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**Analysis of Job Tasks and Activities Performed
by Children in Cocoa Production**

Final Report

Education to Combat Abusive Child Labor
(ECACL)
Basic Education and Policy Support (BEPS)
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Do you see lessons for labor safety?

Applicable to any cash cropping

ms for

6 After

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Photographer: L. Diane Mull

INDEX OF KEY TERMS

Abunu	Landowner gives responsibility of land to the sharecropper
Abusa	Landowner releases land to a producer to grow crops
BEPS	Basic Education and Policy Support
CAII	Creative Associates International, Inc.
CARE	CARE International, Ghana
Convention 182	ILO Convention 182 on the Elimination of the Worst Forms of Child Labor
CRC	UN Convention on the Rights of the Child
GNCC	Ghana National Children's Committee
GSS	Ghana Statistical Service
IIECL	International Initiative to End Child Labor
ILO	International Labor Organization
IPEC	International Program on the Elimination of Child Labor
MOU	Memorandum of Understanding
NGOs	Non-governmental Organizations
Nnoboia	Communal labor system used by some communities in Ghana
PROMAG	Program Management Network, local Ghanaian NGO based in Sefwi Wiawso, Ghana
SIMPOC	Statistical Information Monitoring Program on Children
Soso	Bamboo pole, approximately 15 feet in length with cutting knife mounted at one end
UN	United Nations
USAID	United States Agency for International Development
YES	Youth Education and Skills (YES) Pilot Project

**Analysis of Job Tasks and Activities Performed by
Children and Youth in Cocoa Production**
L. Diane Mull, Consultant

1 INTRODUCTION

For people living in rural agricultural communities, especially in developing nations, farming is a way of life. The work performed is critical to a family's basic survival. It produces the main source of food and income for buying basic necessities, such as costs for housing, disposable supplies, medical care, transportation and education of the children. Farming offers a unique opportunity for children and youth to learn the essential skills for their future livelihood, as well as the value of hard work, how to handle responsibilities, and how to set priorities. Farming is often a family affair in which parents, grandparents, and older siblings help children to develop a sense of pride, a feeling of belonging, and the satisfaction of a job well done. However, there are risks involved in farm labor. While no parent wants to jeopardize the life of his/her child, tragic injuries occur and can significantly impact a child's future. In developing countries, work-related accidents and injuries are often of such regular occurrence that they are viewed as a way of life.

Regrettably, even in developed nations, record keeping and tracking of children's occupational injuries are weak. In developing nations, it is almost nonexistent. Unfortunately, little scientific evidence is available to show what an acceptable level of hazardous exposure for children and youth is. International conventions have moved forward to defining those types of work that are considered to be the 'worst forms.'¹ One such category is generally considered hazardous work and is defined as 'work that due to the manner in which it is performed places a child's health, safety, or morals at risk.'² The definition of what is *hazardous* is left up to the country to define.

Discussions of children and farm safety are often controversial and emotionally charged. They are even more difficult in developing nations where dependency on a child's labor is viewed as a cultural norm. The key question to consider is, "How can fatal and other serious injuries be minimized within an occupation in which children routinely work?" Part of the answer to this question lies in understanding the tasks and activities that children and youth perform (task mapping), the injuries resulting from those tasks (job risk), and the work that is appropriate for the child's stage of growth and development (ergonomics analysis).

1.1 Purpose

Creative Associates International, Inc. (CAII) contracted for a brief study to look at the activities of children in cocoa production. The primary objective of the study is to provide technical background information on worker safety and accident prevention in cocoa production for the development of a functional literacy life skills curriculum and radio social messaging campaign for children and youth working in cocoa production. CAII financed the cost of the activity under

¹ International Labor Organization (ILO) Convention No. 182 on the Elimination of the Worst Forms of Child Labor

² Article 3(d) of the ILO Convention No. 182

the Basic Education and Policy Support (BEPS), Education to Combat Abusive Child Labor (ECACL) task order, funded by the United States Agency for International Development (USAID).

The overall purpose of the task mapping and job risk/ergonomics analysis work performed was to:

- map the tasks and activities performed by children and youth in the growing and harvesting of cocoa; and
- identify the pain and injuries that result from performing these tasks and activities.

The task mapping and job risk/ergonomics analysis are compared with the data collected during the task mapping and job risk/ergonomics analysis to:

- determine if there are age- and task- appropriate activities in cocoa production that are not hazardous to children and youth, and
- identify areas where worker safety interventions and education could be applied to prevent long-term injuries to children and youth.

Due to the brief period of the survey work, the activities performed cannot be fully considered a complete job risk/ergonomics analysis study. Nevertheless, the study does provide task mapping and job risk/ergonomics information about the activities performed by children. The activity was conducted in the Sefwi Wiawso district in the western region of Ghana, known as the largest cocoa-producing district in the western region. The results of these activities are offered to assist CAII's local partner, CARE International – Ghana, and others in the design of child labor intervention strategies. It is believed that this information will be valuable for the development of materials and teaching tools about worker safety in cocoa production for children, youth, and adults.

1.2 Scope and Methodology

The task mapping and job risk/ergonomics activity included an examination of the cocoa production process used by local cocoa producers, sharecroppers, their family members, and other hired workers.

The work performed included an examination of the major tasks and activities performed in cocoa production with a focus on the work performed by children and youth, and the subsequent pain and trauma associated with the performance of each task. The work performed included two areas of study, a mapping of cocoa production tasks and associated activities, and identification of tasks that result in risk of an acute or chronic pain and/or injury.

1.2.1 Study Team

An examination of the situation of children and youth and the work they perform throughout the cocoa production process was performed by a small team in 10 communities within the Sefwi Wiawso District. The primary investigator, Ms. L. Diane Mull, was assisted by Mr. Edem

Ametewee, Field Coordinator for CARE International-Ghana, Mr. Alex Aburam Danso, Care International-Ghana, and Mr. Newman Ofori, PROMAG Network, who provided transportation, community access and local language translation assistance.

1.2.2 Communities Visited

The team visited a total of 10 communities representative of cocoa production within the Sefwi Wiawso District. Based on a review of profiles of the top 20 cocoa-producing communities within Sefwi Wiawso, the 10 communities were selected to: 1) provide a full geographic representation of the district, 2) include communities that were predominantly Ghanaian, and 3) include communities that had a significant number of migrants. All communities were rural, outlying areas where the primary activity is cocoa production. These communities were located throughout the district, but with a particular focus on the southwestern, or frontier, area of the district. The 10 communities were:

- Aboagyekrom
- Bronikrom
- Manukrom
- Nsawora
- Tanokrom
- Bawakrom
- Kodjour
- Nkrah
- Puakrom
- Yoyoagya

1.2.3 Interview Process and Selection

The team conducted 11 days of task mapping and job risk/ergonomics analysis field interviews, focus groups, and direct observation. The team employed primary and secondary research methods, including key informant interviews, focus group discussions, and data collection. It used informal interviews in selected communities, with an emphasis on children and youth who were not in school and who actively worked in cocoa production. The observations helped to develop an overall impression of the extent of work children and youth perform in cocoa production. An informal approach helped to relax respondents, who readily shared information about their work activities, their feelings following the performance of tasks, and any injuries or accidents that they experienced related to their work with cocoa.

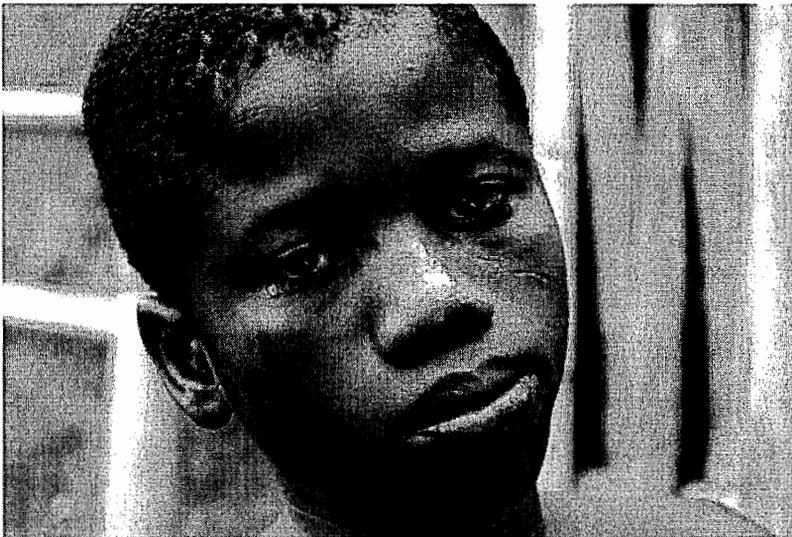


Team meets first with community leaders to explain purpose of the activity before conducting focus groups and individual interviews.

At the onset of visiting a community, meetings were held with community leaders to explain the purpose of the study and to request permission to interview the children and youth. While time consuming, this was a critical and important step in the process. The selection of children and youth was based on the criteria of targeting children aged 9 to 17 and those that work predominately in cocoa production. When possible, all children that met the criteria and were

available were interviewed. Focus groups were held with children of similar age, gender, and school participation. Individual interviews were conducted with a small number of children and youth following the focus group discussions, as time allowed. Additionally, the team collected admissions data from the Sefwi Wiawso District Government Hospital in Sefwi Wiawso.

Interviews were conducted with a total of 61 individuals, between the ages of 9 and 32. Forty-eight of these individuals were children and youth between the ages of 9 and 17 years. Interviews were conducted with adults, as well as youth, in order to triangulate the results for accuracy. This was done to determine if the activities, and the manner in which the activities were performed, were the same for adults as for youth performing the same job. The team determined that children and youth 1) perform activities in the same manner and follow the same approach to work performance as adults; and 2) share similar experiences with respect to how they feel following the work activities and the types of accidents and injuries incurred.



Monarch, 14, cries because he is sad that his father has died. He now works as an apprentice for his mother's friend who is a cocoa producer. When his father was alive, he went to school and liked it. However, currently, he does not attend school.

1.2.4 Task Mapping

As stated previously, the purpose of the task mapping activity was to identify the major tasks and subsequent steps that are undertaken during the cocoa production process and to identify those that are performed by children and youth.

This task mapping activity has the following objectives:

- to identify each of the major tasks performed during the cocoa production process;
- to identify each of the steps or activities performed in each task;
- to identify tools or equipment used in performing these tasks; and
- to identify protective equipment used.

1.2.5 Job Risk/Ergonomics Analysis

The Job Risk/Ergonomics review that the team performed included a review of data from hospital admission and health clinic diagnoses, key informant interviews, focus group discussions, and observation. These activities were written on standardized forms and recorded on videotape and/or photographed by camera.

The job risk/ergonomics review sought to identify those tasks that potentially pose a significant risk to children and youth who labor in cocoa production by examining the following:

- how the performance of each task impacts the workers' physical health and development;
- the safe work behaviors of workers, as demonstrated by their use of protective gear or clothing;
- those areas where workers are aware of risks, as demonstrated by their identification of unsafe tasks; and
- the types of accident and/or injuries that incurred within all identified tasks during cocoa production.

1.2.6 Outputs and Results

While further applications are likely, the following outputs and results were expected from this activity. These include:

1. A report that summarizes information collected, including a description of the cocoa production tasks, and the job risks and ergonomics analysis of the work performed by children and youth in cocoa.
2. Formal distribution of the final report to donors and implementing agencies, through written and/or oral presentations.

3. Input into the development of the YES worker safety curriculum and radio social messaging program to increase knowledge and awareness about safe work practices in cocoa and other farming production.

1.3 Background on Cocoa Production in Ghana

Cocoa is the major source of foreign exchange for Ghana. For many decades, Ghana was the leading global producer, although production declined in the 1980s due in part to the recession. However, given the unstable situation in Côte d'Ivoire, cocoa prices in Ghana have risen significantly in the last couple of years. Cocoa production takes place within 20° latitude of the equator, though most is grown within 10°. In Ghana, cocoa is grown in the belt of tropical forest that stretches from the southwest to the mid-central part of the country. The main commercial production occurs in six regions, including Western, Brong Ahafo, Ashanti, Eastern, Central and Volta Regions. The Sefwi Wiawso district, the target for this study, is located in the northern most part of the Western region (see map).

Traditionally, cocoa production has been concentrated in the central Ashanti region, whose capital, Kumasi, serves as the national commercial and trading hub. However, production has shifted to the Western region (bordering Côte d'Ivoire) as a result of declining soil fertility and widespread land clearing. The shift in production has caused many of the established cocoa farmers in Ashanti to buy land in the Western Region. It has made the Western region an important destination point for migrants from northern districts in Ghana that farm under sharecropping arrangements. Migrants make up a sizable proportion of the agricultural labor in the Western Region, and in particular, in the Sefwi Wiawso district. Migrant families or workers most often come according to the share cropping arrangements of *abusa* and *abuna*. Most tenant farmers live in acute poverty and earn as little as ₵400,000 Cedis per annual growing season amounting to about US \$50. They usually cannot afford even basic necessities, and the children of these sharecroppers are most at risk of missing school and/or shouldering adult-level workloads.

Although the major cash crop cultivated in the Sefwi Wiawso district is cocoa, farming communities in the Sefwi Wiawso district also cultivate food crops like maize, yams, plantain, yams, and cassava. Rice is cultivated in areas that have sufficient water, however to a much lesser degree. These crops are all seasonal, and the income of most of the growers tends to be low, seasonal, and irregular. Production yields are highly dependent on weather and other conditions. Farmers usually have adequate resources during the harvest period, while income levels decline sharply in the lean or planting season, leaving many farmers vulnerable to economic pressures. Compared to the arid regions in the North and East of the country, cocoa producing areas are relatively affluent, though poverty is a persistent and pervasive problem, especially for sharecroppers and their families.

Cocoa is a perennial crop that requires five years before it yields fruit, although hybrids have been developed that provide yields within three years. As the cocoa tree matures from a seedling, shade from other crops is needed. As the cocoa trees develop a canopy, the need for external shade is reduced. The need for shade tends to promote mixed cropping at the early stages of farm establishment. Plantain and bananas are successfully used as temporary shade. While the life of

the tree can exceed 50 years, it only produces economically for about 15. Productivity depends on rainfall and soil fertility, the method of establishing the farm, the level of maintenance (including the weeding of undergrowth), and the ability of the producer to control disease and pest infestations. There are two major harvest seasons: a small season, and a peak season. The small season is an early crop yield that occurs in Ghana generally with harvesting in late July or early August and processing ending in late August to mid-September. The peak season is the major harvest time requiring the largest concentration of labor for work activities. Peak harvesting begins in early to mid-November, with processing ending in January or February. Much of the timing for these activities is dependent on weather conditions.



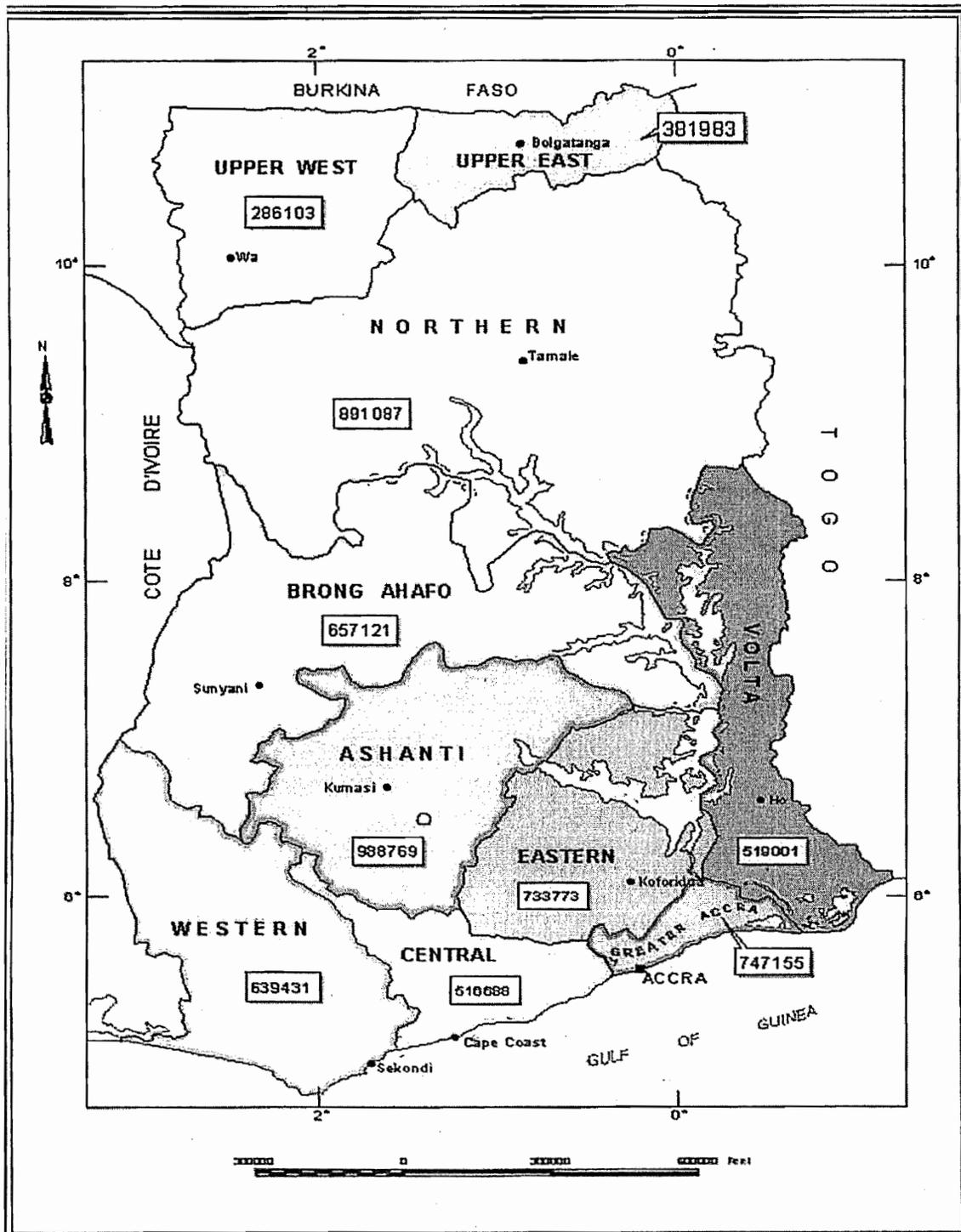
Cocoa grows on trees in large pods. The leaves of the cocoa trees create a dense canopy and provide needed shade from intense sun for the cocoa pods to grow properly. The fallen leaves provide mulch that holds moisture, as well as a thick ground cover that camouflages holes or stones.

