrition" advanced these themes in the agenda of international organizations and national agencies that were oriented or reoriented to women and gender issues. It was believed, however, that the 1979 World Conference on Agrarian Reform and Rural Development provided the turning point as it underscored greater support for women's economic roles, a methodical accounting of rural women's contribution to agriculture, and provision for women's equitable access to productive resources such as land, water, inputs, and services (FAO, 1981 cited in Holmboe-Ottesen, Mascarenhas and Wandel, 1989).

These early events had helped to systematically awaken worldwide concern for farm women's welfare and inclusion in rural or agricultural development policies and programs. In their wake came funding support for rural women's organized initiatives such as alliance-building and various projects to address their specific needs. Also generated were a tremendous research interest on farming women and more avenues (particularly international conferences) for regularly assembling, discussing, and sharing information and research findings on the current state, unmet and emergent needs, and accomplishments of rural

women. Literature analysis shows that lessons from the women in development (WID) thrusts of the first two decades since 1976 firmed up a shift toward mainstreaming gender and development (GAD) in the nineties that seemed to have subsequently slackened but was revitalized in recent years.

In the course of the international call to act on rural women's welfare, many studies have been undertaken to establish or document their baseline situation especially the nature of their needs and problems, the determinants influencing their conditions, the necessary policy reforms and action projects, and the successes and failures of national efforts to address their needs. However, one sphere that has yet to receive adequate attention is the relationship between women's work and women's health in the agricultural setting. There was some impetus to build a database on the subject over a decade ago but this focused on the impact of pesticides and other hazardous agrochemicals on women. Particularly in the Philippines, previous studies as well as current investigations on women's health also tended to emphasize sectoral issues like maternal or reproductive health (see for example Chiong-Javier, 2005; Singh et al., 2003; Kantner and Wesley, 1998; Stewart et al., 1996). Moreover, while there are current researches targeting women farmers in the agricultural setting, these appear to concern non-health issues like gender roles and market participation (see for example Rodriguez, 2007).

To date, therefore, there remains some void in our knowledge about the health situation linked to rural women actively engaged in agriculture or food production activities. What kinds of information and how much of it are available to enable us to understand the connection between the productive work of agricultural or farm women and their health status? What does the information imply about the research directions in this field of interest? A literature review covering research and related publications on women in agriculture was conducted to provide some answers to these queries and to draw out major implications for further research particularly in the Philippines. Originally, I intended the review to focus only on relevant literature in the last decade, but finding inadequate sources, I expanded the coverage to earlier materials.

Agriculture and Women

Why study agriculture and women? There are three basic arguments that can be used to rationalize a research thrust on women in agriculture in developing countries like the Philippines.

One, despite inroads created by industrialization in past decades, agriculture continues to predominate in the economies of developing countries. Unfortunately, in spite of its importance to a developing economy, this sector has generally not merited adequate national attention and budgetary support. In the Philippines, around a third (32.2%; NSO, 2002) of the country's 30 million hectares is agricultural land and agriculture contributes over a fifth to the country's Gross Domestic Product (Tanzo and Sachs, 2004). Notwithstanding this fact, agriculture's annual share of the total public expenditures has been a pittance: it hardly reached 5% in the last decade (PPI, 2004; Briones, 2002). Instead, for the years 2002-2004, the annual share steadily declined from 3.61% to 2.93% (NSO, 2002) furthering the sluggish growth of Philippine agriculture. The inadequate budget has hindered the maintenance and expansion of vital agricultural services such as irrigation support and production loans (PPI, 2004). Compounded by other factors like limited access to productive resources or employment opportunities and increasing landlessness, this intensified poverty among the broad ranks of rural folk, especially the many women who depend on agriculture for their own and their family's survival. Thus the Philippines Peasant Institute (PPI) (2004) has concluded that poverty is a persistently rural phenomenon in the country today, with the rural sector accounting for four out of five poor Filipino families. In a recent statement, the National Statistical Coordination Board (2008) also declared that national poverty has worsened in 2006 with 33 out of 100 Filipinos (or 4.7 million families) being poor and concentrated in the rural areas.

