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AGROECOSYSTEMS MANAGEMENT, SOCIAL PRACTICES AND HEALTH: A Case Study on Pesticide Use and Gender in the Ecuadorian Highlands ¹

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1. INTRODUCTION AND GENERAL BACKGROUND

The Andes of Ecuador has been classified as a centre of genetic diversity of potato (Brush and Taylor, 1992). This crop has been cultivated there for millennia, and is an important cash crop and a component of the every-day Andean meal. The northern Province of Carchi is an important potato producer in the country, where specialised farmers cultivate nearly 40% of national production on only 25% of the area (Crissman *et al*, 1998).

Modernisation of potato production in Carchi is related to fast changes towards high-input commoditised production systems and complex knowledge networks. As a result, the region is confronted with increasing social change and several environmental problems, especially related to pesticide use. Pesticides are the technological key to modernisation of potato production and are considered essential to obtain high yields. Recent studies² have demonstrated that in Carchi, where the farming system combines potato and dairy production, current methods of potato cultivation exhibit the heaviest pesticide use in the Andes and at large in the country. Farmers in the zone deal with many different potato plagues, which are combated by means of several pesticide ‘cocktails’. Among others, the insecticide carbofuran, used extensively by potato farmers, is blamed of extremely high neurobehavioral toxicity. As a result, the health of farm families is seriously threatened (Crissman *et al*, 1998; Cole *et al*, 1998).

2. STUDY OBJECTIVES AND STRUCTURE OF THE REPORT

The general objective of this exploratory study is to analyse how practices of farm resource management and pesticide use are organised at household level in a potato-and-dairy-farming community in Carchi Province. Derived objectives are:

¹ A Technical Report to the IDRC. Canadian-CGIAR Ecosystem Approaches to Human Health Training Awards with a Particular Focus on Gender. June, 2000.

² For example Crissman *et al*, 1998, 1994; Cole, 1999, 1998; Espinosa *et al*, 1999; Antle *et al*, 1998; etc.

1. By means of an ethnographic research, relate farming activities with social relations inside the household in order to determine the way social relations and gender influence the decisions and arrangements concerning farm management and pesticide use at farm level and in the household.
2. To determine the different perceptions and ideas on pesticide-related health problems, in order to relate ideology with practice.
3. To determine the influence of macroeconomic dynamics (especially market forces), on the way farm resources and pesticides are used.

The rest of this report is written as follows. Section 3 includes some theoretical insights followed in this study. Section 4 gives a short description of the study area, while section 5 includes an explanation of the methodology for ethnographic information gathering and analysing. Section 6 defines the farming system in the community from an integrative perspective, which analyses the farm interconnected with the household dynamics. This point refers to potato production activities from a gender sensitive perspective. Section 7 sets out the relation between risk, health beliefs and identity of the study population. Section 8 completes the ethnographic study with information on pesticide-related health problems from the local hospital. Section 9 comprises a brief discussion of results.

I hope this report will offer the reader some bewildering and contradictory complexity of everyday reality in the zone. As Kabeer (1995) suggest “to reverse the elegance of economics sacrificing elegance for a nosier, messier understanding of social process”.

3. INTEGRATING HOUSEHOLD, PRODUCTION DYNAMICS AND HEALTH

In order to understand from an alternative perspective the intra-community dynamics and ecological heterogeneity related to potato production and natural resource use in Carchi Province, it is important to replace the view that resources can be treated as isolated entities. Potato production can not be seen in isolation from the rest of the ecosystem and the social system. Therefore, in this study I have made an emphasis on a people-oriented approach (Berkes and Folke, 1997) which focuses on the resource producer and user rather than on the resource itself. Hence, I had a special analytic interest in people’s dynamics related to this production process. Because of this, I have focused on “potato production institutions”³. Potato production institutions involve complex ‘bundles of rights and responsibilities’⁴, which for this specific setting implies land use rights, the right to exclude others, the right to manage, the right to sell, the right to decide what to do with the benefits of the selling. The idea of ‘rights’ has a substantial dual connotation because it can not be understood without considering the derivative idea of “responsibilities”. Straightforward, this implies that people have the right of use and benefit from resources and social life, but also will have certain

³ Theoretical modification adapted from Berkes and Folke (1997). Berkes and Folke, quoting North (1993), define Institutions as ‘humanly devised constraints that structure human interaction. They are made up of formal constrains (rules, laws, constitutions), informal constrains (norms of behaviour, conventions and self-imposed codes of conduct), and their enforcement characteristics. Institutions are “the set of rules actually used (the working rules or rules-in-use) by a set of individuals to organise repetitive activities that produce outcomes affecting those individuals to organise repetitive activities that produce outcomes affecting those individuals and potentially affecting others’ (Ostrom, 1992).

⁴ ‘Bundles of rights’ is a concept originally adapted from Schlager and Ostrom (1992) quoted by Berkes and Folke (1997).

responsibilities. For example, some will have the responsibility to plough the soil, to apply the pesticides, to look after the farm animals, to take care of domestic activities.

I have used a conceptual framework that highlights the central role of institutions, with the meaning of “regularised patterns of behaviour between individuals and groups in society”, in mediating environment-society relationships (Leach *et al.*, 1999). By means of this framework it was possible to explore how differently positioned social actors command farm and environmental goods and services that are instrumental to their well being. Since this study deals with a way of production which is based in the use of toxic agricultural inputs, local institutions will play a role not just in the way certain actors are excluded from benefits, but also in the way some are facing continuous health risks.

Although the force fields around the production and resources management in Carchi Province differ with the type of resources or conflicts involved (agricultural plots, crops, Andean forests, urban facilities, credit, agricultural inputs, etc.) a central factor in the way in which management practices generally develop is the dense webs of social relations through which people in communities are connected to each other (Nuijten, 1998). Rules or arrangements for resource-use are determined by gender⁵. Resource-use entails, in brief, a set of social relations established around the resources. This determines who can use what resource and how resource-use patterns, and sets of management relations are interwoven and related to other structures and institutions, including family structures. In other words, a person, a household, or a group of persons does not possess exclusive rights to natural resources. The rights that a person (or a household) has to use the natural and farm resources are derived from his/her relations with other persons in the household and community, and are also determined by local and national laws. Since gender plays a significant role in kinship systems and status, and is a basic factor in socio-cultural structures, values, and practices, it is also a significant determinant of who is entitled the right to use the ecosystems (Lastarria-Cornhiel, 1997). The social rules or entitlements that determine individuals’ access to resources are biased in terms of social differences (Price and Palis, 1998). Moreover, as Kabeer and Subrahmanian (1996) state, “institutions can shape and reproduce relations of unequal power and authority”.

Social dynamics and institutions shape the forms in which agroecosystems are managed. Since it is possible to link human health with agroecosystems by seeing agroecosystems and social relations as the basic providers of human well being or deterioration (Cole, 1998; Link and Phelan, 1995; House *et al.*, 1988). Social dynamics may influence health via several pathways. One pathway is based on social influence (Berckman *et al.*, 2000). Shared norms around health behaviours (e.g. pesticide exposure, alcohol consumption, health care utilisation, and health beliefs) are sources of social identification too. Learning experiences, ideas and perceptions on health are socially constructed. These constructions refer to the fact that both individuals and groups of individuals develop ideas about disease and well being. This also means that health issues must be seen in a specific social and environmental

⁵ ‘Gender’ is understood here as a socially developed status, which implies the social construction of masculinity and femininity, and their associated gender roles. Also, we acknowledge that gender is an integral part of any social group structure; domination and subordination and also the division of labour in the family and the economy. “As a major social status, gender shapes the individual’s opportunities for education, work, family, sexuality, reproduction, authority, and the chance to make an impact on the production of culture and knowledge” (West and Zimmerman, 1991). The social position of any individual results from the organisation of collective life, where gender is linked with other social categories such as kinship, age, ethnicity, education, to name a few, which influence his/her live and mediates the ways in which relations are built.

context, because health issues are also subsumed under the symbolism of tradition and culture.

4. DESCRIPTION OF THE STUDY PLACE

San Pedro de Piartal is an Andean community located in Montúfar Canton in Carchi Province⁶. There are around 310 families, but the number of households is always changing due to the high mobility of the inhabitants. Out-migration takes place towards other communities in the province, to the main cities of the country and to other countries, especially to Colombia. The community is receiving also people from outside, especially from Colombia.

