Globalization, Migration and Child Labour:
the case of girl and boy day labourers in tobacco fields in Nayarit, México.

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Australia Carrillo: a death that could have been prevented

When the team working on the video entitled *Huicholes and Pesticides* was about to complete the final film editing in March 1994, it received very sad news: Australia Carrillo, a 14-year old indigenous child day labourer had died victim of osteosarcoma – bone cancer in school-age children or adolescents. Oncologist Fernando Sánchez Zubieta, Australia's physician, was unable to pinpoint the causes originating the tumor: "It is related to radiation, genetic and viral problems, and chemical and physical agents", he said. Although he admitted that "...all chemicals in general, insecticides and hydrocarbons, can produce cancer in different tissues." (Díaz Romo, 1994b: 136-137). Australia, along with her brothers and parents, had been working for several seasons in the tobacco fields of the northern part of the state of Nayarit, Mexico. Tobacco companies force *ejidatarios* to use large amounts of pesticides in this region.

The relationship between a wide range of illnesses and exposure to pesticides is not clear either to patients or, frequently, even to the doctors who care for them. The hazardous effects of the use of pesticides are not obvious to inhabitants because governments do not implement adequate epidemiological monitoring; and because workers do not have access to sufficient, accurate information on the risks involved in the use and exposure to pesticides. The harm caused by these toxic substances is on the rise because people do not have access to health services; because corporations do not assume their responsibility as producers and users of toxic agrochemical products; and

because governments do not properly exercise their duties to ensure the safety of their territory and its inhabitants.

Essentially, Australia's death is linked to an increased vulnerability of children in countries that have been dragged, during globalization, to a subordinate inclusion in the free market economy. Large corporations, particularly those whose businesses seriously compromise the ecological balance, refuse to acknowledge that their production and market strategies are harming the planet and the species that inhabit it. These corporations are huge transnational firms that can allocate part of their profits to invest in scientific research, the findings of which are controlled by these companies. Thus it is hypocritical for these same transnational firms to demand scientific proof of the damage being caused by their activities.

Proving that globalization is making children more vulnerable calls for an enormous scientific research effort, coordinated by the various social groups interested in building a future for the planet and for all of us who live on this earth.

In view of the many testimonies of disease and death caused by exposure to pesticides among the girls and boys, adults and the aged who work as day labourers in tobacco fields or *ejidatarios*, in 1994 the project entitled Huicholes and Pesticides launched a health study to measure the harm being caused by these chemicals in people living or working in tobacco fields. In this paper we present an analysis of the most important findings, particularly those pertaining to the situation of girls and boys who work as day labourers and *ejidatarios.*

Pesticides cause more damage in children than in adults for several reasons. Mothers exposed to pesticides can have problems during pregnancy, causing damage to the fetus, and the baby is born with malformations. The risk is higher in babies who are at an age when they are crawling or exploring their environment, since this increases the possibility of absorbing toxic substances through the skin or through the mouth. Exposure to pesticides during childhood can produce permanent damage, since this is a stage of rapid physical development, particularly during puberty and adolescence.

Children's metabolism makes it easier and faster for them to inhale air and absorb and transform nutrients in a different way than adults do. Consequently, toxic substances in the environment, water and food can harm girls and boys girls at a faster pace than older persons.

And lastly, it is important to mention that poverty, which frequently results in malnutrition, incomplete vaccination schemes, precarious housing and scant access to health services, increases the vulnerability of the girls and boys and children of *ejidatarios* working in tobacco fields.

Tobacco and globalization in Mexico: recent experience

The North American Commission for Environmental Cooperation (CEC), and its advisory body, the Joint Public Advisory Committee (JPAC), were established when the North American Free Trade Agreement (NAFTA) was signed among Mexico, the United States and Canada. Since it is responsible for measuring the impact of free trade on the environment in the region, the CEC asked the experts on the JPAC to draft an *Analytical Framework for Assessing the Environmental Effects of NAFTA*.

The document, which was submitted for public discussion in 1999, establishes several hypotheses. And one of them suggests that liberalization of trade can lead to raising environmental practices and standards in North America, through pressure from the governments most concerned with the environment on other governments that are less attentive to these issues (JPAC, 1999:11-13).

The promise to raise environmental standards and practices is one that has not been fulfilled through free trade; and the case of tobacco companies is clear proof of this statement. Although we do not have sufficient experience to accurately assess the impact of globalization on children and on the environment, we are able to see the different paces of change.

Corporate restructuring of tobacco companies has occurred so rapidly that during the four years since signing of NAFTA, alliances and mergers between the transnational firms that control the tobacco market worldwide have been redefined. But this restructuring has not led to unification of the

standards followed by these companies, which are more strict in the United States and Canada and more lenient in Mexico[1]. For example, methyl bromide, classified by the Environmental Protection Agency of the United States as one of the most lethal of the extremely toxic pesticides, is authorized in Mexico to be applied by anyone to sterilize soil in tobacco seedbeds. Aldycarb, banned in at least thirteen countries, is authorized is Mexico and widely used not only in tobacco fields but for many other crops; despite the fact that intake of only a few drops can produce severe poisoning and even death.