Two, agriculture provides work to half the world's labor force (estimated at 1.3 billion workers) and almost three-fifths (60%) of the total economically active population in developing regions compared to less than a tenth in developed countries (Forastieri, 2007; ILO, 2000). More importantly, farming persists as the sole means of subsistence or source of income for some 70% of the world's impoverished rural populations (FAO, 2003 cited in Garcia, 2004). In the case of the Philippines, Briones (2002) reported that agriculture provided subsistence, employment or income to two-thirds of the country's population. This converts to around 58.45 million people based on the 2007 total Philippine population of 88.57 million (NSO, 2007). Since agriculture is known to support three-fourths of the country's poor and about half the nation's total workforce (Briones, 2002), it thus takes on an overwhelming importance to the country.

And three, women contribute a large share of the labor that goes into agriculture whether as independent food producers or agricultural workers. In developing nations, two-thirds of the female labor force is engaged in agricultural work (FAO, 2003 cited in Garcia, 2004). In terms of their proportion in the agricultural labor force, women account for 80% in Kenya, 73% in Congo, 65% in Afghanistan, and 40 or over in Zimbabwe, Latin America and the Caribbean (RAMP, n.d.; Kavoreria, 2003; ILO, 2000; Rojas, n.d.). In the Philippines, about 13.5 million women comprised the labor force in rural areas in 2004; and of the total employed women in agriculture in 2002, 51.4% were unpaid family workers, 30% were own-account workers, 18.6% were wage and salary earners (NSO, 2004).

It is said that conventional statistics often belie the true picture of the magnitude of women's involvement in agricultural activities in developing countries. According to FAO (2003, cited in Garcia 2004), although rural women are economically active, their livelihood and income-generating activities as unpaid family labor, subsistence crop producers, landless workers, agricultural traders or market vendors, and operators of micro-manufacturing enterprises are not counted in official statistics. This implies that the figures representing rural

women's involvement in agricultural work are actually higher than reported ones in a country's gross domestic product. One explanation for the under-representation of women's work in agriculture is the tendency of many cultures to view women's unpaid work in family farms as a mere extension of their domestic duties (FAO, 2003 cited in Garcia, 2004). This is the context in which women are described as "invisible." Because of their invisibility, they are overlooked in agricultural development policies and programs that are generally partial towards men.

In Philippine agriculture, when compared to their male counterparts how have women farmers fared, particularly after government attempts in the past decade to correct gender inequality in its agricultural policies and programs? The literature shows that it would be incorrect to say that there has been no positive increment to farm women's welfare of such attempts. But the increment seems insufficient to make a dent in their lives or to alleviate their poverty, as implied by the following data:

- Access to land – Women comprise only 22 % out of the total number of agrarian reform beneficiaries who received land from government reportedly after 10 years of implementing the Comprehensive Agrarian Reform Program (CARP) and four years since the issuance of a policy aimed at ensuring gender equality in land titling (PPI, 2004).
- Access to productive resources – Only 24.5% are women beneficiaries of the Department of Agriculture's program for rice, corn, high value crops, and livestock (PPI, 2004). An earlier study found that while major credit schemes are continuously channeled to male farmers, an increasing portion of credit funds disbursed by nongovernment organizations (NGOs) are directed to women but the loans obtained by the latter generally remain small and often lacking to increase the scale of their operations (Illo et al., 1995).
- Access to agricultural extension services – Only 5% of the extension services have gone to women (FAO cited in PPI, 2004).

- Ability to influence agricultural policies as decision makers – Women comprise only 18.5% of agricultural managers (PPI, 2004) and hold only 20% of the positions in decision-making bodies at the village level (FAO-SD, 1996).
- Income from agricultural wages – The average daily income of rural women wage earners is reportedly only Php23.00 (or $0.48 at Php48.00/dollar) which is less than the earning of male farm workers. A woman is said to earn only 36 centavos for every peso a man earns in the agricultural sector (PPI, 2004). While these reported figures are evidently dated, it cannot be denied that women's wages in the farming sector are way below those received by men.

Women's Productive Work in Agriculture

The economic or productive role of agricultural women is characterized by their participation in two separate yet possibly overlapping areas: (a) as hired laborers in farm-related operations of other landowners, commercial plantations, and agribusiness corporations, and (b) as farmers or family workers in owned, spouse- or family-owned, and/or leased farms.