Currently, Ghanaian cocoa production is under threat from insect and fungal infestations that have already affected about 25 percent of producers. It is estimated that in four years, pests and diseases could affect as much as 80 percent of production, which would put the income of farmers and the national export industry at risk. It is reasonable to expect that producers will increase the use of insecticides and fungicides to stave off this threat to production.

Much of the land in the country is communally owned, and chiefs and community leaders traditionally distribute use rights to community members. They pay for temporary use of the land for an agreed upon period, either with money or a symbolic gesture, such as the sharing of palm wine.³ In addition to traditional methods, land can also be leased or sold in some areas at, or approaching, market values, though this breach of customs often results in land disputes and litigation. The selling and buying of land is expanding in cash crop-producing areas. Stability in land tenure agreement is crucial given that cocoa is a labor-intensive crop that requires 3 to 5 years to mature. Under the communal system, chiefs and community elders are expected to hold the land in trust for designated families. Women are customarily prohibited from owning land; despite the fact that women provide a significant amount of the labor on the farm, they must rely on the land of their husband or male members of her immediate family.

³ Palm wine is a local drink made from the juice of the palm tree, which is fermented and distilled.

ADMINISTRATIVE MAP OF GHANA SHOWING ESTIMATED POPULATION OF CHILDREN



1.4 Labor Practices in Cocoa Production

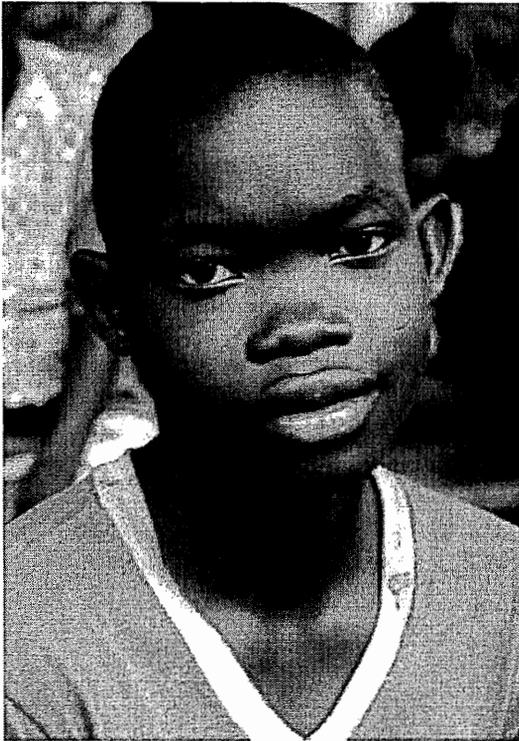
Agriculture is the mainstay of the rural economy, employing over 80 percent of the rural labor force. The family is the primary unit of labor supply, although there is a trend towards hiring day laborers during peak seasons in cash crop growing regions. Migrant laborers more often come to live on and work the land, mainly from arid regions with low fertility, such as the north or from areas where cocoa production is no longer viable. In forest regions where tree crops are grown, land is lent out, not sold; these sharecropping families usually enter into one of two farming agreements with the land owner:

- The *Abusa* system (meaning $\frac{1}{3}$ in the local Twi/Akan language), where the landowner gives responsibility for the land to the sharecropper. The landowner provides seedlings and other inputs; while the sharecropper is responsible for all labor related to clearing, transplanting, harvesting, and subsequently maintaining the farm until maturity. The sharecropper also grows food crops, which are eaten or sold by the household. In return for his/her labor, the sharecropper receives one third of the proceeds of the sale of the cocoa and other crops, and the landowner collects two-thirds.
- The *Abunu* system ($\frac{1}{2}$), where the landowner releases the land to a producer to grow crops. The producer is responsible for all labor and inputs. After harvest, the producer receives half of the proceeds.

There is a possibility for an individual to move from a sharecropper to a producer under these systems, however, the process may take decades, if it occurs at all. On a seasonal basis, groups of migrant farm workers, travel from their home areas to the cocoa farms for peak harvesting, especially between November and January, and, to a lesser degree, between July and August. They come to stay with friends and family who share in their money earned. In some cases, they have a running agreement with farmers to provide such services on a seasonal basis. Those already settled in the area usually involve their children in helping on the farms at these times. Some cocoa producers participate in a communal labor system, or *nnoboa*, where neighboring farms donate labor with the confidence that the recipients will help them when they are in need. However, with the high number of migrants who have settled in the Sefwi Wiawso district, this practice is not widely used.

Labor requirements on cocoa farms are seasonal and intensive at the time of land clearing and harvesting. For about three weeks during harvest time, there is increased activity as farmers pluck the cocoa pods, break, ferment, and dry them. While children of all ages participate, it is usually youth from 14 years and older who do the most intensive work. The peak cocoa harvest occurs simultaneously with the first quarter of school, so it is common for a sizeable proportion of the school children to be absent at this time. Some children stay out of school all year, because they believe that they have fallen too far behind to benefit from school. The work required during the peak cocoa harvest serves as a convenient excuse for students who do not want to attend school or for schools that do not want to accept them. Given that many teachers also have vested interests in cocoa, the teachers themselves may not be available to teach, as they are working on their own or other farms to earn additional income.

The traditional sharecropping arrangement is the primary method for farming families to relocate and find work. It is economically rational for the landowners, because it does not require the investment of capital, and they are assured of a return on the value of their land. Because of the seasonality of their income, most small farmers do not have the resources to pay wage laborers. By paying a family who settles on the land according to their production output, the landowner is assured that the land will be tended to and that the yield will be maximized. The use of daily laborers is relatively rare for most smallholders, since they usually do not have the cash to pay help and rely heavily on family members. Although less common, there are some landowners that have large acreage, some in excess of 100 acres in cocoa trees. These large landowners use various systems for production, including the hiring of migrant workers. Some communities, such as Bawakrom, nearly double in size during the peak harvesting period due to the influx of migrant workers. Additionally, individual workers may be hired to help with the clearing of land. These workers are usually paid a flat rate for each day of labor.



Peter, 14, knows all aspects of cocoa production. He weeds, plants, cuts pods off trees with a long cutlass, gathers pods after cutting, opens pods with a short cutlass, breaks up beans, carries pods and beans, and helps dry and sort beans. He is originally from Togo, but has been leaving and working in cocoa with his family since he was 5 years old. He has suffered numerous injuries, including severe cuts to his legs and hands, and falls from cocoa trees when pruning, and has been bitten/stung by ants. He feels that his work could be safer if workers had protective gear, like hats, gloves, and boots.

2 LAWS PROTECTING CHILDREN'S WORK IN GHANA

If a country has progressive laws and regulations to protect children that are known and enforced within the communities, it would be expected that these would influence the activities performed by children in cocoa production. In particular, these should limit performance of hazardous work. Therefore, an examination of Ghana's existing laws on child labor is important to determine if the tasks and activities performed in cocoa production are legal by country.

In general, Ghana has fairly progressive laws with on child labor and has designed a program to address the problem. Ghana recognizes that "working children" are not the same as child laborers. For example, under the 1998 Children's Act, Ghana's primary national legislation, children under 15 years of age are not authorized to be employed but can do light work if they are 13 years and above. Also, the Act stipulates the age of 18 years as the minimum age for engagement in hazardous work. These national laws are guided by international conventions related to the rights of the child and the prevention of child labor.

With the exception of Greater Accra, the dominant occupations are agriculture, forestry, and fishing. Agriculture and related work are the main occupations for persons in all the economically active age groups. In general, slightly more males are engaged in agriculture than females. According to the Ghana Child Labor Survey,⁴ among rural children aged 5 to 17, about half were engaged in economic activity. About 57 percent of working children were engaged in agriculture, fishing or forestry work. Of those children who were injured at the work place, about a quarter of them worked in agriculture. Of those injured, the data suggests that 21.4 percent of the injuries were very serious, requiring longer-term treatment, and another 38.6 percent were treated and discharged. While agriculture is the dominant occupation of many children in Ghana, the concern over hazardous work of children appears to be focused elsewhere, in particular on mining, fishing, prostitution and trafficking.

2.1 International Conventions and Programs

Ghana has ratified all but one of the major conventions related to child labor and child rights (see figure below). The exception is ILO Convention 138 on the Minimum Age of Work.

<i>Convention</i>	<i>Date Ratified</i>
ILO Convention No. 182 on the Elimination of Worst Forms of Child Labor, 1999	June 13, 2000
UN Convention on the Rights of the Child, 1989	February 5, 1990
ILO Convention No.105 on the Abolition of Forced Labor, 1957	December 15, 1958
ILO Convention No. 59 on Minimum Age of Work (Industry), 1937	May 30, 1957
ILO Convention No. 29 on Forced Labor, 1932	May 20, 1957

⁴ Twum-Baah, K.A., Ph.D. *Ghana Child Labour Survey*, Ghana Statistical Service, March 2003.

While policy level progress has been made in Ghana at the national and regional levels, many of the provisions of the CRC and ILO Convention 182 have not been fully implemented at the community level. Streamlining the goals of the child labor provisions into labor regulations, law enforcement, and education continues to be of concern and is limited by economic, financial, and human resource constraints.

The minimum age for employment in Ghana is 15 years. Children over the age of 15 may work as apprentices, provided that craftsmen and employers ensure a safe and healthy work environment, training and tools. Children under 18 are not allowed to perform certain types of hazardous labor and are prohibited from working at night. The minimum age for employment and compulsory school laws are inconsistent, making it difficult to apply the law. The 1967 decree that prohibits employment before age 15, also allows younger children to perform light work. This makes the allowable age for work to overlap with the period of compulsory schooling, thus making the implementation of universal education difficult to enforce and difficult to explain to children, parents and employers.

Each of the Conventions will be discussed individually.

2.1.1 ILO Convention 182 on the Elimination of the Worst Forms of Child Labor

Ghana was one of the first nations to ratify Convention 182 on the Elimination of the Worst Forms of Child Labor adopted in 1999, in a forum chaired by Ghana's Minister of Employment and Social Welfare. Convention 182 concerns prohibition and immediate action for the elimination of the worst forms of child labor that includes:

- All forms of slavery or practices similar to slavery, such as the sale and trafficking of children, debt bondage, and serfdom and, forced compulsory recruitment of children for use in armed conflict.
- The use, procuring or offering of a child for prostitution, for the production of pornography or for pornography performances;
- The use, procuring or offering of a child for illicit activities, in particular for the production and trafficking of drugs as defined in the relevant international treaties;
- Work, which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children.

With ratification of the Convention, each country determines how they will define hazardous work (noted in the fourth bullet above). In identifying where hazardous work exists, the government of Ghana has given specific consideration to work that does the following:

- exposes children to physical, psychological, or sexual abuse;
- requires children to work underground, under water, at dangerous heights, or in confined spaces;

- requires the handling of dangerous machinery, equipment, and tools, or that involves the manual handling or transport of heavy loads;
- places children in an unhealthy environment that may, for example, expose them to hazardous substances, agents, or processes, or to temperatures, noise levels, or vibrations damaging to their health; and
- exposes them to particularly difficult conditions, such as work for long hours or during the night or work where the child is unreasonably confined to the premises of the employer.

In compliance with the provisions of Convention 182, Ghana developed a *Programme of Action for the Elimination of Child Labor* with relevant government institutions, employers, and worker organizations. Following the signing of the Memorandum of Understanding (MOU) between the government and the ILO in March 2000, the national program to eliminate the worst forms of child labor was launched under the auspices of the International Program on the Elimination of Child Labor (IPEC).

Since the signing of the MOU, a national program manager for IPEC has been appointed, and the Minister of Employment and Social Welfare has inaugurated a National Steering Committee as of August 15, 2000. The Ghana Statistical Service has conducted a child labor survey that was designed according to the framework of the Statistical Information Monitoring Program on Children (SIMPOC) of the ILO.⁵

In response to this convention, Ghana's child labor program works toward the achievement of the following goals:

- Informing, sensitizing, and mobilizing the general public, including national and local political leaders, parliamentarians, and the judiciary;
- Monitoring and publicizing to best practices on the elimination of child labor;
- Publicizing legal or other provisions on child labor in different languages or dialects;
- Taking into account the need for sensitizing parents to the problem of children working in such conditions; and
- Setting up a continuous data information gathering system on the worst forms of child labor (criminal offenses, and labor law violations) disaggregated by sex, age groups, occupation, branch of economic activity, status in employment, school attendance, and geographical location.

In working toward these goals, the program intends to achieve the following results:

- The identification and denunciation of the worst forms of child labor;

⁵ Ghana Statistical Service published, in March 2003, the *Ghana Child Labour Survey*. This represents Ghana's first nationwide survey on various aspects of working children.

- The prevention of abusive child work or the engagement of children in or removing them from the worst forms of child labor, protection from reprisals, and rehabilitation and social integration through measures that address their educational, physical, and psychological needs;
- Giving special attention to younger children, the girl child, the problem of hidden work situations, in which girls are at special risk; other groups of children with special vulnerabilities or needs; and
- The identification, reaching out to and working with public opinion and concerned groups, including children and their families.

2.1.2 U.N. Convention on the Rights of the Child

Ghana ratified the UN Convention on the Rights of the Child (CRC) November 20, 1989 and it came into force in September 1990. The Ghana National Children's Commission (GNCC) was established in 1991, and clauses on child rights and protection were included in Ghana's 1992 constitution. The CRC guarantees children the rights to:

- Survival;
- Protection against harmful influences;
- Physical, moral and intellectual development,
- Participate actively in social and cultural life, and
- Protection from economic exploitation and from performing any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development.

Following ratification of the CRC, African governments developed the African Charter on the Rights and Responsibilities of the Child as a response to what they considered to be a lack of consultation and participation in the decision-making process. The participating governments maintained that the issue of children's rights, which should be viewed within the specific cultural context the countries, should also take into account the children's responsibilities. The regional charter affirmed the provisions of the CRC, by enhancing its applicability at the local level.

2.2 National Laws and Programs

On the national level, there have been numerous policy efforts to protect and promote the development and survival of children.

Initiative	Year	Description
Child Labor Unit	1999	Established as part of the Ministry of Employment and Social Welfare to better respond to the needs of children in difficult circumstances, including abusive labor situations.
The Children's Act (Act 560)	1998	Contains provisions on child labor, provides a legal framework to assist children in abusive labor. Also, it establishes the basic rights of the child, judicial and quasi-judicial adjudication, parentage, custody, fosterage and adoption, and institutional care.
Women and Juvenile Unit of the Ghana Police Service	1998	The Ghana Criminal Code was amended to establish a unit of the police department to respond specifically to complaints of crimes against juveniles and women, especially those related to sexual abuse.
District Assembly Act 462	1998	This session on education provided for teacher and salary infrastructure and set the responsibility for implementation at the district assembly level.
The Court Act, Act. 459	1993	Mandates the courts to ensure the welfare of children 18 and below as well as children in difficult circumstances.
Labor Decree NLCD, Act. 157	1967	Prohibits the employment of children below age 15 and prescribes sanctions for offenders.
Criminal Procedure Code	1960	Gives rights to the police and the courts to protect children in difficult circumstances (e.g., children who are orphans, destitute and maltreated) by sending them to programs to learn a trade.
National Constitution of Ghana		Grants authority to Parliament to enact laws related to child labor.

The National Constitution, 1998 Children's Act and the Criminal Code are discussed below.

2.2.1 National Constitution of Ghana

The Constitution makes direct reference to measures that should be implemented to assure the rights of children. Specifically Chapter 5, Section 28 states that the Parliament shall enact such laws as are necessary to ensure that:

- Every child⁶ has the right to the same measure of special care, assistance and maintenance as is necessary for its development from its natural parents, except where those parents

⁶ For this purpose "Child" means a person below the age of eighteen years.

have effectively surrendered their rights and responsibilities in respect of the children in accordance with law.

- Every child whether or not born in wedlock, shall be entitled to reasonable provision out of the estate of its parents.
- Parents undertake their natural right and obligations of care, maintenance and upbringing of their children in co-operation with such institutions as Parliament may, by law, prescribe in such manner that in all cases the interests of the children are paramount.
- Children and young persons receive special protection against exposure to physical and moral hazards.
- The protection and advancement of the family as the unit of society are safeguarded in promotion of the interest of children.
- Every child has the right to be protected from engaging in work that constitutes a threat to his health, education or development.
- A child shall not be subjected to torture or other cruel, inhuman or degrading treatment or punishment.
- Any other person by reason of religious or other beliefs shall deprive no child of medical treatment, education or any other social or economic benefit.