If there is a blatant lowering of environmental standards with regard to production and use of pesticides in Mexico, the lack of control and deterioration of practices is quite frankly alarming. For example, during the fifteen years we have been conducting studies with day labourers and *ejidatarios* working in tobacco fields, we have never seen a worker mixing or applying pesticides using the complete protective gear; and we have never seen fields marked with the reentry period – that is, the time that should elapse between application of a pesticide and resumption of farm activities. The standards pertaining to use of complete protective gear are indicated in pesticide labels. But in Mexico there are no standards for reentry periods as yet.

Following signing of NAFTA, not only have working conditions and living standards of peasants and day labourers working in tobacco fields not improved, but in some cases they are worse; since producers' organizations are now up against larger corporations, with increased control over the market.

Tobacco is the number one farm product in the state of Nayarit, located in western Mexico. Although tobacco is ranked third, after corn and beans, in terms of the cultivated acreage, it was ranked first in terms of production value between 1994 and 1997. (Mackinlay, 1997:4-6). During the 1960's, the state of Nayarit consolidated its position as the principal tobacco producer in Mexico, and since then an average of over 80% of domestic output is concentrated in that state.

[1] Despite the fact that standards are more strict, environmental and child protection practices frequently violate the law. A report published by *Human Right Watch* in June 2000 shows that hundreds of thousands of children are exploited in U.S. farm fields, exposed to pesticide poisoning. And most of these children are Latinos. (Human Right Watch, 2000).

Four major tobacco companies were operating in the northern part of Nayarit during the 1994-1995 crop year: Agroindustrias La Moderna, which belongs to Cigarrera La Moderna; Tabacos Desvenados S.A. (TADESA), which belongs to Cigarrera La Tabacalera Mexicana S.A. (CIGATAM); Tabacos del Pacífico del Norte, an affiliate of Universal Leaf Tobacco Co.; and Exportadora de Artículos Mexicanos (EXARMEX), an affiliate of The Austin Co.

Since 1994, NAFTA has fostered the entry of foreign capital and the merging process of tobacco agribusiness gained headway. During the 1995-1996 crop year, EXARMEX changed its name to Dimon de México, as a result of the merger of Dibrell Brother Inc., The Austin Co. and A.C. Monk. Mexican magnate Alfonso Romo, principal stockholder of Grupo Pulsar, sold his shares in Cigarrera La Moderna, which became part of Brittish American Tobacco. An affiliate of Philip Morris International, TADESA is part of Grupo Carso, which belongs to Mexican Carlos Slim, who also owns Teléfonos de México – the principal telecommunications firm in the country – among other corporations. Corporate restructuring of cigarette and tobacco companies has occurred at a much faster pace than technological modernization, not to mention an improvement in farmers' working conditions and income. Technological modernization involves a useful application of new scientific discoveries, in this case eradication of pesticides and a transition toward organic farming; since it has been proven that harm to health and to the environment exceeds the presumed benefits of a dramatic increase in crop yields.

But the logic of capital has always posed this contradiction: on the one hand, it promotes the development of productive forces through scientific research and technological innovation. On the other, it impedes application of new expertise and techniques when they represent, even if only temporarily, a reduction in profits. In other words, management has adopted short-term decisions aimed at maintaining and increasing production levels, at the lowest cost possible; without taking into consideration the human and environmental losses represented by the current cultivation scheme in the medium and long-term.

Methodology used in the health study

There are very few scientific research projects on pesticides in Mexico (Albert, 1999:10), and even fewer focused on assessing the risks that these toxic substances represent for children. It was not until the year 2000 that the North American Commission for Environmental Cooperation set forth the importance of a study on children's health as it relates to the environment (CEC, 2000:6).

Between 1992 and 1994, during the filming of *Huicholes and Pesticides* in the tobacco fields of Nayarit – directed by Patricia Díaz Romo, script by Samuel Salinas Alvarez, Guillermo Monteforte and Patricia Díaz Romo -- it became obvious that the inhabitants exposed to these hazardous agrochemical products are not aware of the risks involved. And what is worse, it was brought to light that doctors in the region were not trained to recognize and treat severe, chronic pesticide poisoning.

In so far as government authorities are concerned, they consistently refused to acknowledge the magnitude of the problem, due to both ignorance and the economic strategy of the administration of the president at the time, Carlos Salinas de Gortari; who made social policy and environmental decisions subordinate to foreign trade demands. The fact that it was not until 1993 that the Secretariat of Health began to publish weekly records of pesticide poisoning in Mexico in its epidemiological bulletin is proof of a lack of understanding of the issue. Officials of the National Ecological Institute have made public accusations that several agreements for control of toxic substances have failed to be signed in Mexico due to opposition from the Secretariat of Commerce.