Briones (2002) reported that women agricultural wage earners often land in lowpaying, casual, piece-meal jobs. On the other hand, Rengam (1994) found that in some parts of Asia where women occupy the most subordinate roles, they are the lowest paid workers assigned to the most strenuous or hazardous tasks like mixing and applying pesticides. Engaged as hired labor in farming systems, Asian rural women including those in the Philippines generally figure prominently in transplanting, weeding, harvesting, threshing, and manual paddy processing but the males outnumber them in ploughing and non-manual or mechanized work (Swaminathan, 1998; OWID, 1997).

Various studies have shown that, as heads or members of rural farming households, women farmers are recognized for their fundamental role in producing food and thus ensuring food security for the household. Food security exists, according to Clay (2002), when family members have physical, social and economic access at all times to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. In Population Reports (1997), it is stated that as much as 90% of all food for home consumption is reportedly grown by women in developing countries, to wit: in sub-Saharan Africa, women grow 80-90% of all such foods; in Asia, 50-60%; in the Caribbean, 45%; and in Latin America, over 30%. Holmboe-Ottesen et al. (1986) explained that the role of African women farmers is the most documented in the literature owing to a special interest in their combined situation as paramount yet socially disadvantaged food producers. The PPI (2004) found that in the Philippine case most women farmers are in staple food production notably rice (37.36%) and corn (26.81%). However, those in rice-farming have attracted more studies because of their relative size and importance in growing the country's staple crop and the International Rice Research Institute's program of institutionalizing women's concerns in agricultural research and extension (PPI, 2004; OWID, 1997).

Women's farming roles are usually gender-differentiated–that is, certain tasks or responsibilities are handled only or mostly by the women–and may vary by crop. Philippine data show that gender division of labor is distinct but not necessarily rigid. The men traditionally undertake land clearing and preparation (except where minimum tillage is required like in home vegetable gardens), spray chemicals and fertilizers, and carry out more mechanized tasks. Women, on the other hand, supply a major part of the labor for planting, weeding, and harvesting; they are heavily engaged in post-harvest tasks such as threshing, processing, and marketing, and are increasingly involved in transporting produce to the market where transport facilities have improved (FAO-SD, 1996). Rice production in the country has long been a women's domain, hence seed selection, uprooting and transplanting of seedlings, and storing of grains are part of their major role (Garcia, 2004). Moreover, studies of women's involvement in

rice and vegetable production show that the majority (93%) also spray pesticides (Rengam, 1994) and pesticide-related activities multiply in the vegetable arena (Tanzo and Sachs, 2004). In the banana and pineapple plantations of Mindanao, women are preferably hired as ground sprayers, harvesters, canners, and packers because they "do not smoke and are easier to handle" (quotes in Sarcos, 1997). Those in coconut and sugarcane areas attend to planting and weeding while their male counterparts handle harvesting and processing like milling or making copra (Illo et al., 1995). In commercialized vegetable production, very recent data (Chiong-Javier and Catacutan 2005) reveal the women's principal tasks to consist of planting, weeding, harvesting, and sorting the size/quality of the produce. Their husbands are mainly responsible for land preparation, spraying, staking, tying plants to stakes, hauling, and crating or "sacking" the produce. In larger farms, wives take on the added tasks of hiring, supervising, and paying the field laborers. In some notable cases, those with capital become "biyahidors" who buy other farmers' vegetable produce to sell in the city market and sometimes double as small-time money lenders to obtain an exclusive right to buy the lendee's produce.

In relation to food production, farm women in the Philippines and other developing countries are also mainly responsible for raising poultry, swine and/or goats and collecting animal fodder, whereas tending to the carabao (water buffalo) and cattle is a male responsibility (OWID, 1997; FAO-SD, 1996). With regard to women in upland households engaged in agroforestry, apart from farming they predominate in handling vegetative contouring, planting and establishing trees, weeding, caring for trees, and selling forest products in the market (FAO-SD, 1996). Particularly in South Asian countries like Nepal and India where women spend 3-5 hours per day simply to collect animal fodder and fuelwood for cooking, growing trees assures them some supply of both fodder and fuelwood as well as cash income (OWID, 1997).

