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Keywords

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Abstract

Cocoa remains the most important cash crop in Ghana, with the Western Region being the leading producer. More recently, concerns have been raised about ethical cocoa production, especially regarding child labour. Drawing on historical sources and a survey, the research assessed the injury risks of children in cocoa farming in the Western Region of Ghana and its implications for extension education. The study concludes that cocoa farm households in Ghana, typically in Western Region, engage children in the households in almost all aspects of cocoa production operations as a way of socializing them into the family cocoa production business – a complex and socially tolerable practice in Ghana. The extent of engagement however, is low across the operations. The operations engaged by the children are generally repetitive and include carrying loads, land preparation, planting, fertilizer application, harvesting, and breaking cocoa pods. More importantly, the study concludes that cocoa farmers are more at risk to injuries caused by repetitive strain, and lifting and carrying of loads, which are the work normally done by children. Nonetheless, the focus of extension education in Ghana has been on adult farmers in design and content. To effectively manage the risk associated with this complex phenomenon, the study emphasized the need for a holistic extension education that includes child-sensitive labour practices in cocoa production, focusing on the entire farm household. This will best empower cocoa households to ethically and health-wise socialise children as part of a livelihood system for sustainable cocoa production.

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Introduction

Cocoa is the most important cash crop in Ghana, produced by over 800,000 smallholder farm families in six out of the ten administrative regions in the country, for more than 60 years (Hanson, 2007). For these smallholder cocoa farmers, cocoa accounts for over 67% of household income (Kolavalli & Vigneri, 2011). Most of the farms belong to individuals or families who transfer them from one generation to another to ensure financial security and peace of mind for all involved. These farmers or those they employ to work on the farms (caretakers) are mostly without formal education. In the rural areas of Ghana where cocoa is grown, the smooth transfer of cocoa farms from one generation to the other is done through the socialisation of members in cocoa production from early childhood to adulthood through in formal education (apprenticeship). Besides, adult cocoa farmers learn from each other, and from public and private cocoa extension workers through non-formal education. Thus, growing cocoa in Ghana involves adults and children. This context is not fully researched and understood and has thus, raised some child-labour concern in the Ghanaian cocoa industry in recent times.

As outlined in the Children's Act, 1998 (Act 560) of Ghana, persons below 18 years, irrespective of how big or small they look, must be protected from child labour (Government of Ghana [GoG], 1998). By this Act, child labour is work performed by a person below the age of 18 years, which deprives the person of the basic human rights, and is abusive, hazardous, exploitative and harmful to the health, safety, moral attitude and development of the child. It includes work that denies children education or does not allow them to benefit fully from school, by way of attempting to combine school with heavy work or working for long hours. A concept understood by most rural cocoa farmers in Ghana is that childhood is a

distinct stage of life requiring a tailored set of educational experience (socialisation) relevant to the world that the child will experience as an adult (Bastable&Dart,2008). Apart from Ghana and other developing countries, many children across the world work at home to help parents with household chores and family economic activity as part of the socialisation process (Edmonds, 2008). The involvement of children in cocoa production by cocoa farm families has been a normal practice in Ghana for ages.

Research in Africa, however, shows that cocoa production has numerous health and safety risks. The International Institute of Tropical Agriculture (IITA) (2009) reported that weeding is one of the most injurious activities in cocoa farming. Cocoa production by its nature involves a high amount of manual labour involving the use of tools such as machetes, axes, harvesting hooks, pruners, ladders and chain saws which pose injury risks that may result in cuts, bruises and broken bones (Bosompem & Mensah, 2012). The nature of the cocoa farming system in