The community is located at 3500 m above sea level. The mountain landscape is dominated by colourful and irregular land-patches. By means of a cobblestone path, the community is connected to the Pan-American Highway, which crosses the country from North to South. In comparison with other rural areas of the country this community has a relatively good infrastructure. Houses are constructed with bricks and clay roof-tiles in an Old-Spanish style, and generally are located next to one land plot. Most houses are supplied with piped water and have a drainage system which is connected with a nearby water flow. The farming system in the community principally combines potato production and pasture for dairy purposes. However other crops such as carrot, vetch, maize and green bean are cultivated too.

5. METHODOLOGY

In this study, a combination of ethnographic methods was employed. The theoretical concepts were addressed following an Actor Oriented Approach (Long, 1988). This perspective was suitable to investigate how local actors come to grips, both cognitively and organisationally, with solutions or strategies to maintain their livelihood and to cope with environmental problems. Therefore this approach which directs attention to the arenas of struggle and negotiation in which a variety of social actors (peasants: men, women, children; professionals: doctors, nurses, agronomists, etc) are involved (Long, 1997; Long and Long, 1992). Throughout the data collection and analysis a gender sensitive approach was followed, by using a flexible 'gender analysis framework'⁷.

The fieldwork was carried out from October to December 1999 and from March to April 2000 and the total work was divided in three stages. In the first stage, open interviews with informants (n=35), selected with a snowball sample (Bernard, 1988), were carried out to get a broad perspective about the general situation in the zone, and to determine the key actors for further in-depth interviews.

⁶ Some cities are important for this story such as: San Gabriel, which is the administrative seat and an important market of Montúfar Canton (from the community to San Gabriel it takes half an hour by car). Tulcán, main city of Carchi Province and located one hour by car from the community. Ibarra (main city of Imbabura Province, distance two hours and a half by car from the community) and Quito (capital of Ecuador, distance four hours and a half by car from the community).

⁷ This implies that some categorisations that usually are the main component of traditional gender frameworks were not suitable for this study. These categorisations are underpinned on the classical partition of the three roles: productive, reproductive and social (Mosser, 1993). As it is stated in results, gender roles are dynamic and it is almost impossible to follow categorisations, which isolates productive from reproductive roles.

In the second stage, semi-structured interviews were carried out with key informants (n=21) determined with a purposive or judgement sample (Nooij, 1995). The selection of informants was based on land tenure differences: Households with total plot area of 5 ha or more (n=3), with a total plot area of less than 5 ha (n=13) and households with no land (n=5) were selected. Moreover in every group a household where a female farmer controls the farm production was included. With 10 key informants (6 men and 4 women) I conducted an unstructured questionnaire for in-depth oral histories, in order to understand their point of view regarding health, gender relations and changes in their activities. I put emphasis on actor's forms of 'story-telling'. Those stories that tell individual, personal histories related to family and individual biographies imply forms of self-identification (Nuijten, 1998). "We could begin by paying attention to the ways in which people reflect on themselves, and then see in what ways these reflections are indicative of social and cultural context, or require such contextualisation to be intelligible to us" (Cohen, 1994 in Nuijten, 1998).

The third stage included an investigation carried out in the main hospital of the zone. There, medical reports and statistics were revised. From those reports two kinds of studies were made. One general quantitative analysis of the hospitalisations registered during 1999 (see results in part 7), and second, a content analysis of the texts in these reports on pesticide intoxication from the years 1997, 1998 and 1999. The content analysis of the narratives in the reports brought medical and social interpretations of the circumstances of intoxications (see analysis in part 7). Same types of analysis were made from written police information on violent and abrupt deaths in the zone. A general quantitative and a content analysis were made of the police reports on deaths caused by pesticide.

During all stages of the fieldwork a record of the observations and conversations not recorded in formal interviews was kept in separate notes. These informal observations notes were used to verify the research assumptions, and for the validation of the other sources of information. This was important to verify the consistency on what was said and what was observed.

6. AN INTEGRATED APPROACH TO THE POTATO-AND-DAIRY-FARMING-SYSTEM

- *Land tenure and farming labour in the community*

Small farms dominate land ownership in San Pedro de Piartal. Generally speaking, land units tend to be smaller than 10 ha. According to Barsky (1984) land re-distribution in Carchi Province was the first in Ecuador. In the early 1940s local haciendas were divided after the pressure of several social movements. Further land division took place in the agrarian reform during the 1960s. At present times division of land in the community is arranged mainly by means of land-sales, inheritances, invasions and land-hand-over. When people speak about "their land", they usually refer to several and different plots. Those plots can be distant one from another, some informants even have plots in other communities.

Concerning inheritance rights, informants said that they would divide the land in the same number of parts as the total numbers of sons and daughters they have, so that each of their offspring (sons and daughters). However, they admit that the oldest sons tend to have the best pieces, because "they start early to work in agriculture", and they are seen as "the main responsible" for their own families. Parallel to this, informants said that giving land to their

daughters is a way to “*protect them*”. This is a way to enhance their future bargain capacity related to intra-household rights once they get married.

Farmers in San Pedro de Piartal are commercially oriented. There are several social arrangements concerning potato production and farm labour. In any case household members entail an important and free source of labour. But, since potato cultivation is labour intense, especially when big amounts of potato have been planted, it is also common that farmers contract wage labourers (*peones*). Wages for these *peones* are paid on a daily basis, except during the harvest, when the payments are for every bag (*quintal*) of harvested potatoes.

Sharecropping is a common institution in the community. This way some peasants with no land have more benefits from potato production activities than as contracted worker. For landowners this is a way to share risks. It is important to realise that potato production is a risky activity because several diseases can destroy the entire yield and fluctuations in potato prices can cause high economical losses. Various resource inputs are negotiated in the sharecropping arrangements. Generally, the landowner will put the land and part of the manpower, while the other farmer will put the agricultural inputs (fertilisers, pesticides, etc) and labour. The final division of benefits can be divided equally or unequally depending on power issues playing a role in those arrangements. Many farmers are involved in different sorts of arrangements at the same time. For example, one landowner can sow potato or other crops in one plot, while he is involved in a sharecropping arrangement on another farmer’s land. Besides this, on some free days he may be working for someone else. This example highlights the fact that farmers are using several strategies to deal against uncertainty. Therefore, well-off peasants (who have successfully capitalised, and have the ownership of fertile land) have more possibilities to diversify their strategies, while for peasants with no land or capital, the dependency on their daily income as wage worker is stronger. The peasants who work mainly as wage workers are the ones most exposed to the pesticide hazard by chronic exposure. Moreover, intense potato production and market-forces have caused that a group of peasant households emerges as a proletarianised group. This group depends strongly on their labour force, which primarily allows them to have an income to supply the basic household necessities. At the same time, this labour force is facilitating the capitalisation of other farmers with more resources.

Land renting for cultivation is an arrangement that is usually utilised by capitalised peasants who decided to take the risks and possible benefits of production themselves or in an agreement with an associate farmer. An informant who rents land said that the management of his own plot and of the rented one is rather different. In his own plot he allowed the “*land to rest*”, which implies that he follows a type of crop rotation. In the rented land, potato is planted again immediately after the harvest. He said that he uses the rented plot until “it is not possible anymore to get something from the land”.

- ***Potato Production Practices and Women’s work***

Farmers plant potato all year round due to minimal seasonal changes in rainfall and temperatures (Crissman *et al*, 1998). Even though there are no clear growing seasons for potato production, moon cycles are taken into account by farmers. They consider that sowing during “*bad moon*” makes it more difficult to deal with pests and diseases. Not all moons are good or bad for the same crops. Tuber crops are positively influenced when planting during a decreasing moon. In the contrast, non-tuber type crops are well influenced by crescent or full moon.

In the community's fields it is possible to find potato at different stages of development. Concerning crop-pasture rotation Crissman *et al* (1998) explained that "the size of the cultivated portion of the field is variable since farmers fit different crops onto the field or leave portions fallow. Different crops are entered into the field at different times as harvests take place. The portion of the field in crops or pasture expands or contracts depending on the planting intentions of the farmer. Fallow land quickly converts to pasture". Potato production in the community follows an established sequence of activities. Table 1 lists production activities according to sex. This must be seen as a generalisation, because some households have individual differences, based on family's life cycle, disposability of capital and land property.