Over the past decade, some developing countries encountered a decreasing trend in the number of their female hired labor but experienced a corresponding rise in unpaid female farm workers. In India, women lost out during the shift from

cultivating labor-intensive rice crops to other cash crops requiring less female labor, but they progressively took over more farm work when male cultivators increasingly joined the market economy (Darley and Shanmugaratnam, 1994). In the Philippines, the rate of female employment in agriculture has reportedly been declining since 1994 due to trade liberalization policies (resulting from the World Trade Organization's Agreement on Agriculture) that dampened rural incomes to the point that family labor replaced unaffordable hired labor. Other effects were increased labor outmigration as farm women chose to work abroad and increased transfer to the non-farm informal labor sector as they became vendors, retailers, cosmetic dealers, laundrywomen, beauticians, or domestic helpers (PPI, 2004). With greater poverty, it seems that rural women are further marginalized by their absorption in unpaid agricultural activities or their move to lowly paid off-farm employment.

Health Consequences of Agricultural Women's Work

Forastieri (2007) of the International Labour Organization described agriculture as one of the three most hazardous sectors of human activity in both developing and industrialized countries, along with mining and construction (ILO, 2000). Women's work in the agricultural sector as farmer or wage earner is therefore not without serious health repercussions. The literature on rural women's health indicates that reproductive health risks, occupational accidents, and ergonomic-related problems directly stem from the nature of the work they perform, but nutritional problems appear to be influenced by their intertwining productive and reproductive or domestic roles.

Reproductive health risks

Reproductive health has been defined as the ability of healthy women to bear healthy children with healthy men thus enabling their children to develop into healthy adults with the same capability (Ohanjanyan, 1999). This basically means

freeing women from illness, disease, disability, violence, and other harmful practices related to sexuality; it also implies safe motherhood (ICPD cited in Dodoo and Ezeh, n.d.). The women's reproductive role pertains to their exclusive child bearing function and almost exclusive child rearing and home management tasks. Because of this role, investments in their reproductive health are considered to leave far-reaching implications for the health and future well-being of children and men as well. Reproductive health risks of women are problems that afflict their reproductive system and hinder their overall reproductive and productive capacities.

These risks may already be present when women render extremely time-consuming and heavy work under deprived economic and technological conditions in developing economies. However, numerous studies have invariably pointed to one particular work situation–women's use and subsequent exposure to pesticides and other hazardous substance–as the predominant cause. Introduced as an indispensable part of modern crop production, pesticides and fertilizers top the list of agrochemicals applied to crops, which include fungicides, herbicides/weedicdes, nematocides, rodenticides, and other poisons for various crop pests or vermin. These are among the nearly three-quarters of a million chemicals and chemical compounds reported by ILO (2000) to be in agricultural use throughout the world, with many of them said to elude assessment of their potential harm to people. According to Ohanjanyan (1999), nine pesticides are in the 12 most damaging chemicals classified as Persistent Organic Pollutants (POPs) and recommended to the UN for elimination or reduction by the Women's Environment and Development Organization. These are (1) DDT or its breakdown product DDE, (2) Aldrin biphenyls, (3) Dieldrin, (4) Endrin, (5) Chlordane broad spectrum, (6) Heptachlor, (7) Hexachlorobenzene, (8) Mirex, and (9) Toxaphene (PSR monitor, 1998 cited in Ohanjanyan, 1999).

Pesticide use has become quite pervasive among farmers in developing countries as evidenced by the growth of this practice from 37-55% over a past 10-year period (1983-1993; ILO, 2000). Its popularity in the Philippines can be traced to

the Green Revolution era in the sixties and seventies that introduced pesticide use as a prerequisite input to obtaining high rice yields. Boosted by available subsidies and loan schemes, farmers sprayed their fields as much as 15 times per cropping season (Tanzo and Sachs, 2004). Chemical dependence has become an acceptable norm to the extent that it is increasingly being adopted even by subsistence farmers engaged in some cash crop production in upland areas today.