In view of this situation, in 1994 the *Huicholes and Pesticides* Project launched the *Study on the Health of Indigenous and Mestizo Day Labourers and Ejidatarios Working in the Tobacco Fields of Northern Nayarit*. The research protocol was designed by Dr. Marion Moses, director of the Pesticide Education Center in San Francisco, California. The Universidad de Guadalajara (UdeG) and the Universidad Autónoma de Nayarit (UAN) participated in the field work; and the Centro Huichol de Santiago Ixcuintla, Nayarit provided the indigenous interpreters for interviews with the Wixaritari

day labourers. The Institute for Health, the Environment and Labour, headed by Dr. Carlos Santos Burgoa, was in charge of analyzing the medical data.

The study used the eritrocitic acetylcolinesterase in two blood samples as a biomarker. The first was used to measure levels during exposure, obtained from 505 persons[2] –171 children and 334 adults- during February and March of 1995; and the second to measure the baselines levels in persons not exposed, between November 1996 and January 1997, obtained from 227 persons –73 children and 144 adults.[3]

Participants in the study were grouped into six categories: the first three groups were made up of workers exposed to pesticides (indigenous -- mainly Wixaritari -- and mestizo day labourers and *ejidatarios* working in tobacco fields at the time blood samples were taken). Another three categories, used for comparison purposes, were comprised of Wixaritari indigenous groups and mestizo day labourers and *ejidatarios* who were not working in tobacco fields or who did not have tobacco planted on their plots of land at the time of the interviews and blood sampling.

Blood samples were analyzed in the field, using portable equipment, EQM Test Mate OP Kit, manufactured by EQM Research Inc. of Cincinnati, Ohio, United States. Health conditions were documented through a physical examination and a clinical history performed and prepared by doctors from the UdeG and the UAN. Work history and social and economic conditions were documented through questionnaires.

Links in the chain

In contract agriculture, the system under which tobacco production operates in Nayarit, tobacco companies enter into an agreement with *ejidatarios* to prepare the land for cultivation. Through the contract, the company opens a line of credit, in kind or in cash, which includes delivery of

[2] Unless indicated otherwise, percentages of the various socioeconomic variables analyzed in this article are based on the total number of participants in the blood sampling (505).

[3] Literature on this subject recommends avoiding a comparison with population averages considered "normal", since each individual has a different acetylcholinesterase level. Bearing this in mind, the second blood sample was taken to establish baseline or "normal" values of the enzyme in each person interviewed, taking into consideration that they had not been

seedlings – transgenic, hybrid seeds germinated in seedbeds[4] ready to be transplanted in *ejido* plots – and cash to pay day labourers, the labour necessary during cultivation, harvest and processing of the tobacco.

Production standards, which oblige *ejidatarios* to make an intensive use of synthetic pesticides[5], are an essential part of the contract. These agrochemcial substances may either be provided by the company or purchased with the cash delivered as part of the credit, at stores in the area. After the harvest, *ejidatarios* go back to the tobacco company and are assigned a category and price for the tobacco, according to its quality. But the producer does not receive full payment for the crop, since the company automatically deducts the amount owed for seedlings, pesticides and cash to pay day labourers. Thus the *ejidatario's* net profit is very low. During the 1994-1995 crop, the peasants who planted tobacco received an average annual net income of 8,000 Mexican pesos; that is slightly over 660 Mexican pesos a month (US$190 a month[6], per *ejidatario*) (Salinas Álvarez and Díaz Romo, 1999:62-64)

Toabacco harvesting and curing requires a large labour force. Leaves of the Burley Semi Sombra and Virginia Sarta Sol varieties are cut one by one, starting at the bottom and going up; and are then strung along the nervation, using a needle threaded with *ixtle* thread and hung on a tobacco stick, made up of between 400 and 500 leaves. Ejidatarios hire seasonal workers, referred to as "*jornaleros*" or day labourers to do this work. They cut and string tobacco during the months of January, February, March and April of each crop year. There is no agreement in writing and thus day labourers have no contract relationship with *ejidatarios*, least of all with the tobacco companies. It is not unusual for disagreements and cheating to occur when workers receive their

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exposed to pesticides, at least during the six months prior to the time blood sample were taken. .

[4] In 1995, Agroindustrias La Moderna, a subsidiary of the Mexican Group Pulsar, announced that by 1997 it would be producing transgenic hybrid tobacco resistant to tobacco mildew, a pest resistant to nearly all commercial fungicides (Agrosíntesis, 1995:48-52)

[5] There are biological pest control methods that do not harm the environment or people, as well as non-synthetic substances that are less hazardous. The massive use of toxic substances is not due to a shortage of alternatives but to powerful commercial interests.

[6] There was a devaluation of the Mexican peso in December 1994, in which it fell from 3.5 to 5.0 Mexican pesos per U.S. dollar.

wages for the work performed during the week, generally around noon on Saturday.