Table 1. Potato-production activities of women and men

ACTIVITY	WOMEN	MEN
Ploughing	*	X
Harrowing	*	X
Tubers cure ⁸		X
Fertiliser application	X	X
Planting	X	*
Field irrigation	*	X
Pesticide spray applications		X
Hand-weeding	X	X
Hilling-up	*	X
Food preparation and distribution to field workers	X	
Harvesting	X	X
Sorting harvested tubers	X	*
Potato selling	*	X

X Main responsibility

* Of secondary responsibility or less-frequent enrolment in such activity

Source of Information: This study (October-December 1999 and Mar-Apr 2000).

Men and women were not paid equally. Men earned 30.000 Sucres, while women 25.000 Sucres per day, even if both were doing the same activities. These wages were paid during the months of November and December 1999⁹. However, three months later (in march 2000) at the beginning of the dolarisation process¹⁰, there was a change in wages. Some farmers started to pay daily wages of 35.000 Sucres to men and to women. The explanation the informants gave to me was that due to the economical depression, two wages are needed to cope with the basic requirements at household level. Therefore, men who are working with their wives do not want lower wages for their wife. In 1999 landowners justified paying less to woman-workers with the explanation that "*men-workers do not like to be treated as women*" and because women are not able to lift the quintals of potato on their shoulders. However this was a contradictory explanation because during the harvests the payments are the same for men and women and depends on bag (*quintal*) of harvested potatoes. Although

⁸ This terminology is refereed to the application of any kind of pesticide, at this stage of the process the applications are mainly of carbofuran.

⁹ 1US. Dollar = 18.000 Sucres (1999, last months). 1US. Dollar = 25.000 Sucres (2000)

¹⁰ The dolarisation process is a macro-structural economic measure that started in the beginning of the year 2000. It implies for the country the conversion of the Ecuadorian 'Sucre' into the USA 'Dollar' into the official currency.

few women are able to carry all the bags harvested, they are contracted because some are well know for their abilities of tuber selection.

The division of labour described in table 1 clearly illustrates women's participation in potato production activities¹¹. Current literature says that potato farming in this part of Ecuador is predominantly a male activity (e.g. Crissman *et al*, 1998a; in Crissman *et al*, 1998 pg. 106). Such a conclusion could result when only one or some links in the production chain are considered. Participation of women in farm activities and in commercial potato production has been overlooked in these former studies. This has resulted in an incomplete knowledge of the farm and production arrangements, together with a lack of recognition of the importance of female work in productive activities and roles. Thus, conventional studies in the zone resemble those described by Boserup's 'male farming systems', in the extent that have focused on male tasks and responsibilities (Boserup, 1970).

In some households farm production as a whole is managed by women. This especially happens in the absence of the husband, or when the family had several daughters. There were some households where the father works in the field with his daughters, who also have the responsibility to apply pesticides if they can not afford to pay a wage to a worker. In these households daughters also have some level of decision on what to do with the production benefits. Female farmers considered that they were not educated (formally and non-formally) in agricultural issues as early as their male family members were, which has imposed an extra difficulty for them to obtain information. Some female informants said that even for their own fathers, it was more 'natural' to pass agricultural knowledge to their brothers.

- ***Making a contrast between 'what was said and what was observed': The challenge of gender sensitive methodologies***

It was not a simple task to get answers from informants on division of labour per gender. On the contrary, this implied a methodological challenge. Many informants (men and women) had no problem answering general questions (what activity is done generally by whom?). But when the question was directed in a more personal way (what do you do?), the answers were much more diffuse, incomplete, and especially women tended to give 'value-judgements' concerning their work. Many women answered "*I do not do anything, I just stay at home*". "*My husband is the one who works*". This implied two practical complications. First, to talk about female work, implied to talk about work which was under-valorised by women themselves. Second, potato production has a masculine status and the activity is seen as an "*activity for men*". Then, some men feel ashamed that their wives dedicate themselves to potato production activities. Generally female work in this production system is seen as a secondary help and not as real work. It was quite common that in first conversations I had answers of a man like "*my wife does not work at all in potato production*". But, in the afternoon I found his wife harvesting or working with a hoe or pickaxe. In households where the husband is absent for long periods because he works in another place or when the husband has died, potato production is entirely managed by the woman, together with domestic tasks. This female farmer will refer to herself first as a mother or as a housewife, secondly she will refer to her role as producer.

¹¹ Although there is not an explicit description of children's activities in table 1, it must be explained that informants set out, and it was corroborated in field observations, that girls tend to help their mothers or older sisters. The same do boys with their fathers and older brothers

This kind of complexities implies that conversations have to be continuous. By means of sensible observation it is possible to formulate and reformulate questions and themes of discussion with informants.

- ***Our cow is our bank, my cuy¹² and chickens are my moneyboxes: Livestock and husbandry in the potato-and-dairy-system***

It is artificial to look at potato production in isolation from other household and farm activities. In fact, people organise their daily activities based on complex set of duties. Domestic work, crop production, animal husbandry and other farm activities need to be done daily. This diverse spectrum of activities is organised following different patterns in every household.

According to Crissman *et al* (1998a) “the cattle fit into the farming system by utilising the pasture available during the fallow portion of the cropping cycle. Among the small farmers cattle serves multiple purposes. Typically low-quality, mixed-blood animals, their principal use is as milk cows producing for home consumption and sale. Farmers also purchase younger cattle for grazing on pasture for later sale”. An opinion that was recurrent among informants was that cattle (especially milk-cows) are the first investment they would consider with potato profits. Primarily the adult women of the household execute milk production tasks. Female farmers said that they prefer this type of low-quality cows (*runas*) because they produce the fattest milk and demand less care and “*are less delicate*” than high-quality races. This also has a nutritional importance, especially when considering that fat input is low in the every-day diet. School-aged children work in cattle-caring activities after school time. For grazing, animals are moved systematically through several pasture patches, or led in road borders. Peasants without land or with plots already with crops rent grassland from others. Renting is usual in the zone and prices are set in a negotiation process. This is a potential source of conflict among farmers, especially if the negotiation with a person fails, but succeeds with a second one. There are stories that good friends have become enemies after the failure of a negotiation.

Women generally manage the money obtained from milk sales. Milk provides cash income for spending on daily basic household necessities. Part of the milk produced is kept for consumption in the household. Some informants said that in difficult times, they sell all the milk. Women sell the milk to a local middleman who also buys the milk production in other nearby communities. Buying cattle is seen as an inversion, but also as a good way to save money. Informants said that they had little confidence in banks and financial institutions. Cattle can be sold for potato planting, land acquisition, or to pay debts. This is a potential source of conflict at the household level, especially when a man decides to sell the cattle without the approval of his wife. Although usually it is the man who sells the cattle and decides what to do with this money, this happens after negotiations at home. This does not mean that consensus is always achieved. To sell the cattle sometimes means a significant risk for the primary means of subsistence of the family.

Near to the houses some small animals are kept, such as cuyes, chicken, ducks, pigs, rabbits, etc. They are considered the woman’s property. It is the woman who decides when to sell them and what to do with the money. She often uses the money for household needs or emergencies and to buy the school materials of their children. These animals are prepared as

¹² Guinea-pig

food during special occasions. For example in baptisms or other religious celebrations or when receiving important guests. To feed the small animals women and children collect the grass from pastures that sometimes are distant from their houses, which implies some hours walking carrying the grass.

- *Food preparation for production activities or the ‘invisible giant’*

Moser (1993) influenced gender-analysis frameworks with her theory that women have three roles in society: Productive, Reproductive and Communal¹³. An important contribution of feminist research was to set up the invisibility of those roles of women in agrarian research, but also in the public-political debate. Current feminist debate acknowledges the fundamental continuity between women’s unpaid (domestic or reproductive labour) and paid (productive) labour, “neither of which can be satisfactorily understood without referring back to the overarching cultural construction of gender difference (Kabeer, 1996; Sage, 1993; Radcliffe, 1993; Ram, 1991).

In this report I want to focus the analysis on the multidimensional aspect of food preparation. Cooking during potato production activities is a time consuming activity. Generally, it starts with breakfast preparation for the household members who have to work in the field. In almost all houses there are gas-kitchens, but during potato production periods, women use firewood kitchens. This has two reasons; to reduce costs (firewood is collected for free), and to have extra space for big pans. Then, lunch for household members and field-workers can be prepared. Around 11 a.m. women are ready to bring the food to the fields. Sometimes this means a heavily loaded two-and-half-hour walk through hilly terrain. Around mid-afternoon workers take coffee with bread or a kind of fried pasty. Some women make two journeys daily.