While all agricultural workers are equally at risk from prolonged pesticide use and exposure, women face so-called "gender-specific" reproductive health risks. Persistent organic pollutants tend to accumulate in fatty tissues of living organisms (Ohanjanyan, 1999), making women biologically prone to their toxic effects because women possess more fatty tissues than men (Leyesa, 2004). Findings of epidemiologic and occupational studies done mostly in the west have found that toxins stored in women's bodies increasingly predispose them to various reproductive health disorders and malignancies including hormonal disruptions or interferences in the estrogen level that alter the normal menstrual cycle, pregnancy complications, miscarriages, stillbirths, birth defects, delayed pregnancy, reduced ability to breastfeed, endometriosis, and cancer of the breasts and ovaries (Ransom, 2002; Ohanjanyan, 1999; Rengam 1994). Moreover, pesticide residues are passed on by mothers to babies through breastmilk. Studies have reported the presence of 4-12 times higher than the acceptable levels of DDT metabolites called DDE in breastfeeding infants located in developing countries like Brazil, Zimbabwe, and China (Ransom, 2002). In particular, women workers who are hands-on with pesticides even while pregnant or breastfeeding such as the banana and pineapple plantation workers in the Philippines (Tanzo and Sachs, 2004) are among those at really great risk.

In poorer agricultural societies where women work with pesticides, their situation is compounded by exacerbating factors linked to poverty and exclusion from agricultural extension programs that normally target men. In the case

studies of eight Asian countries including the Philippines, Rengam (1994) reported that most women farmers and workers came in direct contact with pesticides as applicators but many could not read labels and follow instructions owing to illiteracy or low educational attainment, rendering them unaware of the adverse effects of pesticides. In that same study, Rengam found that farm women in the Philippines, Malaysia, and Pakistan narrated the ill-effects of pesticide use in quite general, vague, or hazy terms, viz., being poisoned, feeling dizzy or nauseous, having breathing difficulty, sneezing, itching, muscular pains, skin burns or blisters, nail discoloration, red or "sore" eyes, and death. The women said they failed to wear protective clothing because this was unavailable, unaffordable, unfit for the climate or unknown to them; and if resorted to, the usual means of protection was a handkerchief or cloth placed over the nose and mouth. They could not immediately remove pesticide residues from their bodies because washing facilities were absent in the field where spraying occurred. Moreover, they engaged in improper practices like mixing pesticides with bare hands or disposing of chemical leftovers and containers in home vicinities (Rengam, 1994).

Other complicating factors are the tendency to overlook the multiple kinds of activities covered under the phrase "pesticide use" and the blurred distinction between what differentiates working areas from living areas in an agricultural setting. Most often, pesticide use is understood as mere spraying or application of the chemical. However, studies like that of Tanzo and Sachs (2004) have uncovered its multiple nature especially as handled by women, i.e., mixing is pre-application work but post-application activities range from cleaning the pesticide equipment/tank to disposing of excess pesticide mixture and used pesticide receptacles, storing unused pesticide and tank, placing and monitoring pesticide traps around the field or storage areas, and washing pesticide-soaked clothing. Even when it is the men who spray the pesticide, a number of these activities are assumed by women as part of their domestic obligations (Ransom, 2002). Moreover, in agriculture there appears to be no sharp distinction between living and working conditions so much so that pesticide containers are easily misused

or recycled as food and water receptacles and pesticide leftovers are dumped in the back yard, exposing families to contamination (ILO, 2002).

Occupational accident

Because agriculture is one of the most hazardous occupational sectors, Forastieri (2007) estimated that over 51% (170,000) of the total of 335,000 fatal workplace accidents worldwide are composed of agricultural workers, with the highest frequency and fatality rates of injury or mortality being caused by farm machinery or non-chemical occupational accidents. Unlike those in other work sectors, therefore, agricultural workers run twice the risk of dying on the job (Ransom, 2002). In addition, mortality rates in agriculture have not stopped rising in the industrialized and developing countries, compared to the mining and construction sectors where the trend is declining. The increasing numbers of mechanical, ergonomic, biological and chemical hazards are said to be the main causes of high incidences of accidents, physical injuries, and occupational diseases (ILO, 2002).