Work is paid by the piece; that is, each day labourer earns a wage based on the total number of tobacco sticks or laths. During the 1994-1995 crop, each lath was paid at the rate of Mex.Ps. $3.50; workers' income during that season averaged 34 Mexican pesos –approximately US$ 9.76 (Salinas Álvarez and Díaz Romo, 1999: 62-64). Bearing in mind that work is seasonal, the average annual family income of mestizo day labourers reached Mex. Ps.$ 5,288 (approximately US$1510); and that of indigenous day labourers totaled $2,164 pesos. (approximately US$618).

Girl and boy day labourers working in tobacco fields

Year after year, since the 1940's, thousands of mestizo and indigenous families, mainly the Wixárika (Huicholes), Nayari (Cora), O'dam Nh'ok (Tepehuano) and Mexicanero peoples, are hired during the tobacco harvest season in Nayarit. *Ejidatarios* are very pleased with the work of the indigenous day labourers because the Wixaritari produce arts and crafts with embroidered bead work, which calls for the same precision threading demanded by tobacco leaf-stringing. If the leaf is not strung at an exact place on the rib, it will fall off during drying and tobacco companies will refuse to accept it – they consider it "shag tobacco" – with the consequent loss to the *ejidatario*.

The Wixárika and Nayari day labourers hired to work in the tobacco fields of Nayarit migrate in family units, generally comprised of the father, mother and between three and four children below the age of fifteen. The average age of indigenous minors interviewed in tobacco fields was four and a half. The study found nearly two indigenous girls for each indigenous boy; that is, the Wixaritari families tend to include more girls in the work involving cutting and stringing the tobacco, while they leave the boys in their home communities, probably to take care of the cattle or crops or to attend school at shelters. Boys are found more frequently among the mestizo day labourers; while among ejidatarios there were virtually no females under the age of fifteen working on the family plot. The

average age of mestizo child day labourers was ten years and that of ejidatarios, eleven years.

Furthermore, 61% of the indigenous day labourers interviewed said that they must always take their children with them to the tobacco fields while they are working. It is not unusual to see mothers carrying their babies on their back as they cut the tobacco; and at the same time, watching the children who can walk, as they run between the furrows or help to cut the leaves along the bottom of the plant.

The data outlined above is proof that, among indigenous day labourers, children – mainly the girls – are exposed at an earlier age to the hazardous pesticides.

The health study detected that it is the indigenous and mestizo day labourers who begin cutting and stringing tobacco leaves at the earliest age, since 50% of the Wixaritari and 54% of the mestizo day labourers interviewed said that they were between 10 and 14 years of age when they were first hired on the coast.

It is also important to mention the fact that 15% of the indigenous day labourers and 20% of the mestizos said that they had started working in tobacco fields between the age of 5 and 9 years. And 78% of indigenous day labourers began working, not in their family plots, but as salaried workers for an employer in a wide range of crops.

This early exposure to pesticides has a dramatic impact on the health of these minors, since they are in a stage of physical development in which their metabolism can be most seriously affected by the hazardous action of these substances. Marion Moses explains why:

> "Children are at a greater risk (from exposure to pesticides) from the standpoint of health than an adult. If an adult and child are exposed to the same amount, the child will absorb a larger amount of the pesticide [...]. It will take a smaller amount of a pesticide to poison a child than an adult. Frequently, a child's liver or other organs do not have the capacity to break up or dissolve certain pesticides. It must also be borne

in mind that a child's immune system is not fully developed." (Moses, 1992:43).

Very young boys and girls are intensively exposed to absorption of pesticides through the skin because of the permanent contact they have with the agrochemical products in the irrigation water or impregnated in the earth, as they crawl or sit on the soil of tobacco plantations. They are exposed to pesticide poisoning through intake, since they are at an age when they are exploring their environment and want to put everything in their mouth. (Eskenazi, Bragmany Castorina, 1999). In a study conducted in Nicaragua, the effects of exposure to pesticides were observed in children who played barefoot in puddles formed by sewage water from an airport from which crop spraying planes took off (McConnell, 1999). In Nayarit, it is not unusual to find barefoot teenage workers spraying pesticides or cleaning airplanes and other equipment used to spray pesticides.

Pesticides are toxic substances that are completely alien to the culture of indigenous day labourers. Their traditional farm methods are based on collective work, intercopping and labour-intensive practices to control pests. The sale of pesticides in the Wixárika Mountain Region is destroying the traditional organization of labour. For example, it used to take co-operation among families and neighbours to weed a plot of land planted with corn; but now it only takes one person to spray a synthetic herbicide that will not only destroy the weeds but the entire botanic diversity of the corn field, leaving only the main crop, the single crop planted – generally corn.