Frequently farmers (mainly women) collect firewood from an Andean forest remnant on the upper part of the mountain where the community is located. Some farmers get the firewood from the middle part of the mountain, where they possess land with small forest patches. At times, some buy eucalyptus wood that is sold in markets or by salesmen who go to the community. It appears that many households are using firewood that comes from native Andean forest, and that the pressure on native forest is stronger during potato production activities that require more workers. Many households are not able to buy eucalyptus wood, because of economical depression, causing increasing dependence on forest wood. This implies also that women spend more time collecting firewood. Furthermore, potato production is affecting native Andean forest by its conversion into agricultural land.

Food preparation is one of the resources negotiated in sharecropping arrangements and in the setting of wages. In half-half arrangements, the wives of the farmers involved negotiate among them who will prepare lunch or coffee and on which days. Farmers pay to day labourers 30.000 Sucres “with food” and 35.000 Sucres “without food”. Among the families interviewed one produced potato by contracting workers “without food”, because they realised that food preparation is an extremely time and physically demanding task. Because

¹³ According to this, productive activities include all those tasks that generate economical benefits or goods. Reproductive and human resources maintenance activities are those related to reproduction and care for the household and community. The reproductive role comprises of the childbearing/rearing responsibilities and domestic tasks required guaranteeing the maintenance and reproduction of the labour force. Moser recognises that women are involved in a community-managing role also, which includes different types of communal activities, from the economical to the religious.

in the community workers prefer to accept “*jobs with food*” he has to contract people from other communities. Initially the reason given was that the wife was sick, but in further conversations it turned out that this was because food preparation for workers originated many conflicts inside their household. However, since she is the owner of the land, through inheritance from her father, she has more room for decision making on these issues.

The example of food preparation highlights that a categorisation of domestic work as a non-productive activity is rather artificial. Overlooking the way the so called ‘reproductive work’ influences productive activities would mean lack of recognition for the amount of work that this division of labour imposes on women, and the importance of these activities for production.

Another female activity that is important for many households and is related to potato production is pullover knitting. This activity is especially important in households with no land, or when potato production has brought economical losses. Usually a woman (an adult or a teenager) can knit one or two pullovers per week. There are various merchants who provide women with wool, and pay 20.000 to 30.000 Sucres per pullover. According to some informants, in difficult times the basic household requirements are supplied with the money earned by knitting. This way some households survive until the potato-harvesting period.

These examples serve to ‘deconstruct’ the household (Whitehead, 1994) moving beyond the ‘black box’ conception of a unit collectively engaged in a single form of production (Whitehead, 1981). Rather, the household serves as a locus for supporting simultaneous involvement in various complementary or non-articulated spheres of production. These include both agricultural and non-agricultural activities (Sage, 1993).

7. RISK, HEALTH BELIEFS AND IDENTITY

- *Pesticide use practices and protection*

My field observations coincide with other data published to the extent that farmers apply pesticides several times on a potato crop. Crissman, *et al* (1998a) states that on average, each parcel receives more than seven applications with 2.46 different insecticides or fungicides in each application. Pesticide applications may start before planting when the tubers are treated with insecticides or sometimes with lime. Then, several applications follow when the potato leaves form. Farmers use a variety of chemicals. “Given the costs associated with spraying, farmers combine several products together in mixtures know locally as ‘cocktails’, applying all on a single pass through the field. Foliar fertilisers are also applied with the backpack sprayer and, when added to the pesticides, some farmers report as many as seven products in a single mix” Crissman, *et al* (1998a). Normally applications are done without the use of any professional protection, with exception of rubber boots. Rubber boots are considered the usual working footwear for farming activities. However farmers use certain clothing which is considered protective, commonly a leather jacket, because it repels water and pesticide fluids. This jacket is usually stored together with the backpack sprayer. Another common protective clothing is a denim jacket, which also is exclusively used for fumigations. Other farmers said that they do not use any special clothing for fumigations.

Reasons to reject the use of special protective clothing are (1) discomfort and (2) high costs. At this altitude, mid-day radiation of the sun is intense. Some informants said that they hate

wearing masks and rubber clothes, because this clothing is uncomfortable and it makes them feel that *“the sun fries their brain and body”*. Furthermore, heavy clothes reduce their capacity of movement. Secondly, farmers consider protective clothing expensive, which increases the production costs. Moreover, agrochemical shops in San Gabriel do not sell appropriate protective clothing. Shop assistants said that farmers have to go to the main cities of the country if they want to buy protection items that are included in catalogues. Shop assistants said: *“in stock we have what we know we can sell. Pesticides are good business, but nobody will buy any sort of protection item here”*. Also, according to the shop managers, lately there were no courses or training meetings anymore on technical recommendations related to pesticide use conducted by an agrochemical company. Because they already have a sure market, and they do not need to invest in extension and propaganda.

The pesticide cocktail is generally prepared in the field, in the plot that is treated. The informants said that they prepare the pesticide mix using a stick long enough to reach the container's bottom. When doing this, generally their hands get wet. They said that a few years ago, many farmers used to mix the pesticide with their hands, but now just few farmers do it like that. During the applications clothes and body become damp with pesticides, especially on windy days. It was observed that especially young farmers apply pesticides wearing shirts without sleeves. Additionally, many farmers use defective backpack sprayers, which causes continuous losses of the pesticide fluid from the tank.

Field workers eat in the same plot where they work, even when they are applying pesticides. The majority of them said that they do not wash their hands, because water is not always available and some said that they get so hungry that they just want to eat as fast as possible. It is not rare that some farmers smoke when applying pesticides.

Some farmers wash the pesticide backpack sprayer close to the field, in nearby water streams, but many wash the backpack sprayer at home. The backpack sprayer is washed with the water that is stored in the ‘washing stone’¹⁴. Afterwards, the backpack sprayer is left to dry in places like a courtyard, a patio, and an entrance porch, a storeroom for agricultural items, or in a storeroom together with other household items (such as firewood). One time I saw a dripping wet backpack sprayer in a corner of a room with maize for chicken, and close to the children's bikes. Likewise, another common place to leave the wet backpack sprayer was on top of bags with potato.

Informants said that it is more common that after pesticide applications farmers wash themselves with the water of the ‘washing stone’, than to take a shower. Few said that they really take a warm shower¹⁵. In separate conversations two housewives said that after working sometimes their husbands wash them selves but never take a shower. As one woman said: *“My husband usually does not take a shower after pesticide applications. Therefore I believe that he has lost his sense of smell, because he is not able to smell pesticides residues in his clothes or body anymore. However, after applications I can smell a very strong pesticide smell coming of his body... and I have to sleep with this!”*

¹⁴ Small construction for washing clothes connected to a water cistern, this in Ecuador is called *‘piedra de lavar’*.

¹⁵ This observation is made because some literature concerning ‘good pesticide handling’ states that warm showers are recommended to clean pesticides residues from the skin. And because many informants differentiate to take a wash (in Spanish: *me lavo*) or to take a shower. To wash can mean to wash the whole body with the water from the washing rock, or just to clean hands, head and arms. To take a shower was more specific, and implies to wash the whole body.

- ***Observations on pesticide storing practices***

Although pesticides are not stored for long periods, because they are used almost as soon as they were bought, they are stored for some time near to or in the house. Farmers have different places to keep pesticides at home. It is common that pesticides are stored in storerooms, together with other agricultural items. During the afternoon (when adults are at home) the door of this room stays open, allowing the entrance of household members. It was common to observe these rooms locked when adults were out. The idea behind these rooms is not just to store pesticides separate from other spaces but since pesticides are expensive they also need to be stored in a secure, locked place as a way to protect this against burglaries. It became clear that sometimes, when little kids have been left with out attention, they go into these storerooms. The necessity to ‘keep an eye on’ pesticides, also explains why many people have pesticides close to their social house-spaces, such as kitchens, especially when the pesticides are still in their original packages. The backpack sprayer was not always stored in the same place with pesticides. Sometimes the pesticides were inside, while the backpack sprayer was outside. According to some opinions this is because the backpack sprayer stinks more than the packaged pesticides, and if anyone steals someone’s backpack sprayer it is easy to identify it. But if anyone steal the pesticides, no one can identify them.