In developing countries, both female and male workers are at risk because of usually inadequate education, training, and safety or protective mechanisms. But Tanzo and Sachs (2004) claimed that the women face higher risks in those societies where their use and exposure to chemicals are greatest and where they are forced to increasingly take over the tasks vacated by men who migrate to seek off-farm employment in the cities and leave the farming to their wives. Other than this account, not much empirical data was available in the literature to determine the impact of agriculture-related accidents or physical injuries on women per se.

Ergonomic-related problems

Current ergonomic research in developing countries is said to be focused mainly on the industrial sector and not on agriculture (Forastieri, 2007). Nevertheless, ILO (2002) has pointed out that the transfer of western technologies carries

ergonomic implications for their users in developing countries because imported technology is oftentimes inappropriately designed for the climate and other environmental features, organizational aspects, working conditions, cultural habits, or workers' physical strength, body size and measurements found in the recipient country. Thus when women are beneficiaries of such technology, there is the added fact that the technology may be designed or intended more for male use. For instance, agricultural equipment, implements or tools for land preparation, ridging and weeding, crop threshing, cooking stoves, and water transporting are generally large, bulky, heavy, and difficult to manage and operate for women, especially in Asia. Adopting inappropriate tools could lead to posture, spine, and musculoskeletal problems, or worse, to accidents and physical injuries (ILO, 2002).

Although the literature has very limited information on the ergonomic-related problems of agricultural women in developing countries, there are findings in Africa that demonstrate the adverse effects of ill-suited technology on offspring. Holmboe-Ottesen, et al. (1989) noted that pregnant women who operate heavy farm tools consequently experience a lower infant survival rate than those who work with lighter tools. The development of gender-adapted or women-friendly technologies for transplanting, seeding, and milling in the rice production system may be viewed as a tacit recognition of the existence of ergonomic problems that not only affect women but may also boomerang on children. Besides, experiences with adopting women-appropriate technology have illustrated the additional benefits of shortened work hours or reduced labor input that free women from farm work to attend to other domestic responsibilities (OWID, 1997).

Nutritional problems

Findings from the UN-commissioned comprehensive literature review of studies in Africa and Asia conducted over a decade-and-a-half ago provide interesting insights on the nutritional consequences of women's work in agricultural food production (Holmboe-Ottesen, et al., 1989). Other than these,

recent empirical information has yet to be found that directly addresses how women's farm workload can affect their nutritional status. In the UN study, "nutritional status" referred to women's health condition that is affected by their consumption of food and utilization of nutrients. The direct means of determining this is through the use of anthropometric measurements of weight, height, and arm circumference or growth patterns based on these measurements, clinical symptoms and physical signs of malnutrition, and biochemical or laboratory measurements of body nutrients and constituents.

Owing to limited information based on such direct measures, the UN study utilized what can be called "proxy indicators" to arrive at some conclusions about women's nutritional conditions. These proxy measures are as follows (Holmboe-Ottesen, et al., 1989).

- Children's birth weight – Low birth weight is reflective of the mothers' heavy workload and poor nutritional health at the time of pregnancy. Studies in India, Ethiopia, and Gambia confirm the relationship between high workload and low birth weight.
- Energy expenditures of both women and men – Calculated from time allocation studies, when women put in longer work hours within a given period compared to men, then they expend more energy that consumes nutrient intakes. On a yearly basis, African women average 8-10 hours of work per day but this can rise to 15 hours daily during the peak agricultural season. Combining low food intake with high workload creates an energy deficit that is detrimental to women's nutritional status.
- Women's work pattern during and right after pregnancy – In most agricultural societies, women continue to assume full duties until the onset of labor and return to full work between one day and 2 weeks after delivery. This is a prevalent work pattern noted in a cross-cultural study involving 202 societies.
- Women's weight during peak and off-peak periods and at pregnancy – A study in Gambia shows that farm women gain 5.5 kg during the off-peak period but only half of this weight is attained in the peak of the agricultural

season. In Ethiopia, pregnant women engaged in laborious tasks during the peak season only put on 3.3 kg while the less active ones have a higher weight gain of 5.9 kg. Women's strenuous physical activity results in weight loss for self and unborn child.