2.2.2 Children's Act, 1998 (Act 560)

The Children's Act (Act 560) of 1998 contains provisions on child labor to provide a realistic legal framework for assisting children who are compelled to work. According to the law, the minimum age for formal and informal employment is 15 years, though children are permitted to engage in "light work" from the age of 13, provided it does not harm their health and development, or impede school attendance and their capacity to benefit from schoolwork. The Children's Act specifically prohibits the following types of work:

- Exploitative labor, which is defined as any form of work, which deprives children of their health, education, or development.
- Hazardous work, which refers to work that threatens the health, safety, or morals of children, specifically going to sea, mining, and quarrying; portering heavy loads; and working in places that expose them to immoral behavior (i.e., bars, hotels, and other places of entertainment).
- Night work, which is carried out between the hours of eight o'clock in the evening and six o'clock in the morning.

2.2.3 Criminal Procedure Code of 1960

In 1998, the government amended the 1960 Criminal Code to provide more comprehensive protection to women and children. It includes new definitions related to sexual offenses and has provisions for stronger sentences to the offenders. Sentences for sexual offenses such as rape are doubled. There are also provisions against forced marriage and the recruitment of children into

prostitution. The age of accountability for the commission of a crime has been raised from the age of 7 to the age of 12.

The Bill to ratify Convention No. 138 on the Minimum Age For Work is currently before the parliament, obliging ratifying countries to ensure children are not employed full-time, for remuneration or no, until the end of compulsory primary school, between the ages of 12 and 14.

3 THE COCOA PRODUCTION PROCESS TASK MAPPING RESULTS

Task mapping is an exercise whereby the major steps in the cocoa production process are outlined. The team mapped work performed in cocoa farming, but did not include other kinds of farming, such as rice, cassava, plantain and banana.

The task mapping exercise involved the observation of individuals performing the tasks and activities during the harvest season. As previously mentioned, there are generally two primary harvest seasons; a smaller harvest period, occurring generally from late July through early September; and a largest harvest period, which occurs generally from November through January. The team performed its activities during the small harvest period, during the last week of August and the first week of September. Although this was a non-peak period, individual workers were still performing a majority of the tasks. Activities provided a representative demonstration of the activity of harvesting and how workers performed their jobs.

These activities were recorded on standardized forms. Information was collected through observations as well as individual and group interviews, and recorded on videotape and/or photographed by camera. Once key tasks were outlined, the information was verified within the communities visited to ensure that the activities performed during the cocoa production process were consistent. This included the identification of tools, equipment, protective gear, or safety precautions.

3.1 Key Tasks in Cocoa Farming

Findings related to four components: key tasks; tools, equipment, and supplies used; pesticides; and protective gear and clothing are listed below. These tasks are outlined from the beginning steps in the establishment of a farm, when clearing virgin forests, to the final stage of carrying the dried beans to the central shed for selling.

Each of these key task areas includes a series of steps. The performance of the tasks can involve one person working independently or a large group of persons working together. In some cases, there appears to be a general pattern of delineation, based on age and gender, regarding who conducts certain tasks or steps, however, overall, children under the age of 17 were found to be performing tasks regardless of the degree of hazards associated with the job.

Tasks

- Clearing virgin forest
- Planting cocoa seeds or seedlings

- Weeding and thinning
- Pruning
- Pesticide application
- Blocking/plucking with Soso⁷
- Harvesting pods with long cutlass⁸
- Carrying pods to central cutting area
- Opening pods with short cutlass⁹
- Sorting/breaking up the raw beans
- Carrying the raw beans to the fermenting area
- Fermenting the beans
- Carrying the fermented beans to the drying area
- Sorting and drying the beans
- Carrying the dried beans to the central shed.

3.2 Tools, Equipment, and Supplies Used

Workers in cocoa production largely use manual tools. The only mechanized tools reported by workers were a chain saw and a motorized sprayer, however, a majority of workers reported using the cheaper hand-pump sprayer. The major tools, equipment and supplies reported by children and youth as being used in cocoa production were as follows:

- Long cutlass
- Short cutlass
- Sharpening stone
- Soso
- Chain saw
- Agricultural chemicals (pesticides)
- Hand-pump sprayer
- Motorized sprayer
- Small tools and rubber washer for repairing sprayer
- Fuel for sprayer
- Baskets
- Water containers or cup
- General purpose rag

⁷ A “soso” is the local language term for the bamboo pole with a one or two-edged cutting knife attached at the end of the pole that is used to cut cocoa pods that are out of arm’s reach and located in the upper canopy area of the cocoa trees.

⁸ Long cutlass is a machete that is approximately 14 to 16 inches in length with a sharp cutting edge used largely for clearing, weeding and harvesting cocoa pods from the trunk of the tree that is lower to the ground.

⁹ Short cutlass is a machete that is approximately 10 to 12 inches in length with a rounded cutting edge used largely to cut open cocoa pods and to remove the beans from the pod.

While a variety of tools, equipment, and supplies are used, the only maintenance that appears to be performed is the sharpening of the cutlass, chain saw, and soso knife. Respondents reported spending little or no time doing preventive maintenance on equipment after use.

3.3 Pesticides

The workers reported or were observed using a variety of pesticides, including fungicides and insecticides, to treat black pod and insect infestations. The following pesticides were observed and/or reported being used: Ridomil, Champion, Cocostar, Nordox, Undane and Thionex. The following table provides a brief overview of these pesticides.¹⁰ Undane is not described in more detail, as the team did not have sufficient information to determine if the product was an organochlorine insecticide or a hexachlorobenzene fungicide. The pesticide container was too faded to derive sufficient information, and the workers knew little other than the name of the chemical.

Table 1: Pesticides Used by Cocoa Workers

Pesticide	Type of Chemical	Target	Description
Ridomil plus (Metalaxyl) (Cuprous oxide)	Fungicide	Black Pod	Used to control soil-borne fungal diseases. Metalaxyl exhibits low acute oral and dermal toxicity in laboratory animals. Cuprous oxide is an inorganic copper compound. The dust and powder preparations of copper compounds are irritating to the skin, respiratory tract, and particularly to the eyes.
Champion (Cupric Hydroxide)	Fungicide	Black Pod	Cupric oxide is an inorganic copper compound. The dust and powder preparations of copper compounds are irritating to the skin, respiratory tract, and particularly to the eyes.
Cocostar (Pirimiphos-methyl)	Insecticide	Capsid, Akate	Acts through phosphorylation of the acetylcholinesterase enzyme at nerve endings. Absorbed by inhalation, ingestion, and skin penetration. Exposure can cause: headache, hypersecretion, muscle twitching, nausea, diarrhea, respiratory depression, seizures, and loss of consciousness.

¹⁰ Reigart, J.R. and Roberts, J.R.. *Recognition and Management of Pesticide Poisonings*, Fifth Edition, USEPA, March 1999.

Pesticide	Type of Chemical	Target	Description
Nordox Super 75 (Cuprous Oxide or Copper1 Oxide)	Fungicide	Black Pod	Routes of entry are through skin and eye contact, skin absorption, inhalation and ingestion. The dust and powder preparations of copper compounds are irritating to the skin, respiratory tract, and particularly to the eyes. Soluble copper salts (such as the sulfate and acetate) are corrosive to mucous membranes and the cornea. Early signs and symptoms of copper poisoning include a metallic taste, nausea, vomiting, and epigastric pain.
Thionex (Chlorinated hydrocarbon)	Insecticide	Capsid	Routes of entry are through skin and eye contact, skin absorption, acute inhalation and ingestion. Product is considered to be highly toxic by all routes of entry. Overexposure can cause headaches, loss of appetite, nausea, vomiting, diarrhea, general depression, possible liver damage, and death.

Sprayers, which are often stored within the housing of workers, were observed to be completely covered and oily to the touch from prior applications of chemicals. Homes are also the primary location where chemicals are stored as well. Likewise, chemicals are often mixed in locations open to all community members, including small children. Pesticide spills are left on the ground without any attempt to decontaminate the area. No proper disposal of chemical containers was observed; in fact, it was reported to be common practice to toss the empty pesticide container, plastic bottle, or packet aside. Additionally, a wiping rag was used for just about all activities. This included wiping up pesticides or fuel that dripped from the chemical container and the backpack sprayer, wiping hands and sweat from the face and neck of the worker due to the heat, or serving as a bandage for cuts or scrapes that occur during work. In fact, it was observed that all of these were done with the same rag during the course of a workday, without washing or exchanging the rag.

3.4 Protective Gear or Clothing

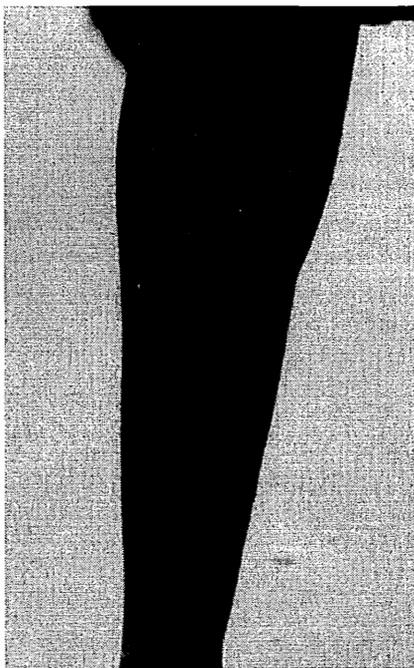
According to the Ghana Child Labor Survey, over 95 percent of children in rural areas do not use protective equipment. The typical work attire reported as worn by most male children and youth was short pants, short sleeve or sleeveless tee shirts, and flip-flops. Their female counterparts wore skirts or dresses, short-sleeve tee-shirts, and flip flops.

The most common item regarded as protective equipment that was found in all communities was the "Wellington" boots. These are sturdy, thick soled, rubber boots that rise about mid-calf on the leg. While the boots were common in each community, it was found that they were generally passed around among male workers. The determination of who wears the boots seemed to be

4 JOB RISK/ERGONOMICS REVIEW OF THE COCOA PRODUCTION PROCESS

Children and youth in rural agricultural areas are more economically active at a younger age than any other children in Ghana. Over 70 percent of those aged 5 to 9 and over 62 percent aged 10 to 14, are involved in agriculture. Nearly 32 percent of rural children have experienced a work-related injury or illness.¹¹

It is suspected that declining conditions in the rural economy including declining soil fertility, smaller land holdings, population growth, fluctuating commodity prices, and high rates of post harvest losses, have exacerbated the problem of children's early involvement in economic activity. High rates of poverty of most rural inhabitants result in many being incapable of meeting their responsibilities to look after the best long-term interests of children, and have often compelled them to withdraw children from school at a young age. Many of the children not in school reported they dropped out because they were not bright enough to succeed. With little else to do, children and youth became actively involved in cocoa production.



A severe cut below the knee, incurred while clearing virgin forest when he was younger, resulted in permanent damage to the leg of this 17-year-old worker.

In the Ghanaian context, children are expected to work for the family doing household chores such as sweeping, fetching water, carrying firewood, washing dishes, preparing meals, and caring for younger siblings from a very early age. These tasks are viewed as an important part of the socialization of children to be responsible and hardworking adults. Children also work in the income generation activities of the family, including cocoa and other farming activities to help support the family. In some cases, youth under the age of 18 are cocoa producers and owners of their own small farms.

On market days, children help sell foodstuffs, engage in petty trading, and work as porters. From the age of 4, they can perform simple tasks on the farm. At the age of 10, children are expected to carry water, cocoa or firewood, and even to use a machete or cutlass to maintain the farm. For the most part, such "normal" work is not viewed as being detrimental to the health or safety of children; however, these children are exposed to the same work hazards of accidents and injuries as adults.

The level to which children are exposed to hazardous working conditions varies according to the employment status of the parent (farm owner or sharecropper), availability of adult labor in the

¹¹ Twum-Baah, K.A., Ph.D. *Ghana Child Labour Survey*, Ghana Statistical Service, March 2003.

community to perform such tasks, and the expectations or attitudes of the family and children. The children of cocoa farm owners generally attend school and perform limited work tasks after school and on weekends. The children of sharecroppers and migrant children, who work as hired laborers, attend school on a limited basis or not at all and perform all tasks during the cocoa production process. The children of sharecroppers and of migrant families from northern Ghana and Togo appear to begin work at an earlier age, are engaged in work for longer hours each day, and perform tasks that are more hazardous, including pesticide application. This group of children, their parents and employers, should be the target for education regarding the governing laws and regulations and worker health and safety.

Understanding the risks of work that children perform can help provide valuable insight for the development of educational curricula and a social messaging campaign. Additionally it can aid the implementation of community mobilization activities focused on reducing child labor and improving the health and safety of children in cocoa production.

4.1 Hospital Admissions of Children Under 18 in the Sefwi Wiawso District

The team performed a review of hospital admission and diagnoses for children and youth, including individual patient records admissions from health clinic referrals. The team focused its data collection on hospital records from the primary public hospital that serves the Sefwi Wiawso district, the Sefwi Wiawso District Government Hospital. This hospital receives walk-in admissions and referrals from health clinic personnel serving the surrounding rural communities. Given the lack of transportation and the rural isolation of many communities, only the more extreme cases would likely result in a visit to the hospital. This conclusion was supported by a majority of the individuals interviewed, who indicated that community or family members provided local herbal treatments for a majority of their injuries, and that, due to lack of transportation, they only resorted to the hospital for severe injuries.

The team reviewed the admission records that included both hospital and health clinic-referred admissions and diagnoses for children less than 18 years of age from January 2002 through August 23, 2003. Individual's records were reviewed to ascertain if the diagnosis could have been the result of a work-related incident. The hospital admission records included the date, name of patient, address (community), age, diagnosis, and attending physician. The team screened out all patients above 18 years and all diagnoses likely not to be work-related, i.e., malaria, influenza (with temperature), etc. Additionally, the team screened out any children where there was information that clearly pointed to a non-work related incident, such as a bicycle or auto accident, dog bite, injury that occurred at school, or if the individual lived in an area known not to be a cocoa producing community (such as the immediate areas surrounding Sefwi Wiawso). The screening identified a total of 79 cases could potentially be attributed to exposure to a work hazard in cocoa production.

Like hospital records in developed nations, clear information about occupationally-related injuries and accidents is limited. The Sefwi Wiawso hospital records, while consistent in nature and information regarding diagnosis, provided sporadic and limited information relative to the incident or cause of the injury or diagnosis. For this reason, further study would be needed in

order to determine if the cause of a majority of the 79 diagnoses were, in fact, directly attributed to work within cocoa. Given the limited time for the activity, the team was not able to complete this process. However, the results of the hospital diagnoses data are enlightening, and, given the extent of cocoa production in the district, it is believed that a strong correlation between the work activities performed by children and the resulting diagnoses are possible.

As you will see in the table below, three major areas of diagnoses were identified:

1. allergic reactions and rashes,
2. external injuries to the various parts of the body (mainly due to cuts and abrasions), and
3. internal muscular-skeletal trauma.

Other areas were also identified.

Table 2: Hospital Diagnoses for Children Under 18 Years for Sefwi Wiawso District 2002/03

Area	Hospital Admission Diagnosis	Number of Cases	Age Range of Children
Allergic Reactions and Rashes (27)	Allergic Reactions, Allergies	10	3 - 16
	Dermal Rashes	14	4 - 16
	Pain and Swelling	3	9 - 17
Internal Muscular - Skeletal Injuries (22)	Arthritis	6	10 - 15
	Neck, Back, Waist, and Joint Pain	9	11- 17
	Tendonitis and Muscle Pain	3	10 - 16
	Knee Injury	1	7
	Fracture	1	10
	Hernia	2	7 - 17
External Injuries to Arms, Legs, Hands, and Torso (16)	Abrasions, contusions, lacerations, nail pricks, and punctures	16	9 - 17
Bites and Stings (5)	Snake bites	4	10 - 17
	Insect sting	1	17
Respiratory (3)	Asthma	1	13
	Chest Pains	1	10
	Collapse	1	16
Head (2)	Severe Headaches	2	10 - 16
	Head Wound/Injury	2	17

Area	Hospital Admission Diagnosis	Number of Cases	Age Range of Children
Poisoning (2)	Chemical Poisoning	2	1.5 - 3

Internal muscular stress and injury can result in an agricultural work environment where children are bending, stooping and carrying loads too heavy for their level of physical development. As noted on two hospital records, such activity resulted in a knee injury (for a 7 year old) and a fracture (for a 10 year old) due to a “fall while carrying [an] object too heavy for the size of the child.” According to hospital records, six children, between the ages of 10 and 15 were diagnosed with arthritis, a fairly unusual diagnosis for children of this age. While this diagnosis could be mistaken, the indication is that these children are experiencing chronic pain in their joints from activities that they are performing. An additional nine children were identified as having joint pain in their neck, back and waist areas. Three other youth were noted to have tendonitis and muscle pain severe enough to require a visit to the hospital. Repetitive bending and stooping for children under the age of 18 is believed to cause internal vertebra damage, while external vertebra damage, or damage to the discs that separate the joints is expected for those above 18 years. Hospital data for patients under 18 years of age was consistent with reports of accidents, injuries and symptoms of pain expressed by respondents during the job risk/ergonomics review.