- ***Pesticide waste and used containers***

Landowners said that they usually do not leave wastes and they usually use all the pesticide prepared. Commonly, landowners and sharecroppers are in the field during the applications, controlling that the pesticide is applied properly. They consider that “*just the owner does not waste the pesticide lasts*”. When farmers refer to ‘appropriate use of pesticides’ they refer to applying the pesticide so that it effectively protects the crop. Also the pesticide should be applied homogeneously on the crop, avoiding waste as much as possible. This contradicts with the fact that farmers usually waste pesticide by using defected backpack sprayers.

The pesticide bags and containers are usually abandoned in a corner of the field, or they are thrown in water streams, or left along paths. A few said that they get rid of packages by burning them. It was generally observed that some containers were recycled at home by transforming them into flowerpots. Patios and porches were decorated with several types of flowers planted in flowerpots made of pesticide containers.

- ***Pesticides-related-practices inside the household***

Male workers, who apply the pesticides, are not the only members of the household who are frequently in contact with pesticides. Pesticide exposure occurs in many places and can be related to several activities inside the household as well. For example, some domestic activities bring women and children in contact with pesticides. In this report I focused on cloth washing. Many women said that they generally do not mix the clothes used for pesticide applications with the rest of the clothes. However, they admit that sometimes, when they have to wash large amounts they mix the clothes in the same bucket. According to various women who mix the clothes, this is seen as a way to save time and money. They think it can be risky, but they expect that the pesticides “*go away with the running water*”. One informant said that when she washes the clothes used for pesticide applications her hands itch and become extremely dry and inside her nails remains a pesticide smell. Therefore, she did

not mix the clothes, because she hates the smell that remains on her hands, in the water or even in the washing stone.

- ***The pact with pesticides: Perceptions on pesticide use and health***

People accept that their living condition has many contradictions. On the one hand they are immersed in a dynamic market-oriented economy, which forces them to increase or maintain production using as much pesticides they can afford, recognising that intensive potato production is affected by many plagues and diseases. On the other hand, some know clearly and others have the ‘feeling’ that pesticides are dangerous. Farmers experience the possibility of pesticide poisoning in their crops. There are recurrent histories of human and animal deaths related to pesticide poisoning. Some histories clearly show that disputes among dwellers can end with the poisoning of the cattle or dogs. Moreover, in the community there have been meetings about pesticide-hazards information¹⁶. The perceived risk generates many contradictory discourses and ideas on risk among local dwellers. I consider that the discourses on pesticide risk have four main complex dimensions that evolve in an interrelated and interconnected way. These dimensions are (1) hopes of economical progress, (2) health-beliefs, (3) gender identity and, (4) social identity.

Informants said that potato production is a risky enterprise (in economic terms and for human health). Therefore, expectancies of economical progress obtained by potato production are translated in “lottery-hope discourses”. Farmers know that they can lose their capital and labour. Actually, during the fieldwork there were many farmers who had big debts due to losses as result of potato price fluctuations on the market. However, they said that there had been many others who had become rich with potato. Then, a hope of a wealthy future by means of potato production pushes farmers (men and women) to keep looking for ways to be successful in this activity. Hence, pesticide applications are necessary to remain economically competitive (because there is no widely accepted substitute to agricultural chemicals) regardless of the perceived risk.

The expected economic progress is seen as a way to increase the farmer’s social status. This dimension of pesticide use also reinforces the issue that farmers are much more conscious of the final earning obtained from potato sales, than of the whole investment they had to do.

Two local health-related aphorisms are useful to understand ideas on sickness related to pesticide use. First, “Fat people are healthier and stronger than thin people”; second, “diseases are transmitted mainly by air”. The first aphorism implies that health problems caused by pesticide exposure are diminished or avoided by eating good food and in big quantities¹⁷. Informants commonly expressed the idea that food protects the body against negative effects of pesticides: “*As he is a well-fed person, he can work with pesticides without problems*”. An informant’s comment, in relation to a man who uses to work since he was young with pesticides was: “*He is fat, healthy, with pink cheeks and for that reason he never has had problems, while his brother who has to work in the city because he could not stand pesticides was thin, pale and weak.*” Only few informants (especially women) assume that allergies and other problems could be related to pesticides. Those informants who relate allergies with pesticides exposure say that they have experienced this problem, especially

¹⁶ Meetings with education emphasis had been organised by/or in collaboration with CIP (International Potato Centre), IDRC (International Development and Research Centre), INIAP (Instituto Nacional de Investigaciones Agropecuarias).

¹⁷ Informants used repetitively the adjectives ‘good’ and ‘abundant’ to describe this idea.

after washing clothes that were used in pesticide applications. The second belief suggests that toxic effect of pesticides can be minimised when avoiding the smelling or the direct inhalation of pesticides. Pesticides get people sick because pesticides enter the body by air via nose and mouth. This has a relation with the idea that the stronger the smell, the more dangerous the pesticide is. Also some informants said that when one has the flu, one is more susceptible to suffer the effects of pesticides.

Ideas of masculinity also have a substantial influence on the actual use of pesticides. Pesticide related sicknesses are associated with weakness. There is the concept that a real man has to be strong. Therefore pesticides can not affect a strong man. These cultural ideas correspond with theoretical insights of “claming the victims”. This implies that many men who had health-related pesticide problems (allergies, for example) have been forced to migrate. In this social context, where it is expected that a man should be sturdy, it is difficult to relate with others without being teased when this man is labelled as a ‘*weak man*’.

People in the community said that in order to be a potato grower, it is required to take certain risks, for example be able to live with pesticides. They even said that “*potato is their source of live and it is also their source of death*”, but they always have lived from potato and they see them selves as potato growers. Social identity plays a fundamental role in these comments, because this is seen as a way of living as well. As one informant responded to me, when asking about the pesticide taste, which remains in potato: “*We all here eat potato with pesticide*”. Besides, many farmers state that because they always have applied pesticides “*they are used to them*”.

Pesticides have been incorporated into daily household practices. Farmers have a pact with pesticides, which implies that in order to succeed socially and economically in this context, one must deal with pesticides although one’s own and the family’s health is threatened. This pact may be dissolved when the farmer succeeds to capitalise. Then, he or she can contract field workers for applications and they just control the efficient use of pesticides, instead of applying themselves. This implies that these field workers will be the population group that inescapably is more exposed to the pesticide hazard.

This last point must be connected with other discourse differences on pesticide risk. Landowners who contract wage workers or managers of agricultural shops tend to explain (1) pesticide poisoning as the result of being careless during pesticide use, and (2) voluntary pesticide intake as “*mental insanity*”. On the contrary, wage workers tend to explain (1) pesticide poisoning as an occupational risk and, (2) voluntary pesticide intake as a “*desperate decision*”. The following opinions illustrate these differences. According to a landowner that contracts workers “*if people get sick due to pesticide use, it is because these people are dirty and do not take proper care at home and in the field. If people commit suicide with pesticides it is because they suddenly become crazy or they are not strong enough to deal with their problems*”. On the other hand, a wage worker’s opinion was: “*We got sick because we are forced to live in continuous exposition to pesticide, this is the only way to survive here. Moreover, what I am going to do in the city? At least here I can maintain my family even if I have to respire pesticides daily*”. “*Those who try to kill themselves with pesticide do that because they can not stand the economical pressure anymore or because they are desperate because they have too many and too complicated problems*”.

8. HEALTH, PESTICIDES AND INTERPRETATIONS

- *Who is afraid of the doctor?: Health infrastructure and services*

San Pedro de Piartal is a community that has a relatively good infrastructure concerning health-care services, compared with other communities in the Province or in the country. Local leaders of an externally founded project¹⁸ have developed a small health-centre. This centre is stocked with essential drugs and offers dental, medical and psychological services, for which a dentist, a medical doctor and a psychologist have been appointed. Each professional goes one day per week to work in the community. Of these three professionals, the dentist attends most patients. The doctor (who is female) has much less patients, not because people believe that they do not need doctors, but because they still refuse to use her services. She considers that for male patients it is difficult to go to a female doctor. Therefore, her main patients are children and women. Moreover farmers (men and women) rely more on hospital doctors. This doctor says that apart from this, she is working there just since a few months, so she is still struggling to get people's confidence. Moreover, she considers that being a local doctor has many complications. One is the lack of possibilities to carry out detailed examinations. Patients consider these exams (usually to detect parasites, blood condition, etc) "an expression of the doctor's lack of knowledge" and they prefer to go to another doctor "who knows better". However, the person with most problems to work in the community was the psychologist.