It is evident from the aforementioned findings in the UN study by Holmboe-Ottesen, et al. (1989) that the enormity of women's workload in the farming sector of developing countries does impact negatively on the nutrition of both women and their families. In view of the fact that women bear the brunt of most responsibilities associated with cooking the family's meals, it is understandable that heavier farm work means less time for food preparation, which leads to a poorer household diet. In times of food scarcity, women's nutrition suffers the most for in most societies they tend to sacrifice their own nutritional requirements to satisfy those of children and spouses. Finally, it is said that if a shorter time for food preparation were combined with peak agricultural season and low food availability, the consequences could be fatal for the family's nutritional status because family meals will be fewer in quantity, lacking in variety, and less well prepared (Holmboe-Ottesen, et al., 1989).

Implications for Research Especially in the Philippines

My review and analysis of available empirical literature for this study has underscored a general lack of current research and publications on women in agriculture that explain the link between their work and their health. The bulk of available studies on agricultural women were conducted in the eighties up to the mid-nineties, or within the first 20 years following the start of the UN Decade for Women in 1976. Obviously, the then availability of research and program funds that supported global interest in agricultural women spurred the compilation of data in developing countries. Between the mid-nineties and the mid-2000s, interest in investigating the impact of agriculture on women's health seemed to have waned, if the number of sources available for review could be used as a gauge.

In the Philippines, however, globalization and trade liberalization issues in the last five years have refocused attention on farm households including women farmers and how they are negatively affected by such issues (see for example Spieldoch, 2007; LWR et al, 2004). The adverse impact of world trade is not a new discourse in the country because women advocacy groups like the Asian Peasant Women Network and the Federation of Peasant Women in the Philippines had already written about this issue in the late nineties. According to Sarcos (1997), economic policies imposed by international trade relations had intensified the exploitation of farm households, caused greater landlessness and impoverishment with the conversion of agricultural lands, shifted production to high value crops that necessitated intensive chemical use, opened the country to cheaper agricultural imports that competed with local products, and forced farm women to labor more or move to lowly paid off-farm jobs that compromised their welfare, among other problems.

Moreover, the role of women farmers in rural development particularly in Asia has been widely discussed again since an international seminar on the topic was held in Korea in 2007 (ASIADHRRA, 2007). The plight of rural women also received international attention in 2008 when a major research-granting institutution–the Bill and Melinda Gates Foundation–made public its strategies of investing in agricultural women and gender mainstreaming to advance global development, fight hunger and end extreme poverty (Bertini, 2008). All these renewed interests in agricultural women could be expected to lead to newer studies and evidences for us to better understand the women's work-and-health paradigm.

Meanwhile, what research implications can be derived from my study? Findings from the review indicated varied issues that can be grouped under the following two broad research imperatives for local researchers.

1. Continuing need for updated and disaggregated statistics. In the course of review, I found many antedated national statistics on such crucial information as the proportion of women in the agricultural workforce, their

income from agricultural wages or paid farm work, the number of female beneficiaries of the major programs and extension services of the Department of Agrarian Reform and the Department of Agriculture, and the extent and nature of rural women's participation in local organizations. Publications after the turn of the century in 2000 presented figures that were quoted and re-quoted from earlier UN studies or materials considered as landmark sources by later researchers such as the 1986 NCRFW publication on Filipino women and the 1995 UN study of Illo et al. Thus data mentioned in more recent articles are repetitions of information in published sources that are at least two decades old. I am aware that by citing the same dated information in this paper, I may also be passing on old data to future researchers.

This problem may be due to the lack of current baseline studies and the continuing lack of gender-disaggregated data in spite of recent conscious efforts in this direction. Although they are an expensive endeavor, baseline studies and comprehensive literature reviews are needed periodically for monitoring developments and assessing accomplishments over a time frame. There was much research interest accompanying the end of the Women's decade in the mid-1980s and 10 years later in the mid-1990s, but this was not visible by the end of the third decade although there was a peaking of interest after 2005.

While UN and national agencies have played a pivotal role in providing updated and disaggregated statistics, the work of individual researchers can also contribute to easing the problem. They can subject voluminous unreported data collected by the National Statistics Office or the Bureau of Agricultural Statistics to secondary, gender sensitive data analysis. But unfortunately, researchers who have attempted to conduct this kind of analysis find that their work continues to be severely limited by the presence of mostly aggregated information. One reason for the persistence of aggregation appears to be economically related because collecting and processing disaggregated statistics can have added costs for government. Another reason could be traced to the fact that not many government researchers are truly gender sensitized and able to apply this sensitivity to their task.