International and domestic regulations provide that labels on pesticide packages must have a clear warning on the dangers involved in the use of these substances. But since many pesticides are imported illegally, the labels are drafted in English, whereas by law they should be translated into Spanish. There is an increased danger for women and children, due to the higher illiteracy rates and knowledge of only one language among these sectors of the population. This makes them even more vulnerable to the risks of pesticides. Among the day labourers interviewed for the health study, the percentage of persons with a knowledge of only one language was higher among children

under the age of 15 (60%); and significantly higher among women (71%) than among men (29%). A total of 64% of the indigenous day labourers interviewed did not know how to read or write, and of this total, 57% were women.

And to complete the picture of marginalization and discrimination against women and children, we discovered that 78.6% of all the indigenous children between the age of 6 and 14 interviewed did not go to school. The averages for school enrollment in all categories of the persons interviewed were always lower for women than for men.

Instructions to kill

The list of pesticides used in the tobacco fields of Nayarit include approximately 35 different substances. Those mentioned most frequently by participants in the health study were: metalaxyl, methamidophos, cyfluthrin and methomyl. Metalaxyl is an organic fungicide [7] marketed under the brand name Ridomil[8] and manufactured by Ciba Geigy[9] of Switzerland. Methamidophos is an extremely toxic organophosphate used extensively in tobacco fields under the brand name Tamarón, produced by Bayer, of Germany. Cyfluthrin is an insecticide made with synthetic pyrethrum, slightly toxic and marketed under the brand name Baytroid, produced by Bayer, of Germany. Methomyl is an extremely toxic carbamic insecticide, produced by Du Pont of the United States, and marketed under the brand name Lannate LV 29 and Lannate 90.

Table 1. Guide to applying agrochemical products in seedbeds, for prevention and control of diseases, weeds and insecticides. 1991-1992 Season.

[7] The United States Environmental Protection Agency classifies metalaxyl as an organic fungicide, without assigning it to any of the chloride, phosphate or carbamatic organic families. The fact that it is described as “organic” should not be understood as “non-synthetic”.

[8] The United States Environmental Protection Agency classifies metalaxil as an organic fungicide, without assiging it to any of the chloride, phosphate or carbamatic organic families. The fact that it is described as “organic” should not be understood as “non-synthetic”.

[9] A company currently called Novartis is the result of the merger between Ciba Geigy and Sandoz. In 2000, Novartis and AstraZeneca began a merger process to establish Syngenta. The merger processes make it even more difficult to pinpoint the responsibilities of corporations for environmental damages and harm to human health caused by the original firms.

Day *	Brand name	Active Ingredient	Dosage	Applica-tion method	Objective
-21	Vorlex	Methyl isothianate	350 l/Hec.	Injected	Sterilizes the soil and controls weeds.
-21	Basamid	Dazomet	50 g/m^2	Applied by hand.	Sterilizes the soil and controls weeds.
-5	Fax	Methyl bromide	500-1000 lb/ha	Gasifica-tion	Sterilizes the soil and controls weeds.
-2	Cupravit 50	Copper Oxychloride	40 g/lt	In water	Disinfects seeds during the pregermination stage
-1	Temik 15-G	Aldycarb	3 g/m2	Applied by hand	Prevents suckers and etch. It is applied on the surface of the soil blended with Ridomil and the fertilizer.
-1	Fertilizante F4 o F5		45-90 g/m2	Applied by hand	Apply dosage and follow the recommendations of the researcher for each seedbed.
-1	Ridomil 5 G	Metalaxyl	3.0 g/m2	Applied by hand	Disinfects the soil against damping-off and tobacco mildew.
0	Sevin 5G	Carbaryl	1.5 g/m2	Applied by hand	Applied on the recently planted seed and in the seedbed to prevent ants
+14	Cocs 7%	Copper oxychloride	20-25 kg/hec.	Sprayed in dry form	Against damping-off and bacteria.
+18	Manzate 200 + terramicina	Mancozeb	5g/lt+400 g/ha	Sprayed	Prevents tobacco mildew and possible microplasmosis.

+20	Cupravit 50	Copper oxychloride	8.6 g/lt	Sprayed	Damping-off
+25	Ridomil MZ-72 + Orthene 75 + Terraminicina	Metalaxyl +mancozeb Acephate	7g/lt + 0.75 + 400 g/hec.	Sprayed	Damping-off and peronosporal diseases * *
+32	Manzate 200 + Terramicina	Mancozeb	5g/lt +400 g/l	Sprayed	Prevents tobacco mildew, anthracnose and possible microplasmosis
+39	Terramicina + Orthene 75	Acephate	400+ 0.75 kg/hec.	Sprayed	Prevents possible micoplasmosis and insects.
+47	Ridomil MZ – 72 + Urea	Metalaxyl + mancozeb	7g/lt + 3 kg/hec.	Sprayed	Prevents peronosporal diseases and provides nutrients
+60 +66	Ridomil MZ-72 + Orthene 75	Metalaxyl + mancozeb Acephate	7 g/l + 1 kg	Sprayed	Prevents tobacco mildew and insects

- * With regard to the planting day (day zero), soil fumigants (vorlex, basamide, bromide) can be applied earlier than indicated here.
- ** Tobacco mildew, flying black shank, etc.
- Table prepared with information fomr: *Normas de producción para los tabacos de Cigarrera La Moderna, S.A. de C.V, ciclo 1991-1992.* Mimeograph. Mexico. P. 11, and *Guía Flexible de aplicación de agroquímicos, temporada 1991-1992, Gerencia Tabacos Pacífico*.

