
Women in agricultural value chains: unrecognized work and contributions to the Guatemalan economy

Jochen Dürr

**Senior Researcher, Center for Development Research, University of Bonn, Germany
jochenduerr@gmx.de**

Abstract

The contribution of women to agricultural value chains has increased in recent decades, but evidence is still scarce, especially concerning the informal, agro-industrial and commercial sectors. This study demonstrates the participation and roles of women and their income generated in these sectors. Primary data combined with secondary census data was used to quantify employment and value added creation of a wide range of value chains in Guatemala. Women contribute nearly half of employment and of value added and their participation in traditional chains is much more pronounced than in the non-traditional export sector. Value chains offer significant employment opportunities as small entrepreneurs and as wage earners, but women occupy nodes which generate low income. Besides the unrecognized work in informal sectors, the contribution of women to the last stage of value chains remains invisible. The number of working days for preparing products before being consumed exceeds by far those applied in agro-industry and commerce. To overcome the unequal value chain participation and benefits, public policies are necessary.

Key words: agricultural value chains, invisible work, women entrepreneurs, informal sector, non-traditional exports

Introduction

The contribution of women to agricultural value chains is recognized as important globally: they contribute 43% of the agricultural labor force worldwide (20% in Latin America and 10% in Guatemala), but have much less access to productive resources such as inputs, financial services, etc. This gender gap has consequences not only for women, but also for the development of economies and societies. Closing the gap could positively influence productivity and agricultural production and reduce hunger and poverty (FAO 2011). The participation of women in agriculture and agricultural value chains has increased in recent decades. Also, the contribution of women to value chains has become more visible due to more research and better data availability. Both developments together have led to the so-called feminization of agriculture (Lastarria-Cornhiel 2006).

Women participate as rural workers, small-scale producers, entrepreneurs or industrial workers in the production, processing and marketing of inputs and agricultural products. The increasing participation of women in agricultural value chains in Latin America has been pronounced in peasant production as well as in the so-called non-traditional export sector which mainly consists of fruit, vegetables and flowers (Deere 2005). The participation of women as wage workers in export industries of high-value export products can improve their socio-economic situation (Dolan and Sutherland 2002) even if women's jobs in these industries are normally less qualified and remunerated than men's jobs, and are often only temporary occupations without social benefits (Raworth 2004). Women also have a strong presence in the retailing sector of most traditional food markets. These traditional markets still

dominate in many developing countries and are generally characterised by informality. Women with few assets tend to engage in informal markets where labor is the main input to run a business (Rubin and Manfre 2014). For example, in sub-Saharan Africa, 60% of the non-agricultural informal sector work force is occupied by women (UN-ECA 2010). Also, informal agro-food processing is often dominated by women (White 1999).

Guatemala has a long experience of non-traditional exports, which consist mainly of vegetables and fruit for the US market, where many women are engaged as smallholder farmers as well as employees in the export industry. Other global value chains in Guatemala are dominated by large plantation production, such as coffee, sugar cane and oil palm, and by medium to big processing and exporting industries, where women are also engaged as rural laborers and employees, but probably to a smaller degree. The value chain of corn, which is the most important product of peasant agriculture and the basic diet of the population, is characterised by strong informality. Numerous wholesalers, retailers, small maize mills and tortillerías (corn bread makers) all over the country form an important value chain which provides employment and income to many men and women. Also, national markets of fruit and vegetables are mainly organized in an informal way.

Evidence of the participation and income generated of women in value chains continues to be relatively weak, particularly concerning the non-agricultural sectors, which FAO (2011) does not quantify. We hypothesize that, on the contrary to which was said above, the contribution of women to agricultural value chains and hence, to the national economy is still highly unrecognized, mainly for two reasons: firstly, women are predominantly engaged in informal value chains where there are few data available on employment and value added, so that this work remains uncounted in national statistics. Second, women are mostly responsible for the last stage of the value chain, the preparing of meals, but this work, mostly done within the household, is even more invisible and its value rests uncalculated.

This paper fills this research gap by answering the following key research questions:

1. To which extent do women participate and add value in the non-farm sectors of the most important agricultural value chains in Guatemala?
2. How much do women benefit from their participation in value chains compared to men?
3. How much of women's work and value added remain unrecognized?

This paper will address these research gaps by using an innovative approach developed by Costa (2012) which combines value chain with input-output analysis. The methodology allows estimating and comparing the participation of different sectors and actors in the value chains, and their overall contribution to the national economy. Using primary data derived from value chain analysis of the main agricultural products in Guatemala, we will be able to quantify the employment and value added of women and men in the value chains on a national level, a comparison which was not undertaken by any other study we have found.

The rest of the article has been organized in the following parts: the first section provides a short overview of previous findings on participation and distribution of benefits in agricultural value chains and their possible explanations. Second, we explicate our methodology and data used. Third, quantitative gender-disaggregated data on participation rates, wages and profits, poverty rates and value contributions are given. Then, we try to interpret these data within the Guatemalan socio-economic context, which limits the participation and benefits of women in agricultural value chains. Finally, some conclusions on strategies to close the gender gap are drawn.