The project leaders appointed the psychologist on basis of some conclusions they had after several meetings, that one of the main problems in the community is the high level of alcoholism, especially among young men. They consider that a psychologist could bring some solutions or at least some explanations for this problem. Although the psychologist was contracted with the public acceptance of the participants of the meetings, he has no patients. Since the salary of professionals contacted by the project depends on the quantity of attended persons, he earns almost nothing. He said that the main reason is that people in meetings say that alcoholism is a problem, but in individual conversations the same people see alcoholism as an isolated incident, as a problem for others who do not have control, but that "*alcohol is not a problem for him*". Moreover, men are not used to talk with other men about intimate things "*with out drinking something*", which also implies that for talking about alcohol or personal problems, it is required to drink alcohol.

People from San Pedro de Piartal usually go to the State Hospital of San Gabriel¹⁹ for emergencies or short consultations.

8.1. Health reports in State Hospital of San Gabriel

In the State Hospital of San Gabriel there is a good register of hospitalisations, but there is not a clear registration of short consultations. For this reason I only count on hospitalisation data. The lack of information on consultations is the result of the difficulty to implement a

¹⁸ Project founded by CCF (Christian Child Foundation).

¹⁹ Some informants consider that the Hospitals of Ibarra, Tulcán or Quito are their alternative place to go when they need long treatments, but not in emergencies. In 1998, they also could count with the Peasant-Assurance-Centre (*Seguro Campesino*), actually this centre has been closed for a long period due to national health-strikes. This note on alternative health-care centres is made in order to acknowledge that much information on health in the zone might be dispersed in other centres of the country.

systematic registration for consultations. Table 2 describes the main reasons for hospitalisations and the number of cases during 1999 in San Gabriel Hospital.

Table 2. Reasons for hospitalisation in San Gabriel Hospital (1999)

REASON	MEN	WOMEN	TOTAL
Normal delivery		577	577
Cesarean		59	59
Obstetric problems (related to pregnancy)		75	75
Delivery of a death baby and stillborn		31	31
Abortions		83	83
Sterilization (tubular ligation)		30	30
Intoxication	40	15	55
Trauma (Accidents/Violence/Occupational).	57	27	84
Diseases of the digestive system	84	99	183
Diseases of the respiratory system	30	27	57
Cerebro-vascular diseases	4	4	8
Cardiovascular diseases	14	11	25
Metabolic disorders	5	11	16
Diseases of the nervous system	6	11	17
Diseases of the urinary system	7	17	24
Diseases of the reproductive system	2	20	22
Other reasons	10	8	18
Total	259	1105	1364

Source of Information: This study (Mar-Apr 2000).

In 1999 the majority of hospitalisations were for obstetric reasons (63%). From this total percentage of hospitalisations for obstetric reasons, 74% are deliveries, 4% are sterilisations and 22% are various obstetric problems or abortions. From the data it is possible to say that from every three women giving birth to a live baby, one woman is having a death baby born, a miscarriage, an abortion or having another obstetric problem. Although the data seem rather high, according to the data published by INEC (1998), obstetric problems are the main cause of female hospitalisation per disease²⁰. However, the number of abortions represents a rate of 5.5%²¹, while the country data is 3.5% (INEC, 1998). The high abortion rate could be related to the intensive use of pesticides in the zone but it can also be associated with nutrition, sexual behaviour, etc. To determine a direct relation between high abortion rate and pesticides need an in-depth case-control study, in which the prevalence of factors is controlled.

Table 2 illustrates that some of the diseases occurred more in one sex than in another. For example, Figure 1 shows that the numbers of hospitalizations for multiple-trauma and other accidental or occupational problems and intoxications are for men twice those for women. Medical reports relate multiple-trauma with (1) traffic accidents, (2) alcohol and (3) violence. On the other hand the medical reports indicate that trauma is a hospitalisation reason for women, in the first place, due to domestic violence, and due to traffic accidents in the second place. In 1999 adult men suffered more from hernia than adult women. This data can be

²⁰ Delivery is the main cause of female hospitalisation in the country, but this is not considered a disease.

²¹ Rate is calculated on the basis of INEC's (1998) rates, which are calculated per 10.000 habitants.

considered as an issue for further studies, because it could relate to the strong physical effort that potato production implies for men. Especially during potato harvests, when have to carry several bags (quintals) full with potato on their shoulders. Burns are an occupational accident more common for women than for men. This is probably related to domestic work, especially cooking.

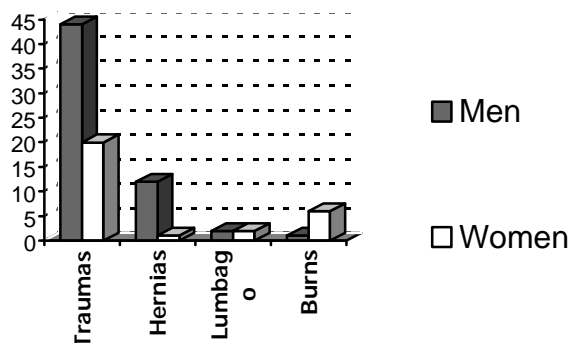


Figure 1. Multiple-trauma and other accidental or occupational problem, per sex registered in San Gabriel Hospital (1999) Source of Information: This study (Mar-Apr 2000)

- *Between accident and gloom: Data and narratives related to pesticide intoxication*

In 1999, there were 509 hospitalised for sickness (see Table 2), of which 55 were due to intoxications. This implies that intoxication represents 11% of hospitalisations for sickness in this hospital. According to medical reports there were four sources of acute intoxication: Pesticides, alcohol, medicines and food. In San Gabriel Hospital there is a register of hospitalisations by acute intoxication, but there is not a specific registration of consultations for problems related to pesticides. According to doctors and nurses every day they treat in external consultation at least one person for problems related with pesticides, especially problems related to chronic exposure to pesticides. Figure 2 describes the distribution per sex of the main causes of hospitalisations for acute intoxication registered in San Gabriel Hospital from 1997 to 1999.

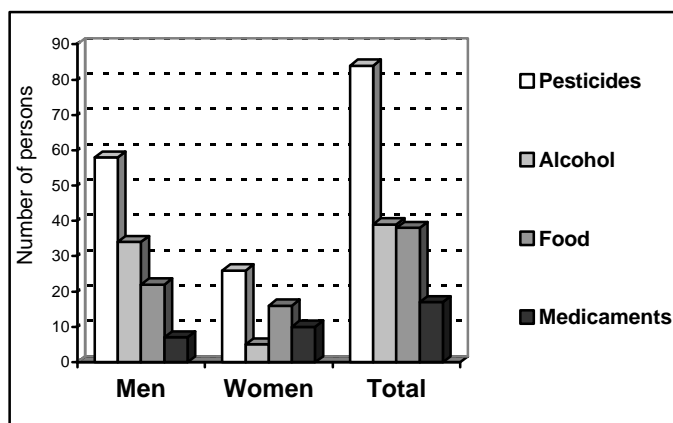


Figure 2. Causes of intoxication per sex registered from 1997 to 1999 in San Gabriel Hospital. Source of Information: This study (Mar-Apr 2000)

Figure 2 indicates that in the years 1999, 1998 and 1997 acute pesticide intoxication was the principal cause of intoxication in both sexes. Figure 3 (pg. 37) indicates the percentages of intoxication per sex. For men pesticide intoxication causes 48% of the cases, while alcoholic intoxication is the second cause of intoxication. For women alcoholic intoxications are much less important (9%). Medical reports related many of those cases with chronic alcoholism. Food intoxication is an unclear category, because it could have multiple causes. Dysentery and other diseases related to intoxications for food are not included in this category, because these diseases are registered separately. The data of Figure 3 includes food-related intoxications that do not have enteric symptoms, which may also have included misclassified cases of pesticide poisoning. But since in the local hospital there are no means to conduct in-depth studies, these cases are recorded as food contamination. This is also a theme for further studies at hospital level on pesticide-related problems. Intoxications with medicaments are related to improper self-medication and in some women with attempts of suicide, as was described in medical reports.