There are several procedures for measuring exposure to pesticides, such as urinalysis for metabolites to detect pesticides of the organophosphate family and measuring acetylcholinesterase levels to assess exposure to pesticides of the phosphate and carbamic families. In view of the fact that it is easy to perform analyses in the field using EQM portable equipment, and bearing in mind that several of the pesticides used in the tobacco fields of Nayarit belong to the phosphate and carbamic families, in the study it was decided to use exposure to levels of acetylcholinesterase as a biomarker.

Several factors can alter normal functioning of cholinesterase in humans, alcohol consumption, certain medications, age and pregnancy, among others. Thus the questionnaires included questions aimed at controlling and ruling out variables that might cause confusion.

Colinesterase is a neurotransmitter that works at the neurona connection level. Thus, when a person is poisoned by phosphate or carbamic organic pesticides, he or she can show symptoms such muscle paralysis or convulsions. There are two types of acetylcholinesterase: eritrocitic, from which it takes several weeks to recover following exposure to phosphate or carbamic organic pesticides; and plasmatic, from which persons recover in only a few hours. We chose to work with eritrocitic acetylcholinesterase, because it is more effective for measuring chronic exposure. (Henao, 1990:16).

The health study established, for the first time, baseline levels of eritrocitic acetylcholinesterase for the indigenous population working as day labourers in tobacco fields, through a second blood sampling conducted in communities in the Huichol highlands, between ten and twelve months after the first sampling was taken. The first blood sample were taken during the time the Wixaritari people were working in the tobacco fields of Nayarit.

Table No. 3
Average concentrations of acetylcholinesterase
In indigenous day labourers under the age of 15

Average concentration of units per gram of hemoglobin. Indigenous children under the age of 15, in tobacco fields	30.3 U/g.
Concentration of units per gram of indigenous children under the age of 15. First sample	32.2 U/g

As can be seen in Table No. 3, the averages of ACE recorded for indigenous girls and boys were lower during they stay in the tobacco fields, as compared to the levels recorded for the same people once they had returned to

their Wixárika mountain communities. Recovery from the enzyme might be due to the fact that, once they had returned to their communities of origin, the children's level of exposure to the phosphate and carbamic organic pesticides is reduced. It is important to mention that, of the groups studied, the children of *ejidatarios* under the age of 15 showed the lowest average concentration of eritrocitic acetylcholinesterase; they cultivate tobacco and reside permanently in the area where pesticides are used intensively (30U/g.).

It is also interesting to point out that, according to the Institute of Environmental Health and Labour (ISAT) – which the *Huicholes and Pesticide* Project contracted to perform the epidemiological study of the data – among the children under the age of 15: "...the boys reported significantly lower levels of eritrocitic acetylcholinesterase than girls in the first blood test." (Santos Burgoa, 1998:119). This statement is based on a comparison of the ACE averages for the entire group of children under the age of fifteen who were interviewed, not only for indigenous day labourers. The averages for boys are lower since mestigzo and ejidatario day labourers tend to use more boys than girls in field tasks; while, as it was mentioned above, indigenous day labourers use more girls than boys.

An analysis of size and age showed that 25% of indigenous day labourers presented some level of malnutrition. In its analysis of the data, the ISAT found significantly lower levels of hemoglobin in indigenous child day labourers in the second blood test.; that is, following the ten or twelve months they had remained in their Huichol mountain communities. This data could indicate that a lower amount of nutrients are consumed in the marginalized indigenous areas.

The diseases recorded most frequently among the children participating in the study were parasitism in the skin and digestive tract (lice, worms and amoebas). Despite the fact that there is broad testimony of the use of DDT to combat lice, bedbugs, fleas and ticks, none of the persons interviewed admitted using this dangerous pesticide, banned in many countries and the use of which is restricted in Mexico. One explanation for this could be the fact

that the day labourers and *ejidatarios* believed that the group of interviewers were "...persons who are against the use of pesticides in general". There are photographs of an abandoned load of DDT by authorities of the Secretariat of Health in the Huichol community of San Andrés Cohamiata, Jalisco; which was used for some time by townspeople to disinfect their houses and to delouse their children.

Later, after being warned of the danger of DDT, the inhabitants of San Andrés Cohamiata decided to bury the DDT, approximately four meters from a spring and from the dam that supplies water to the area; increasing the risk of pollution of the underground water and the soil. The load of DDT should have been removed by personnel working for the Secretariat of Health, the only entity authorized to handle it.