Literature review of participation and distribution of benefits in value chains

The attempt to integrate the gender dimension into the concept of value chains is relatively new and forms part of a conceptual approach aimed at answering two key questions: 1. How do gender relations influence the participation of women and men in value chains and 2. How do gender relations influence the benefits of participation of women and men in value chains? There is a wide range of factors that impact on participation and benefits, for example, the unequal access to resources, management practices, perceptions and cultural values, institutions, public policies and laws (Rubin and Manfre 2014). As our focus is on the forward and backward sectors of agriculture –agro-industry and commerce– we will concentrate in this section on findings of these sectors, which can differ from participation and benefits of women in the agricultural sector itself.

Gender-related determinants of participation in value chains are associated with access to resources which men and women possess, for example, for capital investments. This access limits the entrance to certain activities where capital barriers to entry are high. Women tend to work in activities where these entry barriers are low, for example in product transformation where only simple tools are needed. This also means that women often concentrate on undertakings with low returns, whereas men tend to be over-represented in value nodes with high entries and high rents. Limited access to education can increase the occupational segregation, leaving for women the lower-skilled roles in the value chain. It can also limit their bargaining power towards buyers and sellers of the value chain. Generally, activities that impede women to do reproductive work, for example, by requiring a lot of time or movements far from home, tend to be undertaken by men. But the factors which influence the participation of men and women are also very context-specific, depending on socio-cultural factors, so that participation patterns can vary even within the same value chain, but in different countries (Coles and Mitchell 2010).

The benefits of participating in value chains have to be understood on the chain as well as on the household level. The highest gains at the chain level may go to activities with highest entry barriers or highest educational requirements, as explained above, disfavoring women. Women may also prefer a low-paid but secure job as an employee to a risky, but sometimes high-yielding activity as an entrepreneur. Nevertheless, the intra-household gender power relations will then determine who can dispose on the income gained in the value chain and how it is used (Coles and Mitchell 2010).

An additional explanation for the phenomenon of occupational segregation can be found in institutions that systematically generate gender inequalities. Institutions include both social norms and values, as well as formal and informal organizations of society, both at the household and community level, as well as in the labor market and at the government level (Dey de Pryck and Termine 2014). For example, in many societies women are responsible for reproductive work, which makes it difficult for them to participate in the productive area due to time constraints and/or spatial movement restraints. Another limitation may be cultural stereotypes of what a woman should do and what not. Also, informal institutions, for example, networks of traders or common rules in the market can influence the (non-) participation of women. In addition, access to information and productive resources is usually more difficult for women than for men.

The gendered participation, distribution of benefits and its explanations have been studied for specific traditional and global value chains. In general, men and women occupy different nodes of the chain where the benefits are not the same. For example, Andersson et al. (2016) studied the traditional value chains of cassava leaves in Tanzania. They report that the rural and urban retail sector of these leafy vegetables are dominated by women, whereas the wholesale market is the domain of men. Women tend to handle low volumes of the product and to have lower profits. Nevertheless, female urban traders do have relatively high income, especially, if they engage in pounding the product for urban consumers which prefer pre-processed products. Men occupy the nodes where bigger volumes are handled and consequently, higher profits can be made, such as wholesaling. The reason for the gendered segregation of chain functions are influenced by social norms and unequal access to resources: women lack capital to buy large volumes, but also argue that they cannot handle large and heavy volumes, fear safety if they have to travel to the capital city and also have no confidence in their business skills. Oduol and Mithöfer (2014) show that the small scale trading of avocados in Kenya is mainly done by women with lower returns than those of export markets, where men are engaged. Possible barriers to entry to the export market could be that women lack capital, time, transport facilities and networking skills.

The gendered outcomes of global value chains are mixed. Barrientos (2014) shows that in the horticulture export sector the female labor force range between 53% (fruit in South Africa) to 75% (flowers in Kenya and Uganda). The high participation of women in labor intensive global value chain sectors are due to their socially ascribed skills supposed to enhance quality and productivity. In the Kenyan and Ugandan flower value chains, economic and social upgrading has gone hand in hand, leading to better working conditions, but still inadequate wages for workers. In South Africa's fruit export sector, social upgrading was obtained by the female labor force in packhouses. Also, in the Kenyan horticulture sector, two-thirds of packhouse workers are reported to be female (Dolan and Sutherland 2002). Nevertheless, two-thirds of these women only have casual or temporary work, whereas 66% of men get permanent jobs in packhouses. Women are underrepresented in skilled work and mainly occupy certain routinized, dexterous activities because export companies prefer women to do these jobs. The occupational segregation is reflected in higher wages for men. Nevertheless, wages in the horticulture packing industry are relatively high and workers (men and women) also get additional benefits (such as food, transport and medical care). Dolan and Sutherland (2002) explain the feminization and flexibilisation of the workforce as a consequence of buyer-driven global value chain pressures on cost and quality and the seasonal character of the industry. However, the authors also express the positive outcomes for welfare, autonomy and empowerment of female packhouse workers due to their wages in the horticulture industry. Maertens and Swinnen (2009) report that 90% of workers in the French bean export industry in Senegal are female and that their income represents one third of total household income. They find no gendered wage discrimination as such, but a gender bias in permanent positions which are linked to higher wages. The non-traditional export sector is seen by the authors as a promising sector which provide employment opportunities with relative high wages for women.