2. Need for current studies particularly on identified research gaps. Another way to provide updated data is to conduct new research on previously identified gaps or old issues. In relation to the women's-work-and-health paradigm, the major research gaps that surfaced in this study are primarily the following.

- Studies on farm women's reproductive health and nutritional concerns can include determining the reproductively hazardous farm activities of rural women, the types of morbidity and mortality risks manifested among older and younger women (especially pregnant and lactating mothers) in a chemical-intensive production area like a rice or vegetable farming community, the major risk factors (including pesticide use) in the reproductive health of mothers and girls, the downstream effects that persistent pesticide use in upland production systems have on the health and environment of lowland communities, the lessons from women farmers' adoption of organic farming and integrated pest management as alternative practices, and their nutritional deficiencies as these relate to available food supply for the household and personal food consumption habits.
- Research focusing on the changes in composition and dynamics of farm households and their farming practices in the wake of global trade agreements can cover such questions as: To what extent has female and male out-labor migration affected the leadership, organization of work for food production especially involving adolescent girls, and assurance of food security in depressed farming households? How has the production of cash crops like vegetables in the hilly lands altered upland women's productive and reproductive roles? How have the altered gendered farm roles of women and men been beneficial or disadvantageous for mothers and their children? What changes in crop preferences or farming system practices have adversely affected women farmers?
- Documentation of the impact of externally introduced technologies on the workload, health and overall well-being of rural women is necessary in view of findings that these technologies often place women at a further

disadvantage. For example, how are introduced technologies such as low-cost drip-irrigation and no-tillage adapted to local conditions and made ultimately advantageous to women farmers? Ergonomic-related problems of rural women resulting from ill-fitting technology should likewise be studied. For instance, because women are active in post-harvest activities, it is important to investigate what post-harvest technologies they have been introduced to, the gender appropriateness of such technologies, the women's reasons for adoption or rejection, and the benefits they derive from technology use.

- The analysis of rural women's organizations as a concrete articulation of their empowerment is sorely needed. After the Women's Decade, many foreign and local agencies assisted farming women to establish their own organizations that launched livelihood, education, health, and other projects to better their lives. Their organized efforts were usually documented and analyzed as case studies. Today, there is hardly any literature or updated studies that analyze the broader impacts of these organizations on advocating gender-fair policies and programs for women in the country, on petitioning for members' access to land, credit, and other productive inputs, on lobbying against measures (such as on mining) inimical to their interest, and on the adoption of soil and water conservation, the current state of such organizations, the characteristics and accomplishments of similar organizations created recently, and the collective profile of their women leaders or membership. Information on these aspects is valuable to understand and capitalize on the factors that boost women's empowerment.
- The health situation of women agricultural extension workers and farm researchers as this relates to their work likewise merits some research attention. For instance, how many of our extension workers and researchers are women themselves and what kinds of occupational health risks do they face? It should be important to note if they are also exposed to the same health risks as the female farmers they assist.
- And finally, apart from investigating the apparent gaps in the research on women in agriculture, there may be a need to explain why such gaps have

occurred. Are research gaps created when international research donors withdraw their support for certain areas of studies or shift their research agenda? How politicized are the fields of agriculture and health and how can this ease or aggravate the situation of rural women? What role does politics play in bridging research gaps on women's health?

The research issues raised in this paper should be the collective concern of government instrumentalities like the National Statistics Office and pertinent line-agencies, academic research institutions, and nongovernment organizations that are depositories of rural grassroots information in the country. Many of the proposed studies are usually better conducted by a collaborative team consisting of social, health, and environmental scientists who are grounded in their own fields but who recognize that contributions from other disciplines can help them transcend their theoretical and methodological limitations in approaching a given phenomenon. It is vital to address the research imperatives raised in this study for only in doing so can we be in possession of the information that are needed for sound agricultural policy making and program planning to significantly advance the economic, social, and physical well-being of agricultural women. The improvement in the lives of these women who hold the key to their family's food and health security through their productivity may even be a way to eventually alleviate poverty in the rural areas of our country.

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