Likewise, the high number of allergic reactions and dermal rashes was consistent with the information provided by respondents. Burning of the skin and dermal rashes were two of the most common symptoms described by the children and youth. This was true even for those not involved directly in mixing, loading or applying pesticides and those serving as assistants to adults performing those tasks. The medical and interview evidence suggest that due to its close proximity to the cocoa farm and the lax handling of pesticides, the work environment as well as the living environment, created high levels of exposure to the chemical residue through drift and other routes of exposure.

Lastly, due to the widespread use of long and short cutlasses by young children, beginning at age six, in the process of weeding and farming, external injuries to arms, legs, hands, and torso is also a frequent diagnosis, although not the most prevalent diagnoses in this study. Cuts and wounds are the leading work-related injury to children in Ghana (85.4 percent in rural areas), according to the Ghana Statistical Survey. The multiple scars evident on the legs, hands, and arms of the children who work in cocoa were a clear testament to the large number of injuries incurred.

4.2 Symptoms or Body Pain Experienced

To understand how the performance of each task impacted the workers' health and safety, the team asked respondents to identify the symptoms they experience after performing each of the tasks. This information was triangulated with adult respondents to determine if the symptoms were the same or similar. The following chart summarizes the parts of the body where

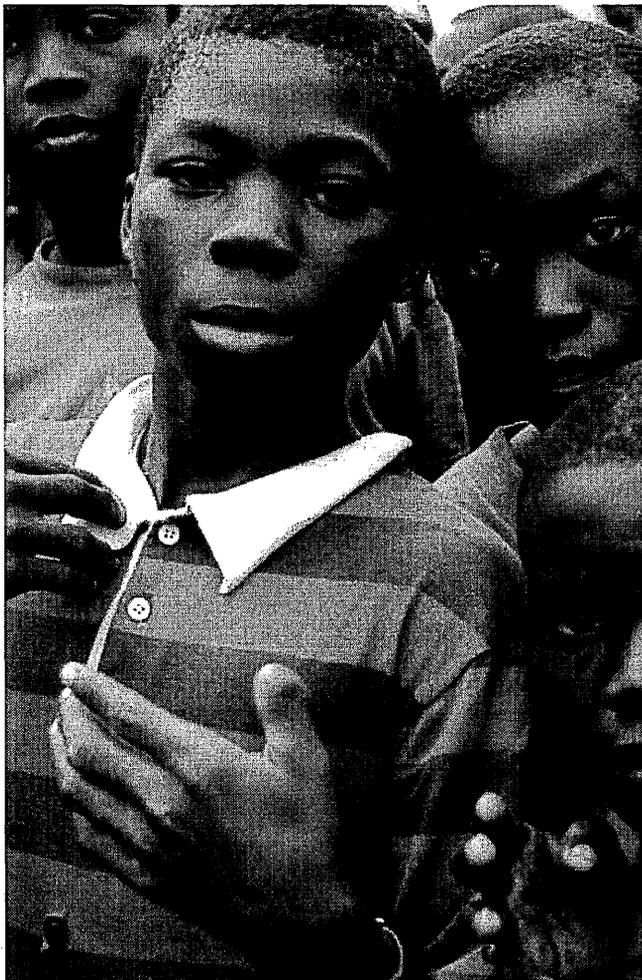
respondents indicated that pain resulted from performing tasks during the cocoa production process.

Tasks in the Cocoa Production Process	Injuries, Symptoms or Body Pain Experienced Following Performance of Key Tasks
Clearing forested areas	Lower back, shoulder, and hand pain (blisters); headaches, dizziness
Weeding and thinning	Lower back, shoulder, and hand pain (blisters); headaches
Pruning	Injuries due to wasp stings and falls
Pesticide application	Headache, nausea, dizziness, dermal rashes, burning and itchy eyes and skin, cough, and shoulder and back pain (carry sprayer)
Harvesting pods with soso	Neck, shoulders, lower back, arm and elbow pain, burning and hurting eyes (due to dropping debris from trees)
Harvesting pods with long cutlass	Lower back, shoulder, and arm pain
Carrying pods to central cutting area	Neck, mid-back, lower back, and shoulder pain
Opening cocoa pods with short cutlass	Cut hands and fingers; lower back, neck, shoulder, and wrist pain, headaches
Sorting/breaking up the raw beans	Headaches, sore hands and fingers, hand and finger pricks, sore knees
Carrying the raw cocoa beans to the fermenting area	Neck, mid-back, lower back, and shoulder
Fermenting the cocoa beans	Lower back pain
Carrying fermented cocoa beans to drying area	Neck, mid-back, lower back, and shoulder pain
Sorting and drying the cocoa beans	Pricks to hands and fingers, pain in lower back and shoulders
Carrying the dried cocoa beans to the central shed to sell	Neck, mid-back, lower back and shoulder pain

The injuries, symptoms, and body pain noted in the above chart are further linked to the individual tasks and activities performed by children and youth. The information provided in the following section includes identification of the equipment used, protective gear worn (if any), steps in the job task which the respondents felt to be dangerous, the reported symptoms felt after performing the task, accidents and/or injuries experienced during this task, and the step-by-step process of how the workers explained that they did their job. The steps that are outlined are based on what the workers described, followed by sight observation of them performing these activities. These were recorded on video to measure repetitive motion, how they performed bending, lifting, etc., and other particular aspects of their duties. While steps are noted, given the limited time period, it was not possible to analyze additional data and verify if the steps are the most effective for production purposes.

4.3 Ergonomics Analysis

The ergonomics analysis combines all of the elements of the task mapping and job risk review, considering the equipment and protective gear used, the reported symptoms experienced following the activity, the types of accidents or injuries incurred while performing the activity, and steps in the process viewed by the respondents as being hazardous or dangerous. This last element is an essential consideration when designing worker safety education and training. Often areas that are hazardous and likely to result in an accident or injury were not viewed by the respondents as dangerous. The information reported in the following sections represents the combined comments of the respondents and is not necessarily what is recommended for preventive purposes or to be highlighted in a safety education campaign. Further analysis would be needed in this area.



Abdula, now 14, had been using a cutlass since the age of six. He thought that he was very skillful using his cutlass with so many years of experience. However, at the age of nine, he had an accident while clearing and weeding—he cut off his thumb. Where Abdula lives, there is limited access to medical care. But even if there were, Abdula says his family would not have the money to cover extra medical costs. Abdula has learned to do most things using his right hand, but is concerned that he may not be able to get a good job when he grows up because of his injured left hand. Abdula is currently not in school.

4.3.1 Clearing Virgin Forest Area

<i>Equipment:</i>	Large cutlass (approximately 16 to 18 inches in length), sharpening stone, chain saw, and fuel
<i>Protective gear:</i>	Mid-calf boots
<i>Steps noted by respondents as dangerous:</i>	Stepping on snakes, cutting with chain saw, cutting heavy brush with cutlass, burning the area
<i>Reported symptoms following activity:</i>	Headaches; lower, side, mid and upper back, and shoulder pain, hands hurt
<i>Types of accidents and/or injuries reported:</i>	Cuts, burns, blisters, and snakebites

Children and youth reported performing the following steps in order to clear forest areas to prepare for planting cocoa seeds or seedlings:

Steps in the Clearing Process
1) Get dressed for the work activity.
2) Gather cutlass, chain saw (if needed for trees), fuel for chain saw, repair tools, sharpening stone, stick for gathering grass, and water container.
3) Walk to the designated area (distances can be short or long depending on the location of the farm to the community/lodging site, and may be up or down hills according to the geography of the area).
4) Sharpen tools as needed.
5) Demark area to be cut, walk through area cutting grass to outline area.
6) If more than one worker, form line spaced about 10-12 feet apart within the demarked area.
7) Bend at waist and take stick for gathering grass and place in one hand, using hook to snare grass to be cut.
8) Take large cutlass in the other hand, holding it firm, with blade parallel to the ground.
9) Begin cutting grass and weeds by bending at the waist and in a bobbing motion, holding grass with stick in opposite hand, move arm with cutlass out and up, then swing arm down in a quarter circle motion, striking grass or weeds near the ground.
10) Repeat this action cutting grass, weeds, and small bushes/tree seedlings until the area is fairly clear of grass, weeds and brush.
11) Identify trees to be cut down that provide too much shade.
12) Take chain saw and cut wedge out of one side of tree that is in the direction where the tree is to fall, then cut other side of tree through to the upper level of the previously cut wedge.
13) Gather wood and carry out.
14) Gather palm leaves to start fire.
15) Set fire to palm leaves and move around demarked area setting small fires.
16) Monitor burning.

4.3.2 Planting Cocoa Seeds or Seedlings

<i>Equipment:</i>	Large cutlass, sharpening stone, water, seeds or seedlings
<i>Protective gear:</i>	Mid-calf boots
<i>Steps noted by respondents as dangerous:</i>	None
<i>Reported symptoms following activity:</i>	Headaches, lower back pain
<i>Types of accidents and/or injuries reported:</i>	Blisters on hands

Children and youth reported performing the following steps in order to plant cocoa seeds or seedlings:

Steps in the Planting Process*
1. If planting seeds, wash cocoa seeds in water.
2. Dig holes using rounded or sharp end of cutlass, digging approximately 3 to 5 inches deep and 1 foot apart.
3. Place two seeds in each hole.
4. Cover hole with dirt.
5. Pat down dirt with hands and feet.
6. Repeat process until area is planted or run out of seeds.
7. If using seedlings, dig holes approximately 6 feet apart.
8. According to moisture in the soil, pour small amount of water into hole.
9. Place root ball into bottom center of hole.
10. Cover root ball of seedling, piling dirt up 2 to 4 inches above root ball (according to size of seedling).
11. Pat down dirt with hands and feet.

* Years of cultivation without crop management and soil replenishment strategies have caused the fertility of many of the traditional cocoa growing areas to decline. A respondent noted that farmers in Côte d'Ivoire typically clear areas of land and grow cocoa with the use of inorganic fertilizers, which increases the yield, but reduces the productive life of the trees. In Ghana, it is more common that farmers intercrop their cocoa trees with other crops, i.e., yams and cassava, particularly in the first years while the cocoa tree seedlings are growing and before the trees are old enough to produce cocoa pods. No fertilizers were reported being used by the respondents.

4.3.3 Weeding and Thinning

Equipment:

Large cutlass, stick for holding grass

Protective gear:

Mid-calf boots, however most reported using no gear

Steps noted by respondents as dangerous:

Stepping on snakes and cutting with the cutlass

Reported symptoms following activity:

Headaches; lower, side, mid and upper back, and shoulder pain, hands hurt

Types of accidents and/or injuries reported:

Cuts, blisters, snakebite

Children and youth reported performing the following steps to weed the cocoa farm area and thin cocoa seedlings:

Steps in the Weeding and Thinning Process*	
1.	Get dressed for the work activity.
2.	Gather tools, i.e., large cutlass, sharpening stone.
3.	Walk to designated area of farm for weeding and/or thinning.
4.	Sharpen tools as needed.
5.	Bend at waist and take stick for gathering grass and place in one hand, using hook to snare grass to be cut.
6.	Take large cutlass in the other hand, holding it firm, with blade parallel to the ground.
7.	Begin cutting grass and weeds by bending at the waist and in a bobbing motion, holding grass with stick in opposite hand, move arm with cutlass out and up, then swing arm down in a quarter circle motion, striking grass or weeds near the ground.
8.	Repeat this action cutting targeted grass and weeds until the area is clear.
9.	When cocoa tree seedlings are approximately 4 feet in height, select the stronger of the seedlings, and cut the other seedling down.

* The process of weeding will be repeated during the growth cycle of the cocoa tree until such time as the leaves of the tree create a canopy such that sunlight does not penetrate the area to sustain growth of the grass or weeds. However, weeding paths to and from the farm and along the outside border of the farm are an ongoing activity.

4.3.4 Pruning

<i>Equipment:</i>	Small cutlass (approximately 10 to 14 inches in length), soso
<i>Protective gear:</i>	None
<i>Steps noted by respondents as dangerous:</i>	Climbing trees, slipping and falling out of trees
<i>Reported symptoms following activity:</i>	Scrapes, scratches, and bee stings
<i>Types of accidents and/or injuries reported:</i>	Head, shoulder, arm, hip, and leg injuries due to falls, punctures when falling on limbs, insect stings

Children and youth reported performing the following steps to prune disease from the cocoa trees:

Steps in the Pruning Process
1. Gather tools for activity and sharpen smaller cutlass as needed.
2. Walk to work site.
3. Identify diseased pods or growth on trees.
4. Using large cutlass, for pods in arms reach, cut diseased pods at the stem from trees.
5. Using soso, for pods high up in trees, cut diseased pods at the stem from trees.
6. Climb tree and maneuver among branches to get close to parasitic plant growth, pods unreachable using soso and/or dislodge soso knife that may have become stuck.
7. Using cutlass, pull or cut parasitic plant or diseased pod growth off the tree limb, or retrieve the soso knife and carry back down or drop knife to ground.
8. Climb down tree.



Of all injuries, snakebites appear to be the most feared by the children and youth who were interviewed. Snakebites can incur while clearing, weeding and pruning. Snakes can be found in the brush, around rocks, under the piled cocoa pods and in the canopy of the cocoa trees. Falls from the cocoa trees often occur when pruning the tree, when youth lose their balance when scared by a snake or stung by an insect, or when limbs are slippery due to rain. While pruning the cocoa trees—removing diseased pods and parasitic plants—wasps stung 17 of the youth in Aboagyekrom. Eleven had fallen out of the trees. One explained that when it rains, the limbs become slick and, if stung or bitten, they may lose their balance and fall. Fifteen of the 17 reported injuries due to the falls. They reported four shoulder, four head, three lower back, and four leg injuries. Only one of the 17 sought medical assistance, as his shoulder was dislocated due to the fall. These youth were between the ages of 14 and 17.

4.3.5 Pesticide Application

<i>Equipment:</i>	Hand-pump or motorized backpack sprayer, chemical packets or bottle, large water container, cup or can for measuring chemical or water
<i>Protective gear:</i>	Mid-calf boots, spraying coat, Afro Moses sandals, hat
<i>Steps noted by respondents as dangerous:</i>	None
<i>Reported symptoms following activity:</i>	Burning eyes and skin, dermal rashes, headaches, coughs, nausea, dizziness
<i>Types of accidents and/or injuries reported:</i>	Found unconscious during spraying

Child and youth perform the following steps to mix, load, and apply pesticides:

Steps in the Pesticide Application Process
1. Dress for spraying.
2. Gather spraying machine, tools, and belt to repair sprayer, fuel (if motorized), chemical bottle or packet, water cup or can for measuring (if using liquid chemical), and wiping rag.
3. Assistant brings large container filled with water (normally a child or youth).
4. Check spraying machine to determine if operational, if rubber belts have breaks or cracks, if machine leaks, filling with fuel (if motorized).
5. Mix chemicals and load sprayer: Remove lid of sprayer compartment that holds the chemicals used for spraying, open lid of bottle or packet with pesticide, pour measured amount of pesticide into sprayer compartment, add water to fill compartment, replace lid, wipe spilled pesticide or water from around lid of sprayer compartment, and tightly replace lid.
6. With help of assistant, mount sprayer on back, with assistant carrying other tools and supplies, including chemicals and rag.
7. Walk to farm site and determine area to start spraying.
8. Crank motorized sprayer or start hand-pumping action (on manual sprayer) to begin spraying pods on trunk and limbs of each individual tree, including pods overhead.
9. Refill sprayer as needed, repeating mixing and loading actions mentioned above.
10. Repair sprayer if problems occur, such as leakage, blockage, etc.
11. When spraying complete, assistant helps remove sprayer from back, gather all tools and remaining chemicals, and walks back to community, with assistant often carrying the spraying machine.
12. Stow away sprayer, and store all tools, rags and unused chemicals.

4.3.6 Blocking/Plucking with a Soso

Equipment:

Soso: a large cutlass (16 to 18 inches in length), sharpening stone, seeds or seedlings

Protective gear:

Mid-calf boots (Wellington)

Steps noted by respondents as dangerous:

Soso knife coming loose and falling striking workers below, cocoa pods falling and hitting workers below, looking up for long periods of time, debris falling into eyes

Reported symptoms following activity:

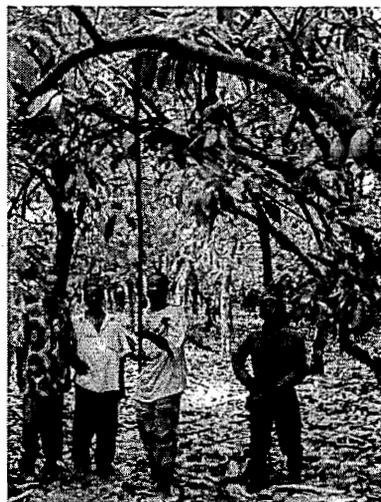
Pain in neck, lower and mid-back, shoulders, and arms, eyes hurt, often fall because always looking up and cannot see holes under thick ground cover of leaves

Types of accidents and/or injuries reported:

Cuts, hits on the head and body by the pods, twists and sprains due to trips and fall, debris falling into eyes, neck pain, torn fingernails (nail pricks)

Children and youth perform the following steps to “block” or “pluck” cocoa pods during the harvesting process using a soso:

Steps in the Process of Harvesting Using a Soso
1. Gather soso for activity, tighten and sharpen soso knife as needed, identify assistant and bring basket for gathering pods.
2. Walk to farm and identify area to begin work.
3. Extend the knife end of the soso up into the canopy of the tree where pods are to be cut.
4. Hook knife over stem of cocoa pod, pulling down sharply to sever cocoa pod or, if dual edged knife, push knife upward to cut stem of pod.
5. This step is repeated from pod to pod and tree to tree until all ripened pods are cut from canopy of trees at the farm site.