Methodology

Agricultural value chains can be defined as a sequence of economic activities, starting from input production and then passing through transformation and commercialization processes until reaching the final consumers (Kaplinsky and Morris 2001). This process includes each

of the economic agents (such as farmers, processing firms, traders etc.) adding value to these activities.

The study of value chains started with local agriculture, following its linkages through the different (geographic) levels and sectors until the final consumer was reached (bottom-up-approach). In this process, the gender-disaggregated transactions, value added and employment generation of the non-agricultural sectors were investigated from the local to the national level. Our primary data show the structure of the value chains using input-output-tables, following the method developed by Costa (2012). As these primary data normally do not include all the intermediaries active in a certain territory, we merged our data with official statistical data (Banguat 2013; INE 2004) of total agricultural output by multiplying the matrix with an expansion factor (total output derived from census data divided by investigated output derived from interview data). This led to an input-output table which should reflect the whole agricultural value chains of the studied territory, assuming that our primary data derived from interviews with intermediaries can be linearly extended to the entire agricultural value chains of the territory, in other words: that the other intermediaries which were not interviewed follow the same input-output structure. This territorial matrix was then extrapolated to the regional level, supposing that the structure of the territorial value chains hold true for the whole region to which the territory belongs to, and taking into account the regional agricultural output for each product. This proceeding is justified by the fact that each of the five agricultural regions in Guatemala presents very similar historical, agro-biological, socio-economic and marketing characteristics (AVANCSO 2001). Adding up the regional matrices led to the national matrix. In short: the primary data determine the structure of the value chains (output, intermediary and final demand, value added, employment, etc.); the secondary data only serve to extrapolate the investigated part of the agricultural value chain to a hypothesized entire value chain (where total agricultural output is channeled from producer to consumer) by using a linear expansion factor.

The data were collected between September 2007 and April 2010 in seven territorial studies to cover all of the five agricultural regions (defined by AVANCSO, 2001) and the metropolitan region of Guatemala. A standardized questionnaire was used for interviews with male and female intermediaries (rural traders, wholesalers, retailers, processing and manufacturing industry, input industry and input commerce), asking information about the products bought and sold in terms of quantity and price. In addition, the value-added activities (for example, packaging, transportation, processing, etc.), the workload of men and women, differentiating between self-employed and employees, and the income generated in these activities were analyzed. Also, qualitative information on their main problems and how they could be resolved were obtained from male and female intermediaries.

The sampling procedure was as follows: as there were no data available for output values, the most important products were selected by their share in the cultivated area of each territory. This led to a sample of 28 products, which account for more than 90% of total cultivated land in Guatemala. The list includes vegetables (onions, chilies, paprika, green beans, pumpkin seeds, cabbages, tomatoes, carrots, snow peas, broccoli, okra), basic grains (corn, rice, black beans), fruits (avocado, peaches, apples, bananas, pineapples, melons) as well as sesame, coffee, sugar cane, cardamom and potatoes, melons, palm oil and cattle.

In total, we obtained 164 interviews with industry (of which, 59 with female entrepreneurs) and 843 with traders (211 female) for all value chains. As there was no information about the structure of the value chains available, we used an explorative procedure similar to the snowball sampling method. Intermediaries were asked about their suppliers and customers in order to identify other intermediaries along the value chain. Following the chains backward to

the supplier and forward to the user industries of agricultural output, the most important intermediaries were identified and interviewed. From the numerous smaller traders and industries, only a sample was obtained. The purposive and snowball sampling method was utilized because of the difficulty to find, approach and then to get information from intermediaries which makes random sampling challenging if not impossible. Therefore, our sample data cannot be considered as statistically representative. Nevertheless, we believe that they represent quite well the structure of the value chain, because the basic structure (for example, female retailers selling fruit in the local market together with male wholesalers exporting fruit of a certain region) could be detected by our interviews. Also, the differences of value generation within each sector of each product are normally not very pronounced, probably because of the law of one price which, in a competitive environment, does not allow traders to pay or receive prices much different from other traders operating in the same market.

Value added in industry and commerce was calculated on a relatively simple basis by deducting the value of the produce bought from the value of the produce sold. This value added was then attributed to men and women according to their participation in their respective business. Thereby, profits of male and female business owners and salaries of male and female employees could be differentiated. Participation rate was estimated by asking how much work (hours per day/days per week/weeks per year) was done in the business by its owners and by their employees, differentiating in both cases between men and women, so that total workload of men and women could be estimated per year.

Results

In which sectors do women participate relatively and absolutely more?