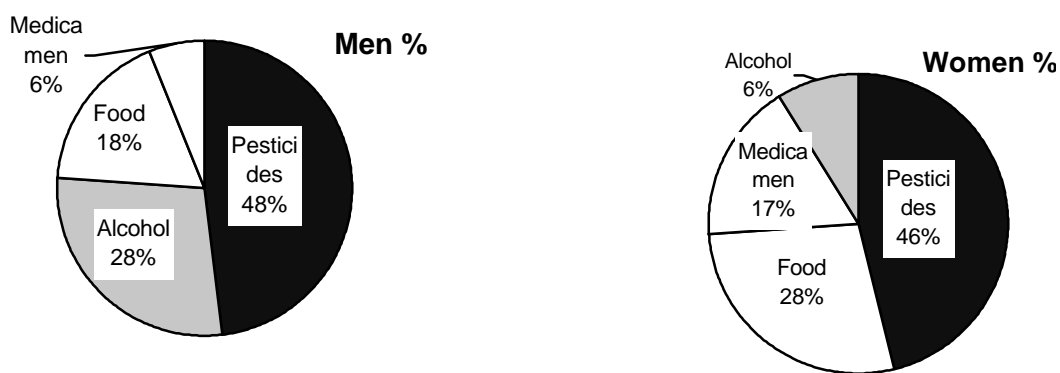


Figure 3. Percentages of intoxication per sex registered from 1997 to 1999 in San Gabriel Hospital. Source of Information: This study (Mar-Apr 2000).

Medical reports make not always the differences clear between chronic exposure and accidental poisoning and suicide attempts. Moreover, for the family of the patient it is difficult to talk about a 'possible suicide' of a family member or relative. However, the strong pesticide smell in the patient, together with some well recognisable physical symptoms is used to diagnose pesticide poisoning. Therefore, it was possible to find some common patterns in the histories that doctors write down in the official medical reports. These histories followed two currents: One was that the patient arrived to the hospital in a bad physical condition after working with pesticides or after doing activities near to pesticides. Another common observation was that the patient inhaled the pesticide or accidentally ate a strongly contaminated food. However, when an intoxication of a child is described, generally it states that the child by accident ate, inhaled or licked the pesticide or the pesticide container. Another common observation is that the patient arrived to the hospital in a bad physical condition after the intentional intake of pesticide. In this case it was common to find a personal history about the possible cause of emotional depression of the patient.

Figure 4 describes hospitalisation frequencies due to pesticide intoxications broken down by sex and age. This figure shows that there are two age classes with more cases: the class from 0 to 5 years and the class from 16 to 20 years. Medical reports indicate that pesticide intoxications of children were related mainly to inappropriate storing practices at household level. In the second group, which is a teen-ager population, male cases are twice the female

cases. Medical reports relate these cases with suicide attempts and few were related to accidental poisoning. With exception of age class from 11-15 years (with slightly more women than men) there were much more cases of pesticide intoxication in men than in women. Moreover, there were no cases of pesticide intoxication in women older than 41 years old. The data presented in Figure 4 illustrate that young children and teenagers of both sexes are the group, that is primarily subject of hospitalisation for acute pesticide intoxication.

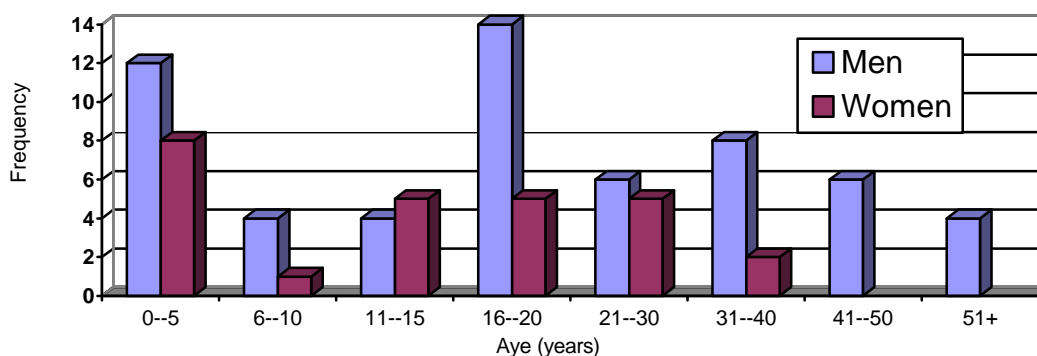


Figure 4. Frequency of hospitalisations (by age and sex) from 1997 to 1999 due to pesticide intoxication in San Gabriel Hospital. Source of Information: This study (Mar-Apr 2000)

The narratives of the medical registration at the hospital indicate that for teenagers (male and female) suicide attempts have three main common causes: (1) family problems and domestic violence, (2) love disillusion, (3) social conflicts with friends (at school or in the community). Suicide attempts of adult men were mainly related to economical problems and depression, while suicide attempts of women were attributed to family problems and domestic violence, as well as depression.

- ***Medical history-writing and local health beliefs***

The way medical reports were narrated showed an extraordinary similarity with local ideas on pesticide-related diseases and problems. For example, doctors also write that pesticide inhalation is the most common cause of disease: *“the patient got sick after pesticide inhalation”*. Medical reports also included descriptions on some aspects of the patient life, which were constructed following personal interpretations. Then, some reports had several versions and interpretations of the same case. This reflects the relativity of these interpretations. Moreover, the social construction of ideas of sickness and its causes in the zone also has cultural dimension, which results in the fact that some pesticide-related beliefs are shared by doctors, patients and by the patient’s family. This agreement between opinions of medical doctors and farmers’ was expressed in idea that the main cause of pesticide poisoning is considered to be via aerial contact, or inhalations.

- ***First aid of pesticide poisonings in the household***

Informants in the community said that it is common to give milk with salt, water with soap or dirty water to patients to provoke vomiting of the intoxicated person. An interesting issue here is that in the containers of the most toxic pesticides it states that in case of intoxication *“do not drink milk, but try to provoke vomiting using warmish water, and give the person urgent medical attention”*. Some informants said that the best way to help an intoxicated

person is by giving him or her, the liquid of the pig-food. They said “in order to provoke vomiting in someone that does not easily do that, you have to give this person something really revolting”. Other farmers said that they do not use any kind of domestic treatment when a person is intoxicated, they said that the only thing that they will do is to bring this person to the hospital. I observed that when a dog was intoxicated with pesticides, people give the liquids described before, but afterwards they inject the dog with antibiotics. This also reflects that farmers’ trust in western-medicine is symbolised by the idea that antibiotics can cure all sort of diseases, even pesticide intoxications.

8.2. Official data on deaths caused by pesticide use

There are two places where the official data on deaths caused by pesticides are registered: San Gabriel Hospital and the Political Intendence (*Intendencia Política*). In San Gabriel Hospital there is a record of patients that die after being hospitalised. The Political Intendence is the institution in Montúfar Canton in charge with the investigations and registration of violent and abrupt deaths. Registered deaths of San Gabriel Hospital and of the Political Intendence of Montúfar (from 1977 to 1999) were summed to obtain the total amounts. The total percentage is presented in Figure 5. Figure 5 illustrates that traffic accidents are the principal cause of death in the zone. According to the Political Intendence’s staff officers, most of these accidents were related to alcohol consumption. Pesticide intoxication is the second cause of death in the zone. The data presented in this figure represents people that had died abruptly or due to unnatural causes. However people who are dying gradually by cancer or other pesticide side effects are not registered in this figure, due to reasons described previously. According to the Political Intendence’s staff officers the deaths related to pesticides are due to voluntary intake of pesticide in the first place, then due to accidental intake or contact and then due to occupational contact with pesticides. Figure 6 illustrates differences per sex for death causes.