Harvesting with a soso can be dangerous if the blade is not securely attached to the bamboo pole. A majority of the children and youth noted that they considered one of the greatest risks of injury was getting hit by a falling soso. The blade can often become caught on a branch when the worker is jerking the soso trying to cut the pod loose from the tree. While older youth and adults generally use the soso, children are often nearby gathering the pods that have fallen. The children and youth also reported occasionally getting hit by the bamboo pole when they were too close to the worker using the soso. They also reported getting hit by falling cocoa pods. While the falling cocoa pods may temporarily hurt, the children reported no injuries.

4.3.7 Harvesting and Gathering Pods with Long Cutlass

<i>Equipment:</i>	Long cutlass, sharpening stone
<i>Protective gear:</i>	None
<i>Steps noted by respondents as dangerous:</i>	Cutting the pods from the branches of the trees, when performing this activity at the same time as someone is cutting use the soso, because one has to watch for the soso knife to be sure that it does not fall on you
<i>Reported symptoms following activity:</i>	Pain in lower and mid-back, shoulders, and arms, eyes hurt due to falling debris; falls because cannot see holes under thick ground cover of leaves
<i>Types of accidents and/or injuries reported:</i>	Debris falling into eyes, cuts on hand when severing pods from trunk of tree, torn fingernails (nail pricks)

Children and youth perform the following steps to harvest cocoa pods with a cutlass and gather the pods:

Steps in the Process of Harvesting and Gathering Pods with a Cutlass*
1. Gather large cutlass and basket for activity, sharpen cutlass as needed.
2. Walk to farm and identify area to begin work.
3. Pods fall to ground and are retrieved by assistant who places pods into the basket.
4. For those pods located within arms length on the trunk of the trees, hold the pod away from the trunk of the tree and sever pods at the stem using the large cutlass.
5. Place hand-held pods into the basket.
6. For those pods just out of hands reach on the trunk of the trees or hanging from branches, severe stem of pod from tree using large cutlass.
7. Bend and pick up pod, placing it into the basket.



Long and short cutlass—tools for work in cocoa production.

* This step is typically performed at the same time that harvesting with a soso is completed.

4.3.8 Carrying Pods to Central Cutting Area

<i>Equipment:</i>	Baskets (depending on size of basket, when filled, baskets may weigh as much as 30 kilos)
<i>Protective gear:</i>	None
<i>Steps noted by respondents as dangerous:</i>	Repeatedly picking up heavy baskets, repeatedly carrying heavy baskets
<i>Reported symptoms following activity:</i>	Pain in the lower and mid-back, shoulder and neck pain
<i>Types of accidents and/or injuries reported:</i>	Twists and sprains due to falls and stepping into unseen holes; lower back, shoulder and neck strains

Children and youth perform the following steps to carry harvested pods to central cutting area:

Steps in the Process of Carrying Pods to Opening Site
1. When basket is full of gathered pods, bend and pick up the basket and place on top of head.
2. Walk carrying basket on head to central site for opening pods.
3. Bend and flip basket over dumping pods on top of the pile, bending and picking up any pods that roll away from the pile.
4. This step is repeated until all cut pods are picked up off the ground and moved to the central opening site and piled into one large pile.



Once cocoa pods are cut, they are gathered by children and youth and placed in baskets or pans to take to a central cutting site where the pods are opened. The pods shown in the picture are being discarded due to disease. Cocoa pods are fairly heavy. Workers indicated that a fully loaded basket of cocoa pods can weight 20 kilos or more, according to the size of the basket or pan. The risk in carrying this heavy load is injury to the neck, shoulders, and lower back. The workers were most concerned with falling while carrying such heavy loads, as opposed to being concerned about injury to their lower backs due to using improper lifting techniques. The leaves from the cocoa trees make it difficult for workers to see holes or depressions in the ground. Several of the youth reported falls that resulted in their being unable to work for over a month due to leg and knee injuries. All mentioned persistent neck, shoulder and back pain, with some indicating that it caused them to miss several days to weeks of work.

4.3.9 Opening Pods

<i>Equipment:</i>	Short cutlass, sharpening stone
<i>Protective gear:</i>	None
<i>Steps noted by respondents as dangerous:</i>	Cutting open the pods
<i>Reported symptoms following activity:</i>	Upper back, shoulder
<i>Types of accidents and/or injuries reported:</i>	Severed fingers, hand and finger cuts, wrist strain, snake bites*

Children and youth perform the following steps to cut open pods using a short cutlass:

Steps in the Pod Opening Process	
1.	Organize opening process, with individual with short cutlass to open and assistant(s) with basket sitting within arms length to side.
2.	Using rounded end of short cutlass, bend at waist and extend cutlass out, cutting into pod on the top of the pile deep enough to pick it up, and moving and depositing pod into other hand.
3.	Holding pod in opposite hand holding the cutlass, swing the cutlass down striking the pod enough to sever the thick shell of the pod.
4.	Flip the pod over, swing the cutlass down striking the pod making a second cut into the shell of the pod, twist the cutlass to break open the pod exposing the beans, and discard broken piece of the pod shell.
5.	Using the blunt, rounded end of the short cutlass, scoop out the groups of beans and twist to drop cluster of beans into nearby basket.
6.	Toss empty broken shell of cocoa pod away from the pile; drop pods with remaining beans into the basket for assistant to remove remaining beans.



Cocoa pods are opened using a short cutlass that has a rounded edge at the end that is used to scoop out the cocoa beans from the pod. Generally, workers make two cuts into the thick, hard outer pod, avoiding hitting the beans, in order to open the pod. On the second hit of the pod, the worker twists the cutlass and pod to crack open the pod. The beans are then scooped out and dropped into a nearby basket where children are waiting to sort and break up the cluster of cocoa beans. The pods are simply discarded to the side. Numerous youth workers reported severe cuts to their hands that occurred during the process of cutting open the pods. Wrist strains were also mentioned, due to the repetitive twisting. On average, a skilled worker cuts open 12 pods per minute, requiring at least 24 swings and cuts with the cutlass, and 12 twisting movements with both wrists. The length of time required to perform this activity is dependent on the size of the pile of cocoa pods to be opened. The intensity and length of time to perform this activity increases during peak harvest periods.

* Snakes like to burrow under piles of cocoa pods and are discovered when pods are removed.

4.3.10 Sorting/breaking up Raw Beans

<i>Equipment:</i>	Baskets
<i>Protective gear:</i>	None
<i>Steps noted by respondents as dangerous:</i>	None
<i>Reported symptoms following activity:</i>	Severe headaches; pain in hands and wrists; bee stings
<i>Types of accidents and/or injuries reported:</i>	Pricks in hands, fingers and under fingernails, bee stings

Children and youth perform the following steps to break up the cluster of raw cocoa beans:

Steps in the Process of Separating Raw Beans	
1.	After the cluster of raw beans is dropped into the basket, use fingers to, separate beans from central stem.
2.	Toss central stem away once all beans have been separated.
3.	Further break up clusters of beans ensuring that each bean is separated.
4.	Remove any remaining beans from pods that were dropped into basket.



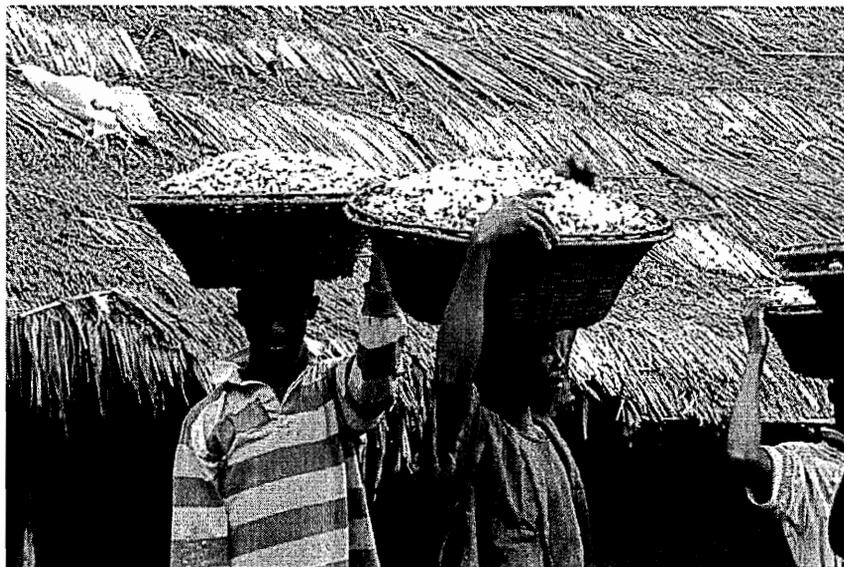
Removing the raw cocoa beans from the pods and breaking up the beans involves lots of little hands. This work activity depends on the size of the pile of cocoa pods to be opened. This pile was approximately four feet deep and ten feet in circumference. It took about two hours to complete this step in the process. The young children involved in this process reported headaches and nail pricks from sorting and breaking up the beans. They were most afraid of being stung by the bees that were abundantly present during this process.

4.3.11 Carrying Raw Beans to the Fermenting Area

<i>Equipment:</i>	Baskets (based on size of basket, when filled, baskets weigh approximately 30 kilos)
<i>Protective gear:</i>	None
<i>Steps noted by respondents as dangerous:</i>	Lifting the heavy baskets of raw beans, carrying the baskets of raw beans to fermenting site
<i>Reported symptoms following activity:</i>	Pain in the lower and mid-back, shoulder and neck pain
<i>Types of accidents and/or injuries reported:</i>	Back, shoulder and neck strains, twist and sprains of ankles and knees, broken wrists and arms, dislocated shoulders

Children and youth perform the following steps to carry baskets of raw beans to the fermenting site:

Steps in the Process of Carrying Raw Beans
1. Once basket is full of raw beans, squat/bend over and pick up basket placing it on top of the head or shoulder.
2. Walk to the fermentation site.
3. Pour cocoa beans in the center of the banana leaves.
4. Return with basket to continue separating beans to fill the basket.
5. These steps are repeated until all of the pods have been open and the beans separated and carried to the fermentation site.



It takes two people to lift a basket of raw, pulp-laden cocoa beans. A basket of raw cocoa beans can weight as much as 10 to 20 kilos, depending on the size of the basket. Once pods are opened, the raw beans are carried to the site where the beans will be fermented.

4.3.12 Fermenting the Cocoa Beans

<i>Equipment:</i>	Large cutlass, quantity of banana or plantain leaves, stakes, small limbs or stalks of banana trees
<i>Protective gear:</i>	None
<i>Steps noted by respondents as dangerous:</i>	None
<i>Reported symptoms following activity:</i>	None
<i>Types of accidents and/or injuries reported:</i>	Bee stings

Children and youth perform the following steps in the fermentation process of the cocoa beans:

Steps in the Fermentation Process
1. Identify site close to area where pods are opened and in location where no standing water would occur if it rains.
2. Clear brush and leaves away from the ground in a large circle (according to amount of beans).
3. Cover ground in area of circle with leaves, ensuring that all ground is completely covered, about three to four leaves deep.
4. Once cocoa beans are piled into the center of the leaves, begin covering the raw beans with more leaves until all of the beans are covered with two to three layers of leaves.
5. Lay stalks or limbs on top of the banana leaves to hold them down in case of wind.
6. Leave for four to five days depending on the weather.



Banana leaves are cut and placed on the ground in an area large enough to accommodate the number of raw beans to be fermented. The cocoa beans are covered with leaves and left to ferment for four to six days. After the beans have fermented the appropriate period of time, the beans will be collected in baskets and taken to the drying mats.

4.3.13 Carrying the Fermented Beans to the Drying Area

<i>Equipment:</i>	Baskets (based on size of basket, when filled baskets weigh approximately 40 kilos)
<i>Protective gear:</i>	None
<i>Steps noted by respondents as dangerous:</i>	Lifting the baskets of raw beans, carrying the baskets of raw beans to fermenting site
<i>Reported symptoms following activity:</i>	Pain in the lower and mid-back, shoulder and neck pain
<i>Types of accidents and/or injuries reported:</i>	Back, shoulder and neck strains, twist and sprains of ankles and knees, broken wrists and arms, dislocated shoulders

Children and youth perform the following steps to carrying the fermented beans to the drying area:

Steps in the Process
1. After the desired period of time allowing the beans to ferment, remove stalks and leaves covering the fermented beans.
2. Bend, place basket at edge of beans, tilted so that the beans can more easily slide into the basket.
3. Extend arms, and repeatedly grab a large section of beans and pull toward the basket until basket is full of beans.
4. With assistant, jointly pick up the basket, until assistant can maneuver to get under the basket and hoist it up onto the assistant's head or shoulder.
5. Assistant turns and carries basket of fermented beans to the drying mats.
6. At the drying mats, assistant lowers basket and empties basket of fermented beans on the top center part of the mat.



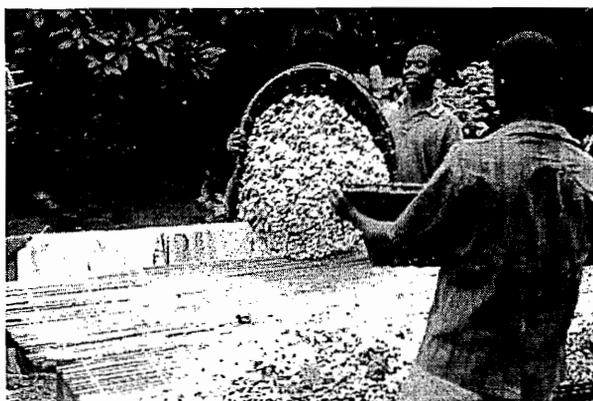
The weight of a basket of raw cocoa beans requires the strength of an adult. The baskets require two persons to lift and help the porter to get a firm hold on the basket. Slips and falls while carrying these baskets is a common occurrence.

4.3.14 Drying the Beans

<i>Equipment:</i>	Drying mat,* baskets
<i>Protective gear:</i>	None
<i>Steps noted by respondents as dangerous:</i>	None
<i>Reported symptoms following activity:</i>	Pain in hands, and lower and upper back
<i>Types of accidents and/or injuries reported:</i>	Pricks in hands, fingers and under fingernails, bee stings

Children and youth perform the following steps to drying the cocoa beans:

Steps in the Drying Process	
1.	Take position on drying mat, lift end of mat upward so that beans do not fall to the ground when pulled toward you.
2.	Bend with outstretched arms, place hands in beans, and pull and push beans spreading them evenly over the drying mat.
3.	Sort through beans and removing any remaining trash and place into basket.
4.	Continue rolling beans back and forth for 30-minute intervals throughout the day for up to three days.
5.	Let beans dry in sunlight, continuing to turn beans for six to 9 days, depending on the weather.



First stage



Third stage

Drying the cocoa beans is a process that goes in stages. The first stage is the most labor intensive requiring the beans to be turned and sorted every 30 minutes during daylight hours for three days. The second and third phase is turning the beans periodically to allow the sun to dry them evenly.

* Drying mats are made of bamboo strips that are tied closely together sitting atop an elevated platform of about 4 feet in height, 15 to 20 feet long, and 6 feet wide. The platform is open underneath to allow air to circulate up through the drying mat. The drying mats are located in an area where they receive direct sunlight for a majority of the day.

4.3.15 Carrying Dried Beans to the Central Shed

<i>Equipment:</i>	Large bags (when filled with dry cocoa beans, bags weigh 60 to 65 kilos)
<i>Protective gear:</i>	None
<i>Steps noted by respondents as dangerous:</i>	Lifting the heavy baskets of raw beans, carrying the baskets of raw beans to fermenting site
<i>Reported symptoms following activity:</i>	Pain in the lower and mid-back, shoulder and neck pain
<i>Types of accidents and/or injuries reported:</i>	Back, shoulder and neck strains, twist and sprains of ankles and knees, broken wrists and arms, dislocated shoulders

Children and youth perform the following steps to carry cocoa bags to the central shed:

Steps in the Process of Carrying Dried Beans
1. Once beans are dried to desired stage on drying mats, place bag at end of drying mat and begin moving beans into bag.
2. Once bag is filled with the dried beans, close bag and sew shut.
3. Bend and with help of assistant, hoist bag onto top of shoulder.
4. Walk to central shed for weighing.
5. Slowly lower bag and place on weighing machine.
6. Once weighed, carry bag to designated area.



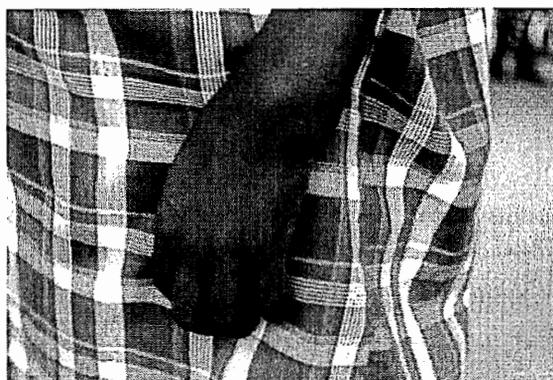
The weight of a bag of cocoa beans is 60 to 65 kilos. Being able to carry and handle that level of weight requires an adult with strong physical capacity. Once at the central shed, the beans may require additional drying before they are finally graded, bagged and loaded on trucks for shipping. At this final stage, the beans are tested, graded for quality, and weighed.