The participation rate of women working in the value chains varies according to the product, but Table 1 shows the following characteristics: in general, participation of women in agro-trade and agro-industry is high. In the processing and manufacturing industry, the female work force is as high as 46% and 73%, respectively. To understand this figure, it is necessary to explain that of total employment in the industrial sector, which, to our data, amounts to 64.5 million working days, 46.8 million are generated in the processing and transformation of maize (mills and tortillerías). As half of the mills and almost 100% of the tortillerías are run by women, their share of total industrial employment is consistently high. In addition, there are more than 2.5 million women working in the processing of pumpkin seed (peeling the seed by hand). The other sector with high female participation is the retail sector: 44% of sales of agricultural products such as vegetables and fruit on street markets, shops, etc. are carried out by women. Meanwhile, there are few rural or wholesale female traders (9% and 11%, respectively). In absolute terms, manufacturing industry and urban retail are the sectors that offer most jobs for women (25 and 21 million days, respectively), followed by the processing industry. In total, 48% of the work in the value chains (excluding the agricultural sector) is carried out by women.

Table 1: Employment generation in agricultural value chain sectors, in 1,000 working days

	Employment women	Employment total	% Women
Rural trade	358	3,780	9
Processing industry	13,955	30,371	46
Manufacturing industry	25,325	34,715	73
Wholesale	880	7,803	11
Retail	21,175	48,107	44

Input trade	615	3,919	16
Input industry	89	627	14
Total	62,399	129,322	48

Source: Own calculations based on own data and Banguat (2013) and INE (2004)

In which chains do women participate relatively and absolutely more?

Table 2 shows the chains with the highest participation of women in agro-trade and industry, in absolute (left) and relative (right) terms. The most important value chain is corn, for its employment creation in mills and tortillerías. In addition, in the fruit and vegetable value chains, female employment is also high, in this case, because of labor-intensive retailing. Peeling pumpkin seed is a very labor-intensive work, which generates 2.5 million working days made exclusively by women (participation rate of 97%). The case of non-traditional export products, mainly French beans and snow peas, is different: here it is the high number of women employed in the export industry to clean, cut, sort and pack the produce before being exported that influences the high participation rate of 76%. Several studies (e.g. Dolan and Sorby 2003) have demonstrated the employment potential for women in these industries. However, comparing these with traditional chains, the absolute participation of women is low: adding broccoli, peas and beans (the three most important non-traditional products, although there are others), they sum up to 1,169 thousand days, much less than most traditional chains such as tomatoes, potatoes or onions (besides corn) generate in the marketing of these products.

Table 2: Absolute (1,000 working days) and relative (%) employment of women in value chains

Corn	36,389	Pumpkin seed	97
Tomato	4,739	Carrot	77
Pumpkin seed	2,563	French beans	76
Potatoe	2,557	Snow peas	76
Pineapple	1,849	Corn	68
Onion	1,512	Paprika	67
Banana	1,445	Avocado	65
Black beans	1,321	Pineapple	63
Chillies	1,257	Tomato	59
Avocado	1,141	Onion	53
Others	7,625	Potatoe	51
Total	62,399	Mean	48

Source: Own calculations based on own data and Banguat (2013) and INE (2004); Note: only value chains with more than one million working days resp. more than 50% participation are shown.

Do women work independently or as employees?

To answer this question, in the following Table 3 we divided the work of women between owners and employees and contrast it with the percentage of men employed. In the agro-chemical input industry, 100% of the work is done by employees. However, as we have seen, in absolute terms, female employment in this sector is limited. In other sectors of industry and commerce, the percentage of women working as employees is less pronounced than that of men. For example, in the processing industry, only 18% of women are employed and most of

the work is done by small independent entrepreneurs, mainly small-scale corn mill owners. On the contrary, more than half (55%) of men work as employees in the processing industries, not only in the mills, but also in the sugarcane and palm oil industries. In the manufacturing industry, the majority of women work as employees (59%), mainly in tortilla shops, which are an important source of employment for young women. The percentage of men employed in the manufacturing industry is higher and reaches 73%. However, these consist of other types of industries, mainly meat processing (butcher's shops) and coffee, cardamom and palm oil industries. The highest absolute and relative participation of small entrepreneurs exists in retail trade: 20 million days, or 95% of total work is done by independent sellers. If workers in the retail trade (e.g., carriers) are needed, men are normally employed.

Considering all chains and sectors, compared to men, women work less as employees: only 31% in contrast to 53%. There are certain sectors where independent work is more frequent, and in these sectors we find a high participation of women, as is the case of retailing. On the other hand, there are also sectors such as tortillerías where many women are employed (by other women, owners of the business). If there is discrimination against women in recruitment cannot be verified with our data; but in certain sectors (for example, in wholesale trade) and for certain jobs (for example, physical jobs), more men than women are employed. However, the participation of men and women is almost the same in agro-input stores: half of the work is done by employees, the other half by the shop owners. That could be an indication that in some sectors women have the same chances of being employed.