During the time they spend in the tobacco fields along the coast of Nayarit, indigenous children are used mainly to cut, carry and string tobacco leaves. None of the indigenous or mestizo children actually said that they had worked directly with pesticides, although we do have photographic and records of children under the age of fifteen driving tractors that are spraying these substances. Only two boys, between the age of 15 and 18 years, admitted that they work loading and applying pesticides.

The aforementioned data shows that the exposure of indigenous girl and boy day labourers is of an environmental nature, given the conditions in which they live and work during their stay in the tobacco fields. Nonetheless, even though they do not work directly with pesticides, children are also exposed to pesticides in their work, since their skin has contact with the residues of pesticides on the tobacco leaves that they cut, carry and string.

Living condition in tobacco fields are worse for indigenous day labourers than for any of the other groups interviewed. Since their work is seasonal and involves migration, 90% of indigenous day labourers always eat in the tobacco fields; only 57% are always able to get purified water to drink; 31% never have clean water to wash their hands and 38% never have soap. A total of 98% of all tobacco workers – day labourers and *ejidatarios*- said that they never have latrines in which to defecate. The foregoing is proof of the high risk of exposure

to pesticides from drinking polluted water and absorption through the skin, in view of the scant possibilities of washing at the end of the day, after having been in permanent contact with the leaves impregnated with pesticides.

A total of 86% of the indigenous day labourers interviewed said that during the time they work in tobacco leaves, they live under the piles (tobacco sticks) of tobacco leaves (12%), under the branches of a tree (69%) or in the open air (5%); while 85% of the mestizo day labourers and 100% of *ejidatarios* live in their houses. Only 57% of the indigenous women interviewed are able to get bottled water to cook with, while 23% get their water from the river or from irrigation ditches. A total of 56% of indigenous day labourers wash their dishes in these same water sources, highly contaminated with pesticides; 70% wash with this water, 71% take baths in it and 72% wash their clothes in it.

A study conducted in 1992 by the Regional General Hospital No. 46 of the Mexican Social Security Institute, at the request of the *Huicholes and Pesticides* Project reported the presence of pesticide residues in our water samples obtained from the water supplies furnished by the *ejidatarios* for their day labourers to drink in the tobacco region of Santiago Ixcuintla, Nayarit.

The near future

At the end of the tobacco harvest for the 1998-1999 crop year, the *ejidatarios* grouped in the ARIC decided to refuse to deliver the product until prices could be renegotiated. In response, tobacco companies threatened to withdraw from the region.[10]. It would be fairly simple for these corporations to move to another region in Mexico with the climatic and irrigation conditions necessary to cultivate tobacco, and implement the same agricultural scheme based on contracts. But the move would be disastrous for *ejidatarios* because it would be years before their land would recover and they could plant another crop. Since contracts with tobacco companies cover only one year, approximately, once the crop season is over, their contract obligations are also terminated. Large corporations, strengthened financially by mergers and alliances facilitated by NAFTA, are also protected by civil codes and trade

[10] In fact, corporations have already begun to transfer their operations to the states of Chiapas and Yucatan.

regulations. Contract agriculture places the entire burden of responsibility for handling of pesticides on the shoulders of *ejidatarios*.

In short, the increased competition promised by NAFTA has not led to improved competitiveness or higher productivity. Technological improvements call for huge investments to switch from agricultural practices with an intensive use of pesticides to organic agricultural methods, free of toxic products. It is an investment that corporations are not willing to make as long as they can continue to allow others, governments or peasant, to pay the cost to the environment and to human lives.

Globalization: a dead-end street

The free market economy, centered around countries with capitalist production schemes based on high-technology –North America, Western Europe and the Pacific Rim in Asia- is being imposed worldwide under the argument that it is the only possible road to development. The concept of development, as disseminated by neoliberal ideologists, gives a pragmatic value to the urban lifestyles in industrialized nation, characterized by a standardization of everyday life centered around employment in a private corporation, food and health dependent upon industrial chains beyond the control of individuals and the use of their free time subordinate to mass communication media.

International economic integration, referred to as globalization, is not the natural outcome of the productive development of humankind; on the contrary, it is the result of artificial strategies designed to prolong a stage of capitalism that is disastrous for the ecological balance of our planet and for the preservation of all species, including the human species.[11]

Globalization has been fatalistically defended[12] by heads of state of industrialized countries and by rulers of nations subordinate to them. They uphold that countries cannot refrain from joining the world market, that isolation will merely postpone the inevitable and make the transition even more difficult. The best alternative is to start the path toward negotiation of free trade

[11] See www.thehungersite.com, a Website that shows a map of the world in which every 36 seconds, a country is highlighted to indicate that a child has died of hunger there.
[12] Here we use the concept of fatality in its irrevocable sense.

agreements in order to guarantee increased employment and improved quality of life for everyone.