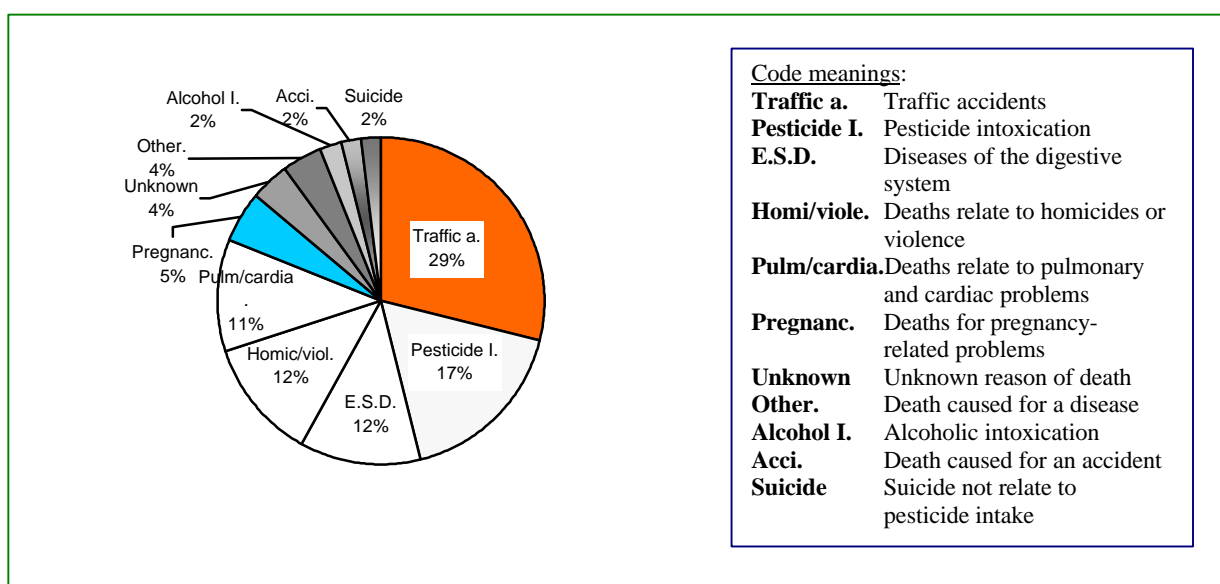


Figure 5. Percentages of causes of death registered in the San Gabriel Hospital and in Political Intendence of Montúfar (from 1977 to 1999). Source of Information: This study (Mar-Apr 2000)

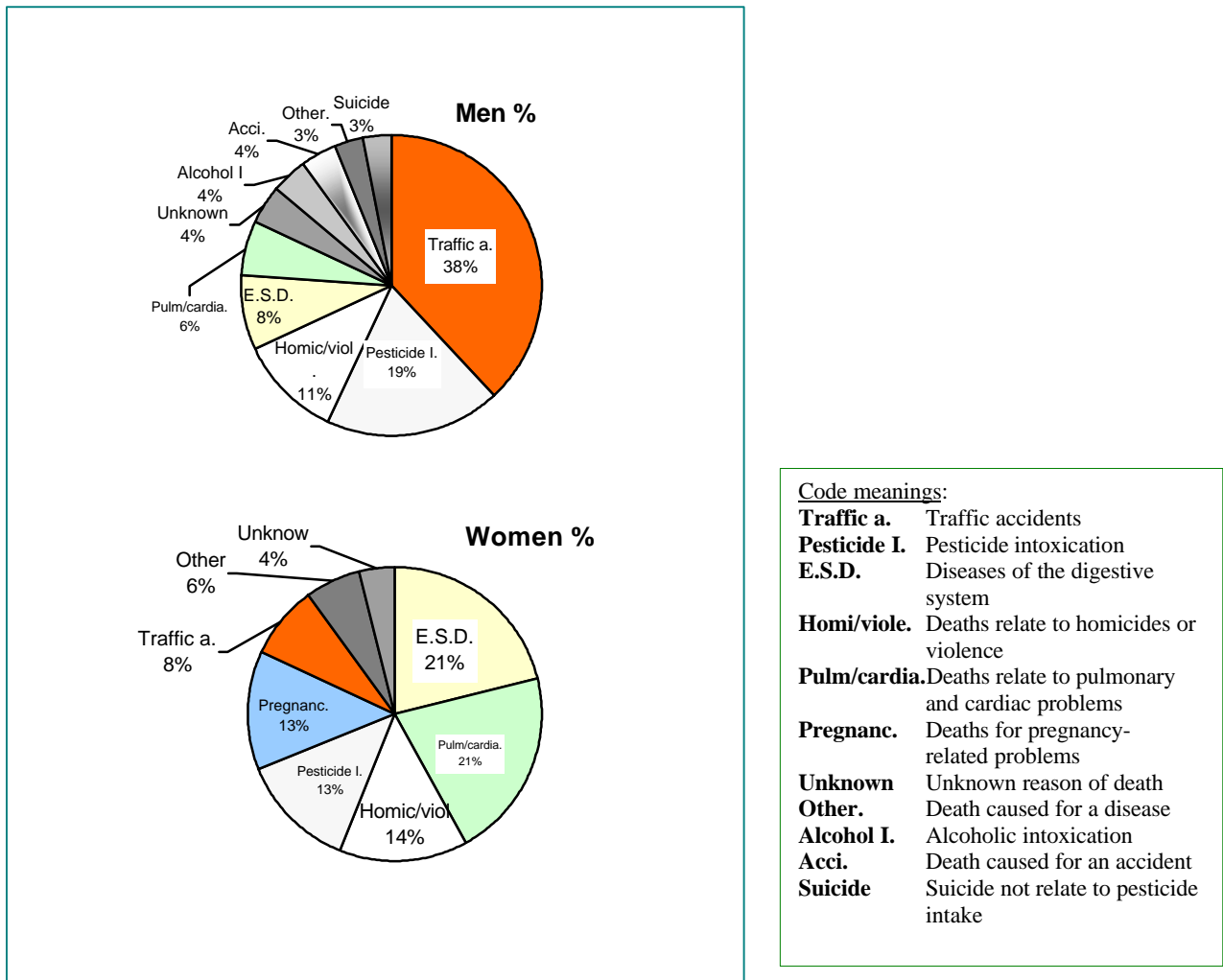


Figure 6. Causes of death differentiated by sex, registered in the San Gabriel Hospital and in Political Intendence of Montúfar (from 1977 to 1999). Source of Information: This study (Mar-Apr 2000).

According to Figure 6 the main cause of death among women is problems or diseases of the digestive system. This data includes different sorts of cancer in older women, but also diarrhoeic child diseases. However considering only the data on women between 10 to 50 years, the main cause of death is pregnancy-relate problems (34%). Pesticide intoxication is the second cause of death (27%) and traffic accidents the third cause of death (13%). Similarly, comparing the data of the whole population with the data of the age class between 10 to 50, deaths caused by diseases of the digestive system and by pulmonary and cardiac problems diminish from 21% to 6.5%. For men between 10 to 50 years old, the main cause of death follows the same pattern as illustrated in Figure 6 (showing data of the whole population). However, the percentages change: Traffic accidents rise to 42%, pesticide intoxication raise to 25%, homicide and violence to 17%.

9. CONCLUSIONS

- *Concerning potato production*

This report has shown that potato production must be seen in connection with social arrangements, household dynamics and macroeconomic forces. The role of individual actors in the production process and household dynamics has become visible. Specifically, this study has highlighted the multidimensional importance of women's work in potato production, farm management and household maintenance activities. So far, this has received relatively little attention in studies for the region. Even though female work is important for potato production and other activities at household and farm level, female work is less remunerated as was shown by lower wages and less involvement in decision making. Approaches based only on male work could give an out-of-focus panorama of the system, which also re-enforces the under-valorisation and invisibility of women's work. The integrated analysis of potato production systems demonstrated that farmers combine various strategies at household and farm level. These strategies allow farmers to maintain their subsistence in spite of the high economic and health risks involved.

Agricultural decisions and practices are dynamic and are influenced by externally driven interactions, such as market dynamics, economic politics and the current recession in the country. The community is differentiated and crosscut by social, economical, and power differences that are shaping practices around potato production. The rapid social change and commoditisation of agriculture is contributing to the progressive development of social stratification, which is causing a growing proletarianised peasant group. This peasant group is most exposed to chronic exposure to pesticides by occupational activities.

- *About risk perception and practices*

Risk and uncertainty are part of the every day life of local farmers, and pesticides are incorporated as one of the elements of this risky way of living. In potato production all household members are involved and therefore, pesticides not only generate occupational risks to the persons who apply them in the field. Pesticides are affecting the whole family because pesticides are also important sources of accidents at household level and are frequently used for suicide attempts. Household level risks (such as inappropriate storing practices and other several forms of contact with pesticides) are extremely important. It was shown that small children (0 to 5 years old) represent the age-class with most numerous cases of pesticide-related intoxication in the hospital of the zone. Pesticides are intricately linked with rural life and domestic activities. It was not possible to count with data on gradual health effects of pesticides, but numbers of acute intoxication were very high (compared to the rest of the country).

In order to develop strategies for reducing health risks of pesticides farm activities and pesticide use should be seen in the context of complex household dynamics. Next to the men that apply pesticides in the field, women and children also get in contact with pesticides and can suffer from acute voluntary and involuntary intoxication. Therefore, programmes directed to reduce health risks of pesticides strategies must consider the sociological dimensions that were described in this report. These dimensions, which as a spider net integrate pesticides in the social dynamics of the community, are health-beliefs, gender identity, social identity, and hope for economical progress by means of potato production.

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