Table 3: Women working as employees and business owners in relation to men, in 1,000 working days

	Women Employee	Women Entrepreneur	% Women Employee	% Men Employee
Rural trade	60	298	17	58
Processing industry	2,577	11,379	18	55
Manufacturing industry	14,940	10,386	59	73
Wholesale	377	504	43	58
Retail	1,029	20,146	5	29
Input trade	338	277	55	50
Input industry	89	-	100	100
Total	19,409	42,990	31	53

Source: Own calculations based on own data and Banguat (2013) and INE (2004)

How much do women earn in the value chains?

Table 4 shows the average wages of women and men in different sectors of the chains. We calculated a simple average wage of all chain averages and a weighted average, taking into account the mass of salaries of all chains.

Table 4: Average wage of women and men working as employees, in US\$ per day

	Average Wage Women		Average Wage Men	
	Simple	Weighted	Simple	Weighted
Rural trade	4	3	7	7
Processing industry	23	8	16	13
Manufacturing industry	12	4	20	15
Wholesale	10	8	9	10
Retail	10	10	7	5

Input trade	7	6	7	7
Input industry	52	52	29	29

Source: Own calculations based on own data and Banguat (2013) and INE (2004)

The difference between the simple and weighted average is evident in the wages of agro-industry: the simple average of women is between US\$12 and US\$23 per day, while weighted, only between US\$4 and US\$8. This means that there are sectors (for example, the rice, cardamom and sugar industry and the non-traditional export industries) where relatively high wages are paid, but most women work in low-wage sectors such as corn bread bakeries and corn mills. In the retail sector, it appears that women earn more than men (who often work as porters), but, as we have seen above, there are few women working as employees in this sector. Interestingly, in the agro-chemical industry, the wages of women almost double that of men. This is explained by the fact that women work more as employees in the offices and less as workers in the fertilizer factories.

Our data do not allow us to differentiate the daily earnings between male and female business owners. However, sectors with high female participation are at the same time the sectors with the lowest profits generated: the average gross profit of retailers amounts to only US\$13/day. The utilities of corn mills and tortillerías are with US\$7 and US\$3, respectively, even lower. In consequence, the differences in earnings between women and men derive mainly from the occupational gender segregation. So the question arises whether participation in agricultural chains can be a means for women to combat poverty.

Are the value chains a way out of poverty?

As we do not have data on household income, we took the individual daily incomes and compared them to a poverty line of the minimum wage which at the time was at US\$7 per day. In addition, since we did not include all costs in calculating the profits of the business owners, we increased this limit by 10%. Table 5 shows the number of days that business owners earning less than US\$7.7 per day in each sector. In total, 28% of men and 61% of women work in a sector that generates less than this salary. This big gender difference is mainly explained by the profits of the processing and manufacturing industry, mainly corn mills and tortillerías, where half of all women work and where 100% of them earn less than the wage limit. Also, 96% of men with their own processing units earn less than this limit; however, there are fewer men working in corn mills. In the manufacturing industry, mainly the butcher's shops, the daily profit of the owners is in 99% of the cases higher than the minimum wage. In the other important sector in terms of employment, the urban retail sector, gender differences are not very high and few women (22%) and men (14%) do not receive at least US\$7.7 per day.

Table 5: Number of women and men working as business owners earning less than the minimum wage, in 1,000 working days

	Rural trade	Process. industry	Manuf. industry	Whole-sale	Retail	Input trade	Input industry	Total
Men total	1,429	7,455	2,582	2,903	19,041	1,668	-	35,077
≤ US\$7.7	6	7,182	14	0	2,658	83	-	9,942
%	0	96	1	0	14	5	-	28

Women total	298	11,379	10,386	504	20,146	277	-	42,990
≤ US\$7.7	82	11,379	10,374	0	4,448	34	-	26,317
%	28	100	100	0	22	12	-	61

Source: Own calculations based on own data and Banguat (2013) and INE (2004)

As we have seen above (Table 4), the weighted average wages of women vary between US\$3 and US\$10, and of men between US\$5 and US\$15 per day (excluding the input industry). These salaries result in high percentages of people who do not get a minimum wage of US\$7.0, see Table 6. 46% of men and 92% of women work in a sector where the average wage does not reach the minimum. That is, the percentage of women is twice as high as that of men. Again, the main reason is that many women work in the processing industry (tortillerías), where wages are low, while men working in butcher's shops and the coffee, cardamom and palm oil industries earn more than the minimum salary. However, in the retailing sector, two-thirds (67%) of male workers earn less than US\$7.0, similar to women.

Table 6: Number of women and men working as employees earning less than the minimum wage, in 1,000 working days

	Rural trade	Process. industry	Manuf. industry	Whole-sale	Retail	Input trade	Input industry	Total
Men total	1,993	8,960	6,808	4,019	7,891	1,636	538	31,846
≤ US\$7.0	1,652	6,351	88	763	5,301	500	0	14,655
%	83	71	1	19	67	31	0	46
Women total	60	2,577	14,940	377	1,029	338	89	19,409
≤ US\$7.0	60	2,283	14,313	160	696	286	0	17,798
%	100	89	96	43	68	85	0	92

Source: Own calculations based on own data and Banguat (2013) and INE (2004)

In conclusion: The majority of women working in agro-food chains fail to earn the minimum wage because they work in sectors where employment is low-paid. In many cases this might be a job of "last-resort" (see Lanjouw 2001) where women have to accept low incomes because they do not have other options. Also, the great competition between small businesses owners or between retailers make that both the wages and the daily profits remain low. However, it must be taken into account that for many women this employment is a means of survival and sometimes an extra income that complements other sources of family earnings. So we cannot conclude that the value chains do not allow women (alone or with their families) to get out of poverty; but our data indicate that many women possibly will have difficulties to make their living by working in the chains.

How much do women contribute to the national economy?

In the agricultural chains, value added is generated by the owners of businesses (profits and mixed income) and the workers (wages). Table 7 differentiates the gross value added (GVA) and the wage bill between men and women.

Table 7: Gross Value Added (GVA) of women and men in value chains, in US\$1,000

	Rural trade	Process. industry	Manuf. industry	Whole-sale	Retail	Input trade	Input industry	Total
GVA Women	28	568	587	38	264	9	-	1,494
GVA Men	135	372	146	217	249	57	125	1,301

Salaries Women	0	21	64	3	10	2	5	338
Salaries Men	15	115	100	39	41	12	16	105
Total GVA	178	1,077	897	297	565	80	145	3,238
Women total	28	589	651	41	274	11	5	1,599
% Women	16	55	73	14	49	14	3	49

Source: Own calculations based on own data and Banguat (2013) and INE (2004)

The relative contribution of women is very pronounced in the processing (55%) and the manufacturing industry (73%) as well as in retail trade (49%). In absolute terms, in these three sectors, women contribute US\$589, US\$651 and US\$274 million, respectively, to the national economy. Its total contribution reaches US\$1,599 million, which represents nearly half (49%) of total GVA of US\$3,238 million.

Again, summing up the value added of the non-traditional export sector products (snow peas, French beans, and broccoli), a GVA of US\$45 million can be contributed to women's work. This is much less than, for example, the GVA of US\$167 million which women contribute to the corn value chain. The contribution of women to value added is mostly through their work in informal agro-food chains, which normally does not appear in official statistics. The wealth created by women (and men) in these sectors is important for the Guatemalan economy, nonetheless unrecognized, because GDP usually does not reflect these contributions adequately due to lack of data. However, this is only part of the invisible work of women in value chains. The other part is even less visible and does not enter into the calculation of GDP: domestic work.

What is the value of women's domestic work?

The last stage of agricultural value chains, the preparation of products before they can be consumed, is located in restaurants and canteens, but mainly within the households. In the former case, it will be part of productive, in the latter, part of reproductive work. Nevertheless, household work can also be seen as productive as it can be outsourced to professional providers and as such, a monetarized value can be given. This aspect of the chains, in-house unpaid work, as well as work in restaurants and canteens, is not included in our study, even though we can assume that most of this work is done by women.

For purposes of dimensioning the subject, we can make a simple hypothetical calculation: if 90% of the meals were prepared by women, and each household needs three hours a day to buy and prepare food, then, with a total of 2.8 million households in Guatemala, it turns out that $0.9 \times 3/8 \text{ hours} \times 365 \text{ days} \times 2.8 \text{ million households} = 345 \text{ million days}$ would be performed by women, which in most cases is unpaid work, besides the work done by domestic servants or cooks in restaurants and dining rooms. This figure is much higher than the total employment of the chains (excluding agriculture) that we estimated by 129 million working days (see Table 1).

In addition, our data only accounts for the value of manufacturing corn breads in tortillerías, not those that are made in-house. Of total corn production of 785 thousand tons, we estimated that 127 thousand tons or 16% is made in tortillerías (generating 23 million working days), the rest, at home. If all corn breads were produced in tortillerías, six times more employment would be needed. That is, there would be 145 million working days created in tortillerías, more than total employment in agro-industry and commerce of all value chains. That would

generate a GVA of almost US\$500 million, around one third of what women contribute in all value chains to the national economy. Thus it appears that the invisible and unpaid work of women represents a great value for society.

Discussion: Why do women participate in sectors with low remunerations?

We have seen that the participation of women is concentrated in certain sectors and chains, mainly in the informal sector which require less capital and renders lower profits. In other words, women face limitations for certain activities within the value chains and this fact is reflected by lower incomes. These findings are confirmed by a World Bank (2010) study which used a household survey dataset and reports that women entrepreneurs in Guatemala are more concentrated in specific activities than men, mainly in the commerce sector. This also applies to women's participation as employees. In general, women participate mainly in informal activities, and therefore, remain uncounted. The authors give some possible explanations why women concentrate on the informal trading sector, including lower educational and training requirements, more time and locational flexibility, social conventions and lower investment levels to start a commercial business. But the survey data does not allow them to test these hypotheses. Neither do we have sufficient qualitative data, and therefore mainly refer to the literature presented above to discuss the issue.