And at the other extreme, the critics of neoliberalism believe that globalization is a dead-end street for capitalism because, once the world production reserves – labor and raw materials --are depleted, it will be impossible to begin a new capital formation cycle[13]. Following Shumpeter, Wallerstein explains that: "...capitalism, although a historic system, will eventually die out, not because of its failures but because of its successes.". (Wallerstein, 1999). The principal achievement of the current stage of capitalism is the dramatic reduction in average salaries and control of raw material prices.

Essentially, companies have been able to lower their costs by paying only part of their bills. Wallerstein gives an example of the process when he states that labour is not fully paid, and the State is left with the responsibility of catering to needs such as health and education, which must be provided to the work force but are impossible to cover with ever-increasingly lower real salaries in subordinate countries. Cutting down trees in a forest without paying reforestation expenses and dumping toxic wastes into rivers without assuming responsibility for treating and recovering water horizons are another two examples of how companies lower their costs and only partially pay their bills. The accrued debt, in environmental as well as human terms, is increasingly larger; and there doesn't seem to be a reserve large enough – either in government budgets or corporate provision funds – to pay it.

Increased competition among large international corporations, characteristic of free market, forces companies to seek alternatives for saving money. Technological standardization also involves standardization of machinery prices; thus savings are impossible under this heading. The free market does not only operate for finished products, but for raw materials as well; thus it is not easy to save money under this heading either. It is savings

[13] Human conglomerates capable of relating adequately to factory organization -- that is, technically disciplined and literate – constitute productive reserves to the extent that they can be included in the logic of capitalism, not so much as consumers but fundamentally as producers of low salaries. The case of the maquiladoras in Tijuana or the aggressive productivity in China are two examples of these "productive reserves".

on labour that determine the direction of capital flow at the international level; so companies tend to establish manufacturing – or service distribution -- centres where labour is cheapest. There is a free market for raw materials and for finished products, but not for the labour force.

The concept of free market sets forth a contradictory process. It must incorporate a labour force at the lowest possible cost, so it tends to use child labour, virtually without pay; by hiring domestic production units in which whole families distribute tasks in a non-factory production processes. Although family labour has been a traditional strategy for survival, it is becoming an over-exploitation in the logic of capitalist employment, since producers no longer own their production facilities; and thus they do not control the wealth produced, either. The contradictory nature of the process consists of the fact that childhood, the stage in which skills and attitude are being formed and knowledge is acquired for a productive life, is distorted as a learning stage. The role of the school is cancelled out and children are forced to learn to produce directly in the production process. In other words, boys and girls are no longer able to enjoy “the grace period of childhood”; but must join the production process as soon as their physical force allows them to. With this distortion, capitalism draws on its reserve labour force and weakens it, speeding up the arrival to the endless tunnel toward which humankind has headed.

The massive use of children in production processes, particularly farm activities in subordinate nations, not only poses an ethical issue for globalized society but a technical problem as well. Cancelling out childhood as a completely formative stage – and therefore essentially recreational – means foregoing a future of free, creative citizens to prolong a present of passive consumers with increasingly standardized tastes.

Globalization is not only making childhood, but the family as a whole, more vulnerable. The free market must be expanded in order to survive, placing great pressure on areas that are not fully integrated. Such is the case of the Wixárika mountains, in which the indigenous culture acts as a dam that holds back the invasion of capital production process. But the dam is not uniform.

In some towns in the community of Santa Catarina Cuexcomatitan, Jalisco, the most conservative of the Wixaritari communities, measures have been taken to reduce and eradicate the use of pesticides. In Las Guayabas, San Andrés Cohamiata, indigenous authorities declared that their land is a pest-free territory and warned that whoever uses these substances will be sentenced to traditional punishment, including pillory. In other towns, indigenous youths have decided to accompany the families of day labourers to advise them when they are being hired to work in tobacco fields.

The Wixárika people have had strong cultural ties to tobacco. Known as *macuche*, tobacco is considered "the breath of the gods". It has medicinal uses, to cure snake bites and this indigenous group even has custom of hanging a small pouch with *macuche* around children's necks, to warn off bad spirits.

Globalization makes children and the family more vulnerable, but its effects are entirely unequal depending upon income and education levels and the degree of access to information of each person and family. In tobacco fields, the female and male children of *ejidatarios* who cultivate tobacco are in permanent contact with agrochemcal products, either because they work with them or because the pesticides are stored under their beds, in the kitchen or in the sheds or storage places where children play.

In November of 1999, after the team participating in the Huicholes Project released a press bulletin in the tobacco region on the status and effects of pesticides in Mexico, *ejido* authorities requested more information and alternatives for mitigating the risk. It may be too late to reverse the harmful effects of intensive pesticide use, but we must continue to disseminate the information because an increased awareness of the problem can reduce cases of poisoning and death among *ejidatarios* and their families.

More vulnerable children are the direct outcome of more vulnerable families and a more vulnerable society. Must we wait until the contradictions of globalization reach a crisis, and change suddenly becomes essential, not as the result of a well-informed society but of superstitious fatalism and ignorance?

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