5 OCCUPATIONAL RISKS IN THE COCOA PRODUCTION PROCESS

From a historical perspective, child work is integral to the social fabric of Ghana. Children are considered an investment, with the expectation that they will contribute to the family income and look after their parents in old age. The expectation for children to work does, however, should be coupled with a commitment to keeping children safe.

A key to injury prevention is matching a child's development, supervision, and task with his/her developmental capabilities. Each child's emotional development, thinking processes, and physical growth vary. A child's development is influenced in many ways: by the family's background and the influence of friends and education. Each child's growth and development should be considered unique. Strategies for injury prevention may overlap across ages depending on the child's developmental progress.

Injuries often occur when children are doing something that is beyond their mental, physical, or emotional ability. As children grow and develop, their behavior, as demonstrated through play and work habits, changes considerably. As a result, their susceptibility to certain types of accidents and injuries may increase. Understanding children's developmental stages is a crucial factor in determining work tasks appropriate for a child and in implementing appropriate safety procedures to prevent serious injuries or even death.



Mohammad, 13, suffers permanent wrist and arm damage due to a fall that occurred at age six. He was carrying items too heavy, tripped and fell on his left arm breaking his wrist and arm. He is in school, but does not know what type of work he may be able to do when he is older. He would like to be a truck or taxi driver.

Physical readiness is an important factor in a child's ability to handle tasks. Equally important in determining readiness are a child's mental, emotional and social development. Particularly in rural agricultural communities, parents and producers are the primary safety trainers with responsibility for assigning and supervising tasks. This becomes more difficult as children and youth develop, because they mature at different rates. A child of 10 to 12 may have the physical strength and seeming responsibility to handle the spraying of pesticides, however, when a dangerous situation suddenly arises, the child may not possess the cognitive ability to perceive and react quickly to the crisis. Child development specialists generally agree that few children under the age of 14 can anticipate or handle danger.

Since parents are the decision-makers, they need to be aware of how children develop before assigning them work tasks. While a child may not be ready to handle all aspects of a job, the job may be safely separated into parts that a child can handle at certain developmental stages. Critical to this, is parents setting a good example by practicing safety in their own day-to-day

work activities. The information derived from the job risk/ergonomics review can help service providers ensure that parents and communities understand the risks and know ways to minimize these risks for children in the future.

5.1 Hazardous Activities

Based on the results of the review, the most hazardous activities in which children and youth are currently engaged appear to include a majority of the steps in the following task areas:

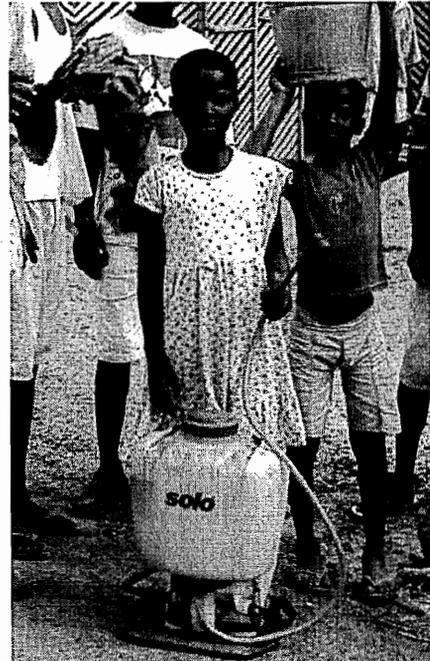
- clearing virgin forests and weeds, particularly using the chain saw;
- pruning the trees, when it requires climbing heights above 9 feet;
- mixing, loading and applying of pesticides;
- harvesting the pods, either by soso or long cutlass;
- opening the pods using short cutlass; and
- transporting heavy baskets and/or bags of pods and beans for long distances.

While these major tasks contain some of the most hazardous activities, there may be some steps within these processes that are acceptable for some older youth to perform; however, children's involvement in these activities is highly questionable. Some tasks not listed above could place a child's health and safety at risk. For example, sorting raw cocoa beans is, in general, considered a safe activity. However, further study is needed to determine whether contact with the treated cocoa pods may increase a child's exposure to pesticide residue as suggested by the severe headaches that the children experience following completion of this task.

Helping families to understand the calculated risks against the minimal gains of their children's work will require considerable education and attitude change within the communities, but also with the children themselves.

5.2 Potential Acute and Chronic Risks

During the review, several occupational safety concerns were identified. Chemical hazards, heat stress, skin disorders, and potential increased risk of cancer due to sun and chemical exposure were evident. The following areas need to be addressed to ensure that stronger protections are afforded to cocoa workers, including children, youth, producers, and for the community at large.



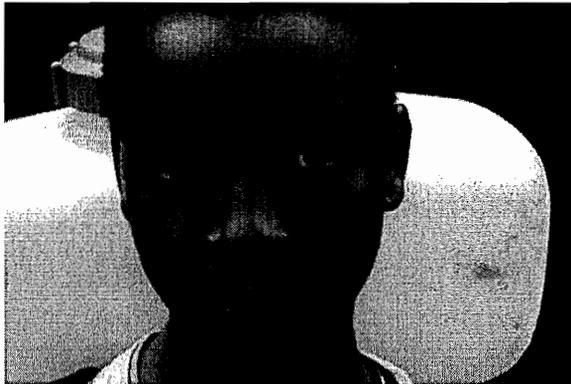
Ruth, 12, helps her father when he sprays pesticides. She stays within 10 feet of her father at all times while spraying in case he needs her. She helps her father put on and take off the hand pump sprayer and balances the sprayer on top of her head to carry it home for him after he finishes spraying. They spray every three weeks. She does not like it when the sprayer drips on her, because it stains her clothes. Her skin and eyes itch when she helps her father, but she does not understand why.

5.2.1 Chemical Hazards

The greatest concern related to the potential for acute and chronic risks lies with the exposure to chemical hazards. Youth, as young as 14, work as pesticide applicators, and children, as young as 10, assist applicators coming into direct contact with pesticides. Likewise, even younger children are at risk of exposure due to chemical spills when mixing and loading the sprayers, inappropriately discarded pesticide containers, storage of chemicals and sprayers inside housing, drift during pesticide application and contact when walking through and playing in treated areas.

In many cases, no protective gear was reported as used by the cocoa workers. However, in those cases where special clothing was mentioned, it included boots, a spraying coat and Afro Moses sandals (made locally of thick rubber with open toes). In some cases, a separate building is used to store chemicals and sprayers. However, because the sprayers are often rented, it was found that these were more often stored in the home for safekeeping. Empty pesticide containers or packets were simply tossed aside with no regard for proper disposal. Washing and changing clothes after the pesticide application was also not regularly reported, except by adults whose primary job is pesticide application.

As a result, many agricultural workers and others are dangerously exposed to chemicals on a daily basis. If they do not observe proper precautions, illness or even death may occur. Pesticides most commonly enter the body through skin contact and inhalation. To reduce dermal (skin) contact and inhalation of pesticides, individuals operating the sprayers and their assistants should wear personal protective clothing and equipment. When using diluted pesticides, they should wear chemical-resistant coveralls or an apron. When handling concentrates during mixing and loading, a face shield, unlined rubber gloves and boots, and a lightweight rubber apron should be worn. Boots and aprons should be washed daily with soap and water and dried thoroughly, inside and out, to remove pesticide residues. The individuals operating the sprayers should take necessary precautions to shower immediately following pesticide application. All clothing worn while handling pesticides should be washed daily and separately from other clothing.



Sarah, 14, works as an assistant pesticide handler with her older brother, carrying the spraying equipment to and from the farm, and fetching the water and the chemicals. Her eyes, which are very bloodshot, sting and itch due to the spray. She has rashes on her face, neck, and arms. She and her brother use no protective gear.

Mixing and loading sites should be in isolated areas away from children and other community members. No pesticide application should occur while children and other community members are present. Immediately following pesticide application and for an appropriate period of time following the application, reentry into the treated site should be avoided. At no time should children or youth serve as assistants to the applicators, handle the chemicals, or sprayers, or have any other direct contact with the chemicals.

5.2.2 Heat Stress

Numerous children and youth describe symptoms that mirror heat stress and dehydration following very strenuous work activities. These include headaches, dizziness and nausea. These symptoms were described when performing such tasks as clearing forest areas and weeding. These work activities require a great deal of physical exertion and are performed for long periods of time. While these workers are more used to the sun and heat due to living and growing up in a tropical environment, the children's level of tolerance is still not as great as the adults. Yet, it was found that children perform the work activity for similar number of hours and perform tasks in the same manner as the adults, without taking frequent breaks and drinking lots of water.

Heat stress occurs when the body builds up more heat than it can handle. High temperatures, high humidity, sunlight, and heavy workloads increase the likelihood of heat stress. Common symptoms of heat stress are headaches, dizziness, thirst and, in severe cases, nausea, vomiting, chills, disorientation, and fainting. People who are accustomed to working in the heat are less likely to suffer heat stress. However, children and older persons are more susceptible. Frequent breaks and drinking plenty of fluids before, during, and after work are the best prevention.

5.2.3 Skin Disorders

Children and youth working in cocoa production often experience rashes and itchy and burning skin, especially among those who work either directly or indirectly with the application of pesticides. With considerable disregard for pesticide safety, the risk of dermal exposure to pesticide residue is high.

Contact dermatitis is a skin disorder that occurs among agricultural workers. There are two general categories: irritant and allergic. Irritants act directly on the skin at the place of contact. Allergic sensitizers, however, cause changes in the immune system so that subsequent contact produces a reaction. Phototoxic or photo allergic reactions occur when light, in combination with certain substances, causes skin disease. Other types of agricultural dermatitis include heat rash, origin infections, and insect and plant irritations. A number of factors predispose an individual to dermatitis, such as age, sex, race, temperature and humidity, previous skin disorders, skin damage, and personal hygiene. Work-related skin diseases are often easy to detect. Chemicals and other agents to which an individual has been exposed increase the risk of dermatitis. Wearing proper protective clothing and washing frequently are the most effective means of prevention.

5.2.4 Cancers

With the level of repeated, intense and long-term exposure to the sun and chemicals, the potential risks of certain types of cancer are increased. The workers know little about these risks. The team observed that most undertook no prevention to reduce these risks, such as wearing protective clothing or other gear.

Skin cancer, the most common form of cancer, is a concern on the cocoa farm due to the long hours producers and workers spend in the sun and the intensity of the sun due to the location near the Equator. There are three major types of skin cancer: basal cell carcinoma, squamous cell carcinoma, and malignant melanoma. Basal cell carcinoma is the most common form. It rarely spreads, but if left untreated, can spread to underlying tissues and destroy them. It usually occurs as a small, shiny, pearly nodule that may ulcerate and crust. Squamous cell carcinoma, although rarely life-threatening, is more dangerous than basal cell carcinoma because it spreads more rapidly. It may begin as a nodule or as a red, scaly, sharply outlined patch. Malignant melanoma is the least common, but most deadly, type of skin cancer. It starts as a small, mole-like growth that increases in size and forms irregular borders. It may change color, ulcerate, or bleed from a slight injury. Melanoma is completely curable in its early stages, but if left untreated, spreads rapidly through the lymph system.

Additionally, some studies have shown that farmers may be more at risk of leukemia and lymphoma. Agricultural causes of these concerns have not been conclusively identified, but agents of concern include nitrates, pesticides, viruses, antigenic stimulants, and various fuels, oils, and solvents. All of these agents can be found in the cocoa producing communities.



Girls often assist family members by carrying pesticide sprayers, in addition to other cocoa work activities and household chores.

5.3 Developmentally Appropriate Work Tasks

The following table identifies the growth stages of children, ages, developmental characteristics, and suggests developmentally appropriate tasks for each age group. Further analysis may be helpful in order to predict those tasks and specific steps that have a greater likelihood to cause accidents and injuries, and offer preventive strategies.

Child Development and Appropriate Work Tasks¹²

Growth Stage	Developmental Characteristics	Developmentally Appropriate Work Tasks
Birth to 4 Years (infant/ toddler/)	<ul style="list-style-type: none"> • Rapid growth, beginning motor skills development • Has balance problems, slow reaction time 	<ul style="list-style-type: none"> • None. Children this age should not be exposed to work hazards.

¹² Adapted from Murphy, D., Ph.D., *Children and Safety*, Pennsylvania State University, 1997.

Growth Stage	Developmental Characteristics	Developmentally Appropriate Work Tasks
preschooler)	<ul style="list-style-type: none"> • Is curious, exploring • Is fascinated by movement • Has illogical or “magic” thinking • Is very energetic, releases tension by playing, even when exhausted • Is self-centered but interested in group activities 	
5 to 9 Years (preschooler/ elementary school age)	<ul style="list-style-type: none"> • Is learning to use small and large muscles—slow, steady growth stage • Has poor hand-eye coordination • Tries to master more complex skills • Operates with concrete facts, not capable of abstract ideas/thinking • Wishes to appear competent; seeks parental approval • Wishes to take on tasks without adult supervision • Is discovering that parents make mistakes, are human • Rarely follows through on a task—not yet ready for responsibility 	<ul style="list-style-type: none"> • Tasks of short duration that do not require hand-eye coordination • Activities using hand tools, but not sharp cutting tools • Help with watering plants, and feeding small animals • Gather/collect eggs • Should not be involved in clearing virgin forest areas or working in dense brush/weeds • Should not be involved in carrying fermented cocoa beans or bags of dried cocoa beans • Should not be involved in any aspect of mixing, loading or applying pesticides, including fetching water that would place them into the area where pesticides are mixed or loaded into sprayers
10 to 13 Years (middle-school age/ early teen)	<ul style="list-style-type: none"> • Is growing at a steady rate—approaching puberty; boys grow more quickly than girls • Small muscles are developing rapidly • Has same coordination as adults but lapses of awkwardness are common • Has greater physical and mental skills 	<ul style="list-style-type: none"> • Hand raking, digging, assisting with planting of cocoa seedlings • Extracting cluster of cocoa beans from pods by hand and separating cocoa beans • Helping to dry cocoa beans • Use of small hand tools • Handling and assisting with animals • May be ready to carry small containers based on size and

Growth Stage	Developmental Characteristics	Developmentally Appropriate Work Tasks
	<ul style="list-style-type: none"> • Desires peer and social acceptance • Wishes to try new skills without constant adult supervision • Signs of independence emerging • Success is important for self-concept 	<p>physical ability</p> <ul style="list-style-type: none"> • Should not be involved in any aspect of mixing, loading or applying pesticides
<p>14 to 15 (adolescent/ young teenager)</p>	<ul style="list-style-type: none"> • Is growing rapidly and changing physically; can be a difficult and uneasy time • Girls growing faster than boys • Has moved from concrete thinking to abstract; enjoys mental activity • Can find solutions to own problems, but still needs adult guidance • Feels need to be accepted by peers • Resists adult authority • Feels immortal 	<ul style="list-style-type: none"> • Still needs adult supervision, but ready for more adult jobs, such as maintenance of some non-cutting equipment (not pesticide sprayers) • Gradually increase tasks as experience is gained • Manual handling of animals • May be ready to carry appropriate sized small loads based on size and physical ability • With appropriate training, experience and proper safety gear, can assist with and handle cutting and gathering cocoa pods with small cutlass, preparing the fermentation site, and planting, weeding and thinning cocoa seedlings at farm site • Should not be involved in any aspect of mixing, loading or applying pesticides or serving as an assistant
<p>16 to 17 Years (middle/older teenager)</p>	<ul style="list-style-type: none"> • Awkwardness overcome, mastery of small and large muscles basically complete • Knows abilities, moving further away from family and into community as independent person • Feels immortal • May act like child one day, adult the next 	<ul style="list-style-type: none"> • May be ready to work with soso and large cutlass for short periods, but must earn this responsibility • Carrying appropriate sized loads based on size and physical ability • When trained, maintaining equipment and tools • Should not be involved in any aspect of mixing, loading or applying pesticides, however may

Growth Stage	Developmental Characteristics	Developmentally Appropriate Work Tasks
	<ul style="list-style-type: none"> • Rebellion, risk-taking, aggressiveness typical behaviors • Consistent treatment from adults important • Need independence and identity • Has increased sense of adult responsibilities, thinking of the future • May experiment with drugs or alcohol 	work as assistant to pesticide applicator (if does not come into direct contact with pesticides)

Some existing awareness of the physical development of children in delegating work activities provides an excellent foundation for further community education. Additionally, it would appear that children, youth and their parents would be receptive to learning more through a curriculum, radio social messaging, and other strategies.

5.4 Applying Worker Limits

Working safely and avoiding injury in cocoa production depends on understanding worker limits and applying them to real work situations. Some work situations can cause specific repetitive motion health-related problems or work-related injuries, such as “Raynaud's Syndrome” (white fingers) and “carpal tunnel.”¹³ These injuries are caused from repeated and extensive exposure of the hands and feet to vibration (white fingers) or the repeated stress on the hands and wrists from some constant repetitive motion (carpal tunnel) required.

In general, workers need to be aware of their children’s limits when working in these types of agricultural tasks. These limits can be classed into three areas:



Children seize the opportunity to play in the dried cocoa beans.

¹³ Wilkinson, R. and Tilma, A. 2002. *Knowing Your Limits Prevents Manual Labor Injuries*. East Lansing Extension Service, Michigan State University, 2002.



- Physical
- Physiological
- Mental and emotional

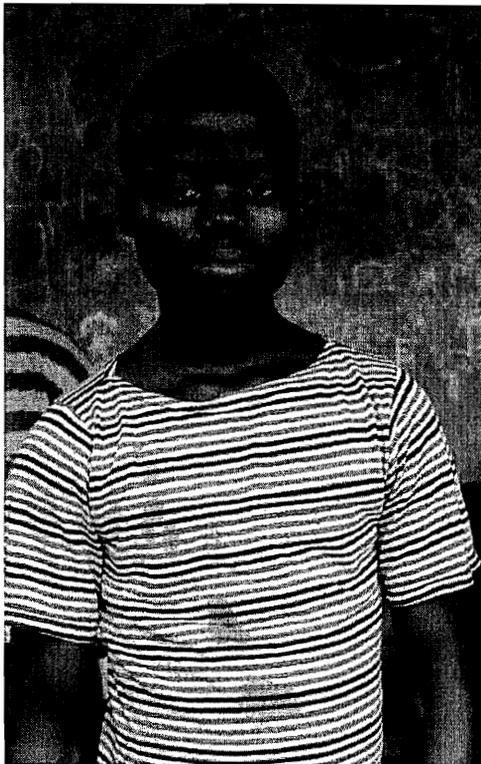
Physical Limits:

The limits of physical activity are determined by the individual's size, height, weight and body type. There are limits to performance that, when exceeded, can lead to unsafe work situations. For example, a worker can only reach so far or lift so much. If the task requires the worker to go beyond these limits, then help should be sought. This help could come in the form of a ladder, long-handle shovel, cart, or someone who provides an extra hand. The team observed an example help being provided when lifting baskets of fermented beans so that worker did not place themselves at risk by straining and exceeding their limits.

Physiological Limits:

Muscle tone, physical fitness, rest, good health, and nutrition, and freedom from drug or alcohol effects determine physiological limits. For children and youth, these characteristics are linked to their developmental stage. A person's physiological limits can also vary from day to day and season to season. Illness, fatigue, and lack of food or nutrition are things that affect the worker's limits on a more routine basis. Education for work safety needs to communicate that the wise workers will pay attention to these factors and provide what the body requires (i.e., frequent short rest breaks, clean air and water, good food, and adequate sleep). Experience and sensitivity to the body's warning signs can usually prevent a worker from exceeding physiological limits. However, younger children who are seeking peer and adult respect may push themselves to attempt more than they are physically able to perform. For that reason, adult understanding of limits and supervision is required.

Mental and Emotional Limits: Mental and emotional limits are usually more difficult to predict and often will change from day to day, depending on a worker's stress level. Although a worker's basic mental capacity may not change, their emotional state can have a profound effect upon work performance. For example, when a person is angry, has interpersonal (upsetting) problems, or is preoccupied (finances, relationships, family issues, etc.) they may be distracted to the point where risk of accidents and injuries increase. Lastly, workers with a "who cares" attitude or younger workers who developmentally cannot focus are safety hazards to those who must rely on their job performance. Such individuals should not be in a position where the safety and health of others depends on their job function.



At age 13, Adu learned how to spray pesticides from his grandfather. He now has one year of experience as a pesticide applicator. He performs all tasks associated with pesticide applications, including mixing, loading, and applying pesticides using a hand pump sprayer. His spraying time is from 6:30 am to noon. The only training he has received is from his grandfather who taught him how to operate the sprayer and do minor repairs when it leaks. He does not use a mask, eye guard, or gloves. He sometimes wears boots, but mostly sandals, and a short sleeve shirt and long pants. He says that after spraying, his eyes sting and he itches a lot on his face and arms. His worst accident he recalls is when he fell into a pit while spraying. He was looking up and didn't see the edge and fell with his sprayer on his back. He said that "hurt pretty bad."

Avoiding injury and working safely in cocoa production depends on understanding worker limits and applying them in real work situations. The following table recommends some steps that can be undertaken to prevent possible cocoa work injuries:

Manual Work-related Cocoa Production Injuries

Disease/Injury	Symptoms	Possible Cocoa Work Sources	Possible Steps for Protection
Eye injuries	Debris falling into eyes	Looking up into canopy of cocoa trees while cutting with soso or large cutlass.	Wear protective eye gear.
Neck pain	Sore or stiff neck	Improper lifting and carrying excessive weight on head or shoulder, extended periods of time looking up.	Carry less weight and use proper lifting techniques; take periodic breaks and perform strengthening exercises for the neck.
Back pain	Sore back	Long periods working in bent or stooping position, improper lifting/bending techniques, and use of short handle cutting instruments.	Take periodic breaks, perform stretching exercises, carry less weight, and use proper lifting/bending techniques.
Hand/skin injuries	Cuts, blisters	Use of short handle cutting instruments.	Protect hands with gloves, feet with boots, remove or cover sharp edges.
Carpal Tunnel Syndrome	Sore joints of hands, wrists, etc.	Constant, repeated motions over a long period of time (i.e. cutting weeds, opening pods, etc.).	Take periodic breaks; slow down the process.
Raynaud's Syndrome (white fingers)	Numb fingers, hands	Long periods using a long and short cutlass that vibrates due to repetitive impact; vibrations from holding the chain saw.	Take periodic breaks; use hand exercises.
Heat Stress/ Dehydration	Headaches, dizziness, nausea, vomiting, fainting	Working without break in high heat/temperatures without taking breaks or drinking sufficient amounts of fluids.	Take periodic rest breaks and drink plenty of fluids.
Slips/falls	Bruises, strains, broken bones, joint or muscle pain	Slipping on discarded pods and cocoa bean pulp, damp leaves, falling into holes covered by leaves, and falling from trees.	Clear and maintain walking paths or surfaces; flag holes that are often hidden by leaves.
Snake bites/ insect stings	Pain, swelling, paralysis, death	Working in forest areas with high grass and brush.	Protect feet with boots and hands with gloves.

6 FINDINGS

The team drew the following conclusions from its review:

6.1 General Working Conditions of Children

The team found that children and youth perform activities in the same manner and follow the same approach to work as adults. Community members have, in practice, begun the division of cocoa work tasks based on physical capabilities. For example, only physically strong young men over 16 were observed carrying the heavy baskets of fermented and dried beans. It was found that many children began some aspect of work in cocoa production around the age of six with increasing levels of responsibility until they reached the age of 15. If they are physically fit, at the age of 15+, they begin performing the same tasks as adults. However, there were some exceptions, largely in migrant and/or sharecroppers families where younger children served as independent workers. Children and youth work an average about 7 hours per day, a few hours less than adults. The majority of children and youth reported departing for work between 6:00 am to 7:00 am and returning to the community from work between 2:00 pm to 3:00 pm.

6.2 Lack of Enforcement of Child Protective Regulations

As is often the case in rural agricultural areas, with a general lack of awareness and limited enforcement, the child protective laws, in practice, do not exist. Children were involved in hazardous activities, such as the mixing, loading, and spraying of pesticides at a younger age than the law allows, and violations of the law were observed.

6.3 Work Task Differences between Migrant and Cocoa Sharecropper Children

The children of sharecroppers and migrant families from northern Ghana and Togo appear to begin work at an earlier age, work for longer hours each day, and perform job tasks that are more hazardous, including pesticide application. Children of cocoa producers—those who own the land and farm—appear to be performing appropriate child work activities and attend school. They generally work for a few hours after school and on weekends. Children in school were not found to be involved in the more hazardous activities, such as pesticide application or clearing virgin forest areas.

In-country migrant workers were evident in a majority of the communities. These migrant workers were families who have migrated for employment from the Upper West and Upper East regions of Ghana. Former migrants from Togo who are settled and have been residing in the communities for some time were interviewed in several communities.

There was evidence of some unaccompanied children who were working as apprentices in cocoa production and as domestics in the households of large cocoa producers. While signs of abuse were not readily present, further examination of their individual situations needs to be performed. Trafficked children were not evident to the study team during its review. However, further examination of some communities during the peak harvest period needs to be conducted, especially farming communities with farms in excess of 100 acres that hire migrant workers.

6.4 Pesticide and Other Worker Safety Training and Research Needed

Young children consistently reported experiencing headaches following the handling of cocoa pods, extracting the seeds from the pod, and removing the seeds from the stem. This process results in the children's hands being heavily coated with the raw cocoa pulp. The team noted that while working children often placed raw cocoa seeds in their mouths to eat the pulp, spitting the seeds back into the basket once the pulp was removed.

The cause of the reported headaches is not known. The composition of cocoa pulp fresh from the opened ripe pod is: 85 percent water, 10 to 14 percent sugars, and the balance minor components including pectin and protein. Given the small volume of pulp children ingest, eating pulp does not appear to be the cause of the headaches. The cause may be the children's contact with pesticide residue on the pods, which they ingest by using their hands to place raw cocoa seeds into their mouths.

7 RECOMMENDATIONS

Based on the interviews, focus groups and data gathered, the following recommendations are offered for consideration with respect to the activities of children and their work in cocoa production. This includes recommended content for the youth education life skills curriculum and for the development of key messages in a radio social messaging campaign.

7.1 Approach to Education and Training for Occupational Safety

The children of sharecroppers and migrant families from outside of the western region and Ghana appear to begin work at an earlier age, engaged in work for longer hours each day, and are performing job tasks that are more hazardous, including pesticide application. These children are generally not in school. This group of children appears to be at greater risk. Therefore, it is recommended that these children, their parents and their employers should be the target for education and radio social messaging activities. This should include information regarding the governing laws and regulations, as found in Chapter 2, and worker health and safety training and key messages.

It will be important to undertake a holistic approach, addressing training, awareness-raising, and community consensus building from multiple levels. A broad-based approach will help to mobilize the community around providing a safer environment for children to grow and learn while continuing to maintain production levels. If positive change is to occur, it is essential that recommendations are practical, low-cost and reasonable so that the communities will embrace them. While it would be ideal to say that workers must use personal protective equipment (PPE), reality forces a level of practical application. Working with the communities to strategize about how to apply worker safety with constraints of limited resources will be critical. Developing key partnerships within the community is essential. This can include forming partnerships with schools and teachers; developing teen peer education/mentoring activities or strategies; involving parents; linking with other training and education programs, including health care providers; working with employers and producers; and reaching the broader community, their leaders and decision makers.

Whether implementing worker safety training on a cocoa farm in Ghana or an apple farm in the United States, the following five general principles for safety on a farm should be kept in mind:

- farm safety is everyone's responsibility,
- risk is a part of life, simply because people and technology are not perfect,
- risk can be reduced by paying attention to the cause of accidents and changing work habits,
- there is usually more than one way to prevent an accident, and
- an individual's perception of risk is not always accurate.

7.2 Curriculum and Radio Social Messaging Content

Based on the job risk/ergonomics analysis, the following key areas are of primary importance for inclusion in the worker safety education curriculum and key radio social messages:

- Pesticide safety
- Use of personal protective equipment/clothing/gear
- Safe bending, lifting and carrying techniques
- Avoidance of slips, trips, and falls
- Safe use and maintenance of tools
- Prevention of repetitive motion
- Heat stress prevention

Primary messages on each of these areas need to be imparted to the target audience using effective interactive instruction methods and applied learning approaches. Training must be practical and appropriate for the communities and target audiences.

7.2.1 General Farm Maintenance

Safety on the farm can be addressed as part of an overall maintenance campaign to “clean up” the farm site. This can, in general, help to address several areas of concern, including but are not limited to: proper disposal of pesticide containers; clean-up of contaminated areas; tool and equipment maintenance; proper storage of equipment and chemicals; clean-up and storage of protective gear; and flagging of holes or depressions in the farm work areas to prevent falls. Overall, if farm sites are kept clear of unnecessary debris, holes or depressions are flagged for future work activity; this can help to prevent accidents or injuries before they occur. The key is identifying potential problem areas and then taking steps to ensure that preventive measures are undertaken before an accident occurs.

7.2.2 Pesticide Safety Education

The job risk analysis suggests that the risk of exposure to pesticides is extremely high in cocoa producing communities of the western region, due largely to the lack of training and awareness about the chemicals and the lack of minimum safety procedures. The job risk analysis showed a very limited understanding and awareness about pesticides and their potential dangers.

Additionally, hospital and health services personnel have received no training on recognizing, diagnosing, and treating cases of pesticide exposure. Further training is needed for doctors, nurses, health service providers and other hospital personnel about the recognition and treatment of pesticide related injuries and/or illnesses.

Several key messages need to be included within the educational materials and other communication strategies used within the communities:

7.2.2.1 *Children May Be Particularly Sensitive to Pesticides*

Infants and children may be more sensitive to health risks posed by pesticides for several reasons:

- their internal organs are still developing and maturing,
- infants and children eat and drink more than adults, in relation to their body weight, possibly increasing their exposure to pesticides in food and water;
- climbing the cocoa trees, playing in areas where chemicals are mixed or applied, putting objects in their mouths increase a child's exposure to pesticides.

Additionally, pesticides may harm a developing child by blocking the absorption of food nutrients necessary for normal healthy growth. If a child's excretory system is not fully developed, the body may not fully remove pesticides. Also, there are "critical periods" in human development when exposure to a toxin can permanently alter the way an individual's biological system operates.

7.2.2.2 *Basic Pesticide Safety Needs to Be Taught*

Training is key for the proper use of pesticides and successful protection of cocoa producing communities, especially children. This training is important for producers, workers and community members alike, although the degree of training varies depending on the direct involvement with pesticide handling and exposure. The most critical groups to be targeted for training are: 1) those who are handlers who are involved in the mixing, loading, and applying of pesticides, and 2) workers directly exposed to pesticides during the course of their work in cocoa production.

The training provided must use non-technical terms that can be understood and presented in a manner that promotes increased understanding and application of the knowledge gained. Interactive, hands-on training is preferred with applied learning activities, music, dance, games and other exercises. The content of such training should include:

Hazards:

- hazards of pesticides resulting from toxicity and exposure, including acute and chronic effects,
- hazards from drift and chemical spills in the mixing and loading sites,
- hazards from pesticide residues on clothing and proper washing of contaminated work clothes and the body,
- environmental and health risk concerns such as drift, runoff, and wildlife hazards,

- signs and symptoms of common types of pesticide poisoning,

Prevention:

- how to prevent pesticides from entering the body,
- appropriate protective gear and wearing protective clothing,
- safety in handling, transporting, storing, and disposing of pesticides, including general procedures for spill clean-up,
- where an individual can come into contact with pesticides,
- proper maintenance and storage of pesticide application equipment.
- proper disposal of pesticide containers, including warnings about taking pesticides or pesticide containers home, and
- re-entry intervals and posting of areas treated by pesticides,

Treatment:

- emergency first aid for pesticide injuries or poisonings,
- routine and emergency decontamination procedures, including emergency eye flushing techniques,

Each of these topic areas are important as pesticides, once applied, have an environmental health impact on the community at large. Laboratory studies show that pesticides can cause health problems, such as birth defects, nerve damage, cancer, and other effects that might occur over a long period of time. These effects depend on how toxic the pesticide is and how much of it is consumed or the amount of exposure. Safety education and information can help to raise the awareness level in cocoa production so that the risk of exposure can be reduced. Also, identifying and training persons to serve as health or safety ombudsmen in the communities could be a sustainable strategy.

For each of the pesticides that are used in the communities, fact sheets should be produced. Training for producers, workers and community members should be customized to address the signs and symptoms of acute and/or chronic exposure of each pesticide used, and to understand the precautions that are needed to reduce the level of risk. The training should be implemented in such a way as to avoid scare tactics or inciting fear. The message is that pesticides can be safe—when proper precautions are undertaken and if appropriately used. The training can also present other, more cost-effective alternatives to the use of pesticides that can yield positive results, such as organic cocoa production and the use of integrated pest management (IPM) practices.

7.2.2.3 *Integrated Pest Management (IPM) Practices—A safer and more cost-effective alternative to widespread pesticide applications.*

In technical terms, IPM is the coordinated use of pest and environmental information with available pest control methods to prevent unacceptable levels of pest damage by the most economical means and with the least possible hazard to people, property, and the environment. IPM is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programs use current, comprehensive information

on the life cycles of pests and their interaction with the environment. The IPM approach can be applied to both agricultural and non-agricultural settings, such as home, school and gardens.

IPM takes advantage of all appropriate pest management options including, but not limited to, a cautious use of pesticides. In contrast, organic food production applies many of the same concepts as IPM but limits the use of pesticides to those that are produced from natural sources, as opposed to synthetic chemicals. The chemicals that were observed and used within the communities were all synthetic pesticides.

It will be important for cocoa producers and workers to understand that IPM is not a single pest control method but, rather, a series of pest management evaluations, decisions, and controls. In practicing IPM, it will be helpful for producers and workers who are aware of the potential for pest infestation to follow a four-tiered approach that includes: setting action thresholds, monitoring and identifying pests, prevention and control.

7.2.3 Use of Protective Gear and Proper Work Clothing

Nearly all workers reported minor to very serious cuts from use of the long and short machetes—some resulting in permanent physical disabilities. Abrasions, burns, contusions, punctures, rashes, snakebites and stings were reported in varying degrees—some of a very serious and life-threatening nature. When asked how to make the job of working in cocoa safer, the most frequent response mentioned was having access to and using protective equipment or gear, yet those were seldom observed in use. A curriculum should discuss the types of protective gear and clothing that are available and the work contexts in which they should be used. These included boots, gloves, spraying coats, protective eyewear, hats and chemical cartridge respirator.

7.2.3.1 Protective Clothing for Handling and Using Pesticides

It is important for workers to protect themselves from risks, particularly exposure to pesticides, as chemicals can enter the body via inhalation, ingestion, and absorption through the skin, eyes, mouth, and nose. The label on a pesticide container will clearly indicate the type of protective clothing or gear that is necessary for the pesticide that is being used. This is generally referred to as personal protective equipment or PPE. Depending on the pesticide and how it is applied, a range of protective clothing may be needed:

- Head coverings – hat with brim, especially when spraying pods overhead and up in the canopy of the cocoa trees
- Body cover – long-sleeved shirt, long pants
 - Avoid: shorts or skirts/dresses, t-shirts, sleeveless shirts or tops
- Eye protection – safety glasses or goggles that have brow and side shields
- Hand protection – waterproof or chemical resistant gloves
 - Avoid: fabric or thin latex gloves
- Foot protection – closed, nonabsorbent shoes or boots, worn with socks
 - Avoid – open shoes, such as flip-flops or Afro Moses sandals; fabric shoes, such as sneakers; other cloth or leather shoes that are absorbent and difficult or impossible to clean adequately.

Protective clothing and gear should be worn from the moment the worker starts handling the pesticide product, including when:

- opening the pesticide container,
- mixing or diluting the pesticide,
- handling the pesticide sprayer,
- cleaning up contamination site if pesticide is spilled,
- carrying the pesticide sprayer to and from the application site,
- applying the pesticide,
- cleaning up after applying,
- disposing of pesticide waste, and
- coming into contact with freshly treated surfaces.

After completing pesticide application and cleanup, protective equipment or gear should be properly cleaned and stored:

- wash rubber gloves and/or boots before taking them off,
- remove (as soon as possible) the clothing worn during application,
- launder the clothing and gloves and boots (inside and out) separately from other items, so that pesticides do not spread to other clothes,*
- wash from head to toes to ensure no residue remains, especially if pesticides were spilled on the clothing,
- be careful not to come into contact with the treated area after removing the protective clothing, at least until after the re-entry interval as specified on the pesticide label, and
- do not use PPE for other purposes, such as reusing boots for clearing and weeding.

7.2.3.2 Protective Clothing While Performing Other Non-pesticide Related Work

Dressing appropriately for the job activity can play a significant role in reducing the risk of non-pesticide related accidents and injuries. Over exposure to the sun, dermal rashes, minor abrasions, bites and stings, serious cuts and other injuries, etc., are prevented when the proper clothing is worn during periods when the exposure risks are high. The curriculum will discuss the different kinds and uses of the following protective clothing or gear:

Eye protection is important when workers are pruning the cocoa trees or using the soso or cutlass to remove cocoa pods from the trees. Debris that is dislodged and falls can cause serious injury to the eyes. Safety glasses, goggles or face shield should be considered. The practical rule is to select the right protection for the type of hazards that are likely to be encountered.

* There are specific laundering techniques recommended for pesticide contaminated clothes and gear. Proper care should be given when laundering and cleaning PPE and clothing so that laundress is not exposed to pesticide residue.

Hearing protection is needed when working with or around the chain saw. Acoustical earmuffs provide the most effective protection against noise, but is likely unrealistic and too costly for most cocoa workers. Lower cost alternatives can be pursued, such as using cotton to plug the ear canal, using a head bandana to hold the cotton in place.

Hand protection is needed when cutting open cocoa pods, sorting raw cocoa seeds and drying cocoa beans. These can help to prevent cuts, nail pricks and hand and arm exposure to possible pesticide residue on the cocoa pods. While gloves may seem a practical solution in some cases, such as pesticide handling, other aspects of cocoa production require intensive hand labor making the use of gloves impractical. However, if gloves are to be used, they need to fit properly. Gloves that are too big are cumbersome and can actually create greater risk of injury.

Respiratory protection is needed when the workers are exposed to dust or smoke or when an individual is allergic to certain types of grasses, weeds and pollens. Low cost filter masks are readily available in many areas of Ghana and are most frequently used by pesticide handlers. Should these masks not be available, a cloth bandana tied over their nose and mouth that provides some protection; however, pesticide handlers should wear a chemical cartridge respirator when applying pesticides.

Sun protection is needed due to the repeated daily exposure to the sun over a number of years increasing an individual's risk of developing a number of health problems including: aging, wrinkling, and drying out of the skin; skin cancer; lip cancer; and damage to the eyes. Ultraviolet rays can be harmful to any person, even if they have dark skin and hair. Solar radiation is strongest between 10:00am and 3:00pm, the time periods reported as the most frequent work hours by respondents. It is especially important to protect skin against the sun during these hours. Choosing the right clothing can help to limit the exposure to the sun, as well as taking opportunities to limit the time in the sun and taking breaks in the shade or indoors. Clothes to be worn should include lightweight, tightly-woven shirts and long pants. Light colored cotton is most comfortable under tropical conditions. Garments should fit comfortably and not too tight. Loose or floppy clothes should not be worn if operating chain saw machinery or spraying equipment. Wearing a hat is a must. It should shade the ears, face, temples, and back of the neck. Eye damage can result from prolonged exposure to the sun. If possible, sunglasses that filter out at least 90 percent of the sun's ultraviolet rays are suggested. Sunscreens are advisable, but may be too costly.

7.2.4 Safe Bending, Lifting and Carrying Techniques

Neck, back, and shoulder pain was the most common symptom expressed by all of the workers interviewed. From a very early age, children can be seen carrying objects on their head as they walk long distances over difficult terrain. Their agility is quite impressive. Once a child reaches their teens, they are expected to carry and transport weight similar to that of an adult. This is a norm and viewed as culturally appropriate and will be one of the more difficult areas to address. Children themselves may be initiating carrying larger and heavier items as a way to demonstrate their physical abilities and appearance of maturity. Of particular note, the team observed that often parents do adjust the size and weight of the objects being transported by younger children,

reserving the smaller pans and loads for the very young, gradually increasing the weight and size of the loads until the child is older and has greater physical capacity. This is a point from which education can build. Improper lifting techniques are responsible for a large percentage of back injuries. Proper methods of lifting and handling protect against injury, and make the work easier.

The curriculum will include information on the following:

1. Proper methods of lifting and handling
2. Proper footwear

Weights that are lifted should be limited to 10 to 15 percent of body weight and the length the object is carried should be limited to 10 to 15 yards. Realizing that considerably longer distances are required to carry objects, the weight of the loads should subsequently be reduced.

Proper footwear is needed, to help prevent slips, trips and falls while carrying objects. The norm in Ghana appears to be flip-flops or walking barefoot. While wearing non-skid shoes is preferred, it may not be a practical alternative for most workers. Afro Moses sandals are used by some workers during pesticide application, but not for the purpose of preventing slips and falls while carrying the sprayer.

It is important for the workers to think about what they are preparing to do before bending to lift an object. Repetition of safe lifting techniques, reinforced by reduced symptoms of back, neck and shoulder pain, should promote this behavior becoming habitual over time. Following are the basic steps of safe lifting and carrying that should be stressed:

1. Size up the load and check overall conditions. Don't attempt to lift an object alone if the load appears too heavy or awkward.
2. Feet should be shoulder width apart to ensure good balance. One foot should be beside the object and the other foot behind the object that is to be lifted.
3. The back should be kept straight, but not vertical—tucking in the chin helps straighten the back. Bending should occur at the knees without stooping.
4. The load should be gripped with the palms of the hands and using the fingers. The palm grip is more secure. Chin should again be tucked to ensure that back is straight before starting to lift.
5. Use body weight to start the load moving and then lift by pushing up with the legs—making full use of the strongest set of muscles.
6. Arms and elbows should be kept close to the body while lifting.
7. The load should be carried close to the body. Avoid twisting the body while carrying the load. If a change in direction is needed, shift the foot position and then turn the whole body.
8. Keep eyes on the path that is being taken—watch where you are going.
9. Bend the knees not at the waist to lower the object. To deposit the load on a bench or shelf, place the object on the edge and push it into position. Make sure that hands and feet are clear when placing the load down.

If the weight, shape, or size of an object makes the job too much for one person, then team lifting is needed. It is helpful if the workers involved in team lifting are approximately the same size and height. One individual needs to be responsible for control of the action to ensure proper coordination. If one worker lifts too soon, shifts the load, or lowers it improperly, either they or the other persons working with them will be injured. The secret to safely lifting heavy items is in taking the proper stance and grip. This requires training and practice.

7.2.5 Avoiding Slips, Trips, and Falls

Numerous workers mentioned the problem of stepping in holes they could not see due to the fallen leaves from the cocoa trees. This most often occurred while working with the soso, looking up into the canopy area of the tree without watching where they were stepping. It also occurred when carrying objects that were too heavy, or not having a flat, clear walking surface. Additionally, using flip-flops and not having non-skid shoes or boots adds to the increased risk of slips, trips and falls. Other types of falls occurred while workers were pruning the cocoa trees, when they slipped on wet branches or in avoiding or being stung by bees. Falls such as these can result in serious injury and worse. Taking steps in advance to ensure that the worksite area is free of unnecessary debris, flagging holes, checking for bees or snakes in trees before beginning to prune—all are preventative steps that could help avoid accidents and injuries. The curriculum will include the following tips for avoiding slips, trips, and falls:

1. The first step is to think about what is to be done before beginning to do it.
2. The most prevalent “slips and trips” hazards:
 - a. This could include flagging holes that are covered by leaves so that workers will be aware of them when working in the area.
 - b. When opening cocoa pods, collect the pods and other debris and dispose of it in an area away from where the workers are transporting raw cocoa beans.
 - c. Clear paths to and from the worksite areas, moving fallen leaves and other debris out of the path.
 - d. Locate the fermentation, pod-opening and bean-drying sites in as close proximity as is reasonable so that the distance is reduced and the path between each is clear of debris.
 - e. Avoid creating paths for workers to carry loads straight up the sides of hills; have paths traverse with a gradual incline for the workers. This will help to avoid erosion during the rainy season as well.
3. Habits that will reduce the chance of being injured in a fall
 - a) Avoid picking up objects too heavy and attempting to walk too fast.
 - b) Use proper lifting and carrying techniques.
4. Steps to eliminate hazards to the extent possible.
 - a. Take extra care when using machinery or equipment—sprayers, chain saws, cutlass and soso.
 - b. When possible, cut machinery off if moving between work areas or in difficult terrain.
 - c. Good housekeeping at the farm site can help to reduce risks, discard debris outside of the work area.

- d. Avoid pruning if rain is present, as this can increase the risk of falls.
- e. Stay alert and think about their actions before taking steps.
 - 1) The worker should check the trees for bees, snakes, and weak or cracked limbs before beginning the pruning process.
 - 2) Wherever possible, use the soso to remove diseased pods or unwanted growth, as opposed to having a worker climb up into the cocoa trees.

7.2.6 Safe Use and Maintenance of Cutting Tools

When providing training in the use of cutting tools, consideration should be given to address the following:

- Using the correct cutting tool for the job.
- Keeping tools in good condition. Handles should be tight and free from defect. Cutting tools should be kept sharp.
- Using and maintaining the power tool according to the instructions.
- Switching off power tools before changing blades or servicing and repairing.
- Wearing clothing with no strings or loose ends to catch on things.
- Wearing appropriate personal protective equipment (PPE), such as boots, gloves, glasses, goggles, dust masks, face shields, hearing protection, shin guards, etc.
- Keeping other workers and bystanders at a safe distance.
- Keeping all guards and shields in place.
- Putting tools away after use. Consider locking out power tools to prevent others from using them without permission, especially younger children.

Following are some simple questions that can be used to complete the inspection:

- Are tools in safe condition?
- Are instruction manuals (chain saw) available, read and understood?
- Are guards and shields in place on the power tool?
- Is PPE available?
- Are tools put away and properly stored?

7.2.7 Preventing Repetitive Motion

The curriculum needs to address the common causes of Raynaud's and carpal tunnel syndrome (CTS). These are:

- Prolonged use of vibrating power tools (e.g. chain saws).
- Frequent use of tools that require gripping with the hands (cutlass, soso, shovels, etc.).
- Carrying heavy bags, buckets, baskets or pans of cocoa pods, beans or water.

Because these syndromes may have multiple factors, there is no single mode of prevention. Simple common sense may help minimize some risk factors predisposing a work-related CTS or other cumulative trauma disorders. Workers need to learn how to adjust the work area, handle tools, or perform tasks in ways that put less stress on the hands and wrists. Maintaining good posture during work activities, using the bending, lifting and carrying techniques can also help.

Exercise programs to strengthen the fingers, hands, wrists, forearms, shoulders, and neck are recommended. Most importantly, varying work activities so that the same activity is not repeatedly done for long periods of time is key. As a result, frequent stretch breaks are helpful. These take only a couple of minutes but help to reduce the strain on joints and muscles and releases tension. Rest breaks, especially for children are important. A rule of thumb is take rest break of 10 minutes for each hour. Also, limit the weight and the length of the load to be carried is helpful as well. The weight of loads should not exceed 10 to 15 percent of the body weight, and the length of carry should be limited to 10 to 15 yards.

7.2.8 Heat Stress

There are numerous precautions that can be undertaken against heat stress. Some of them are summarized here and should be included within the educational materials:

7.2.8.1 Training on Heat Stress

Train workers and employers in how to control heat stress and to recognize symptoms of heat illness. This should emphasize that children are more susceptible to heat stress than adults and that further precautions should be undertaken to ensure that children drink lots of fluids and take more frequent breaks, in the shade if possible. A rule of thumb that can be followed to avoid heat stress is, taking a ten minute rest break and drink one quart of water during each hour of work. Ensure that workers, especially children, drink at least the minimum required amounts of water to replace body fluid lost through sweating. It is important to remember that thirst does not give a good indication of how much water a person needs to drink.

7.2.8.2 Monitoring and Adjusting Workloads

Take into account the weather, workload, and condition of the workers, and adjust work practices accordingly. Higher temperatures, high humidity, direct sun, heavy workloads, older workers, and workers unaccustomed to heat are more likely to become ill from heat. Here are things to do:

- Monitor temperature and humidity, and workers' responses at least hourly in hot environments
- Schedule heavy work and PPE-related tasks for the cooler hours of the day
- Acclimatize workers gradually to hot temperatures
- Shorten the length of work periods and increase the length of rest periods
- Give workers shade or cooling during breaks
- Halt work altogether under extreme conditions.

7.3 Improving Occupational Health Services and Reporting

Training for doctors and other health service providers is needed. This should include training particularly related to the proper diagnosis and treatment of pesticide exposures. Additionally, improved record keeping by hospitals and other health facilities that appropriately documents occupationally related accidents and injuries are needed—particularly when children and youth under the age of 18 are involved.

7.4 Need for Further Study

Further examination of communities during the peak harvest period should be conducted, targeting those communities with farms in excess of 100 acres. Additionally, analysis of the impact of pesticide use within the communities is warranted, along with an evaluation of the effect of various educational, social mobilization and social marketing strategies. Further analysis of data collected during the study is needed. Additionally, further work to analyze the demographic data on the children and youth interviewed would be of significant benefit. This would help to ensure that key worker safety messages would be appropriate for the targeted age group for which the curriculum is being developed and radio messaging targeted.

While key points of information have been provided to assist with the development of the curriculum and the radio social messaging campaign, further information and strategies for approaching the delivery of such information would be valuable to ensure that the training is appropriate and community-supported prevention strategies appropriate. Activities to apply job risk and worker safety training, using role-playing, interactive games, participatory learning processes, and challenge tasks are needed to be developed and customized for the cocoa producing communities. Application of the training that is appropriate for adults may not necessarily work effectively with children. Therefore, key points related to risk communication must be taken into account.

7.5 Conclusion

Cocoa is a labor-intensive crop. Due to the timing of the peak harvest season, work is in competition with school attendance. With flexible scheduling of school classes around the peak harvest period, this issue can be addressed. Still, cocoa offers limited safe work opportunities for young children. However, with training, protective clothing and gear and adequate adult supervision, there may be some activities that are appropriate for older youth. Currently, children under 18 are involved in hazardous activities that should be restricted to adults only, such as pesticide handling. Cocoa producing families are eager to learn about more effective cocoa production strategies and how to keep themselves and their family and other workers safe. This is an opening that offers a great opportunity for advancing worker safety education through the curriculum and the radio social messaging campaign.

While organic farming or IPM is a preferred approach in cocoa production, given the level of black pod and insect infestations, the reality is that it may be some years before that approach is achieved. As a result, the first priority of intensive training must be addressed toward providing education and awareness-raising about pesticides and related worker and handler safety training. While this may seem as a daunting task, the multi-pronged approach of a coordinated community

social mobilization, basic literacy life skills instruction, and radio social messaging campaign can have far-reaching and long-term impact.

8 ABOUT THE AUTHOR

L. Diane Mull is internationally known for her expertise on child labor and migrant worker issues. She has 15 years experience working on child labor issues, including child slavery/trafficking, soldiering, prostitution, and hazardous child labor, particularly in agriculture. She has over 25 years experience in policy and program development related to agricultural labor, literacy education, workforce development, employment and skills training, occupational safety and health, organizational management and community development. She has served on numerous national and international technical and policy advisory committees and testified/presented before the U.S. Congress, ILO, and the Human Rights Commission of the Helsinki Commission on issues involving child labor, workforce development, immigration, and human rights issues. For 19 years, she served as the executive director of a U.S. national association of NGOs providing education, training and other services for migrant and other agricultural workers. More recently, she functioned as the senior level advisor on child labor for USAID under the BEPS's ECACL activity managed by CAII. Currently, she is the Chief Executive Officer for the International Initiative to End Child Labor (IIECL), a U.S.-based international NGO whose sole purpose is to eliminate the worst forms of child labor worldwide. She holds degrees in both Education and English.