The fact that there are far fewer women in the wholesale business than in the retailing sector where profits are lower, may be due to the fact that more fixed and working capital is usually needed in the first than in the latter, for example, to be able to buy large volumes and to have a means of transport available. As access to capital in the form of loans is easier (but also not as easy) for men than for women, this would explain the fact that there are almost no women wholesalers. Supposedly, socio-cultural reasons also influence the different roles that men and women can exert. For example, for rural women in Guatemala it is not very common to have a driver's license, much less to travel alone, as it is often necessary in the case of wholesaling. In addition, household chores make it difficult for women to travel. Women may seek work that is close to their home and has temporary flexibility. The retail sale usually allows for exactly that: it is a job that is sometimes executed only in the morning or on certain days of the week, and nearby the place where women live. Another explanation for the labor segregation is supposedly found in informal market relations and rules. For example, negotiations with male producers or traders may be more complicated for female traders, also for socio-cultural reasons.

However, there are important exceptions, at least if the wholesaler has a fixed location in the city. In this case, we found that there are also women engaged, often wives who work together with their husbands or widows who continue the business of their deceased spouse. But in general, it seems that it is much easier for women to work as a retailer because it does not require so much capital and often less time, so it can be more easily combined with work at home.

There is another domain where many women work: in the agro-processing of corn (tortillerías and maize mills). It seems that, also for cultural (it is women who traditionally grind corn and make tortillas at home) and socio-economic reasons (small businesses that are less demanding

in terms of capital and time, often in or nearby the house) is easier for women to open their own business or find a job as an employee in this sector.

The World Bank (2010) confirms that businesswomen in Guatemala have smaller enterprises than men in terms of sales volume (60% lower), but interestingly, their profitability is the same. The lower sales volume is exacerbated negatively for women by having young children. Women also tend to locate their business at home, with negative consequences for returns. Even if more than half (53%) of business owners in Guatemala are women, they have less employees and possess less capital than businessmen. Women have significantly less formal education and get less job trainings than men. They have less access to credits and get lower loan amounts (World Bank 2010).

In the export industry of non-traditional products (such as snow peas, French beans, and broccoli) the participation of women is high. On the one hand, export companies explain that women are considered more skilled for certain manual tasks such as cutting, sorting, packing etc. On the other hand, employing women may allow firms to pay lower wages and obtain more labor flexibility (for example, hiring women only in seasonal work spikes). Nevertheless, salaries in export industries are higher than income which agricultural laborers obtain and represent an important income opportunity for women in rural areas (see also Maertens and Swinnen 2009). Also, temporary flexibility sometimes interests women so that they can continue with their reproductive obligations. Furthermore, their wage income may allow women to gain more personal autonomy and empowerment (see Deere 2005).

Conclusions

The objective of this study was to demonstrate the participation and roles of women and the income generated in agricultural value chains. We focused on the non-agricultural sectors, i.e., input and agro-industry and trade, where evidence is scarce, mainly for informal sectors. Primary data combined with secondary census data was used to quantify employment and value added creation of a wide range of value chains, including informal sectors.

Women contribute nearly half of employment (48%) and of value added (49%) of all value chains included in our study. Women's participation in traditional value chains is much more pronounced than in the non-traditional export sector. This is even more so if we take into account the unpaid, invisible work of women within the household. The unrecognized work done by women is two-fold: on the one hand, it can be found in informal sectors of traditional value chains and on the other hand, in the last stage of the value chains. The number of working days for preparing products before being consumed exceeds by far those applied in agro-industry and commerce.

In short, agricultural value chains offer significant employment opportunities for rural and urban women as (small) entrepreneurs, but also as wage earners. Nevertheless, because of a gendered occupational segregation, women occupy nodes within the value chains which generate less income than men can earn, and do most work without any payment. Because of limited access to resources, women tend to work in activities with low entry barriers and low capital requirements which offer lower returns. Moreover, the reproductive, unpaid work is disadvantageous for women participating in labor markets (Elson 1999).

However, value chain dynamics can change labor market participation. This holds true not only for the expansion of non-traditional exports (Maertens and Swinnen 2009). Also, an increasing national demand of processed food, due to urbanization and modern lifestyles, can lead to new business opportunities for women (see Andersson et al. 2016). For example, in Guatemala there is a growing demand on pre-prepared corn bread so that the traditional tortilla-making at home will gradually be substituted by specialized businesses. This trend probably will give rise to more remunerated jobs, mainly for young women, and lessen the time-burden of women for unpaid work at home.

In conclusion, as long as socio-cultural and political institutions exist that systematically discriminate against women, the gendered outcome of value chain participation and benefits will persist. Public policies are necessary to eliminate unequal access to productive resources, to invest in new technologies and infrastructure to improve women's benefits from their participation in value chains, and to facilitate the insertion of women in rural labor markets in a flexible, fair and efficient way (FAO 2011). For example, our qualitative data showed that the access to capital is one of the main bottlenecks for women to start or enlarge their business. Even if this is also a problem for male intermediaries, it seems that women have even more difficulties to receive credits because they mostly lack of collateral. Special credit lines for women would be needed to overcome this situation.

Guatemala is one of the countries with the most advanced political institutions to promote women in Latin America. It has more than twenty laws, public policies and legal regulations; it also counts with 340 Municipal Women's Directorates, a Presidential Secretariat for Women, and gender units in all ministries. Already in 2002, Guatemala adopted a National Policy for the Promotion and Integral Development of Women (SEPREM 2002). Nevertheless, this did not materialize in less gender inequality, because it seemed that this was not a political priority. Therefore, the often invisible, but, as revealed in this paper, high female value chain participation and contribution to the national economy, should convince policy makers that special gender policies are needed for the social and economic empowerment of women. This will be crucial to further enhance the already high contribution of women to economic development and lead to less gender inequalities.

References

Andersson, K., Bergmann Lodin, J. & Chiwona-Karltun, L. (2016) Gender dynamics in the cassava leaves value chains: The case of Tanzania, *Journal of Gender, Agriculture and Food Security* 1(2), pp. 84–109.

AVANCSO (Asociación para el Avance de las Ciencias Sociales), (2001) Regiones y zonas agrarias de Guatemala. Una visión desde la reproducción social y económica de los campesinos, Cuadernos de Investigación No. 15, Guatemala.

Banco de Guatemala (Banguat), Departamento de Estadísticas Macroeconómicas, Sección de Cuentas Nacionales, (2013) Estadísticas de Producción, Exportación, Importación de los principales productos agropecuarios Años: 2001–2013, Guatemala.

- Barrientos, S. (2014) Gender and Global Value Chains: Challenges of Economic and Social Upgrading in Agri-Food, *EUI Working Paper*, RSCAS 2014/96.
- Coles, C. & Mitchell, J. (2010) Gender and agricultural value chains – a review of current knowledge and practice and their policy implications, *ESA Working Paper* No. 11-05, FAO, Rome.
- Costa, F. de A. (2012) Corporations and local economies in the Brazilian Amazon: the impacts of the mining sectors scheduled investments in Southeastern Pará (2004–2012), *Applied Economics* 44(10), pp. 1285–1302.
- Deere, C.D. (2005) The Feminization of Agriculture? Economic Restructuring in Rural Latin America, United Nations Research Institute for Social Development Occasional Paper No. 1. UNRISD, Geneva, Switzerland.
- Dey de Pryck, J. & Termine, P. (2014) Gender Inequalities in Rural Labor Markets, In: *Gender in Agriculture - closing the knowledge gap*, pp. 343–370, FAO/IFPRI.
- Dolan, C.S. & Sutherland, K. (2002) Gender and Employment in the Kenya Horticulture Value Chain, Discussion Paper 8, School of Development Studies and Overseas Development Group, University of East Anglia, Norwich, UK.
- Dolan, C. & Sorby, K. (2003) Gender and Employment in High-Value Agriculture Industries (*Agriculture and Rural Development Working Paper 7*), World Bank, Washington D.C.
- Elson, D. (1999) Labor markets as gendered institutions: equality, efficiency, and empowerment issues, *World Development* 27(3), pp. 611–627.
- FAO (2011) The state of food and agriculture 2011: women in agriculture - closing the gender gap for development, Food and Agriculture Organization of the United Nations, Rome.
- INE (Instituto Nacional de Estadísticas) (2004) IV Censo Nacional Agropecuario 2003. Guatemala.
- Kaplinsky, R. & Morris, M. (2001) A Handbook for Value Chain Research. Report prepared for IDRC, Institute of Development Studies, Brighton.
- Lanjouw, P. (2001) Nonfarm Employment and Poverty in Rural El Salvador, *World Development* 29 (3), pp. 529–547.
- Lastarria-Cornhiel (2006) Feminization of Agriculture: Trends and Driving Forces. Background paper for the World Development Report 2008, RIMISP.
- Maertens, M. & Swinnen, J.F.M. (2009) Gender and Modern Supply Chains in Developing Countries, *LICOS Discussion Paper* No. 231.
- Oduol, J.B.A. & Mithöfer, D. (2014) Constraints to and Opportunities for Women's Participation in High Value Agricultural Commodity Value Chains in Kenya, Working Paper no 2014/11, Maastricht School of Management, Maastricht.
- Raworth, K. (2004) Trading away our rights. Women working in global supply chains, Oxfam International, Oxford.

Rubin, D. & Manfre, C. (2014) Promoting Gender-Equitable Agricultural Value Chains: Issues, Opportunities and Next Steps. In: Gender in Agriculture - closing the knowledge gap, pp. 287–314, FAO/IFPRI.

SEPREM (2002) Política Nacional de Promoción y desarrollo integral de las mujeres - PNPDIM y su Plan de Equidad de Oportunidades - PEO. Secretaria Presidencial de la Mujer, Guatemala.

UN-ECA (United Nations Economic Commission for Africa)/African Union Commission/African Development Bank (2010) Gender and intra-African trade: The case of West Africa, Chapter 12, In: Assessing regional integration in Africa VI: enhancing intra-African trade, UN Economic Commission for Africa, Addis Ababa.

World Bank (2010) Women's Economic Opportunities in the Formal Private Sector in Latin America and the Caribbean – A Focus on Entrepreneurship, GTZ/World Bank/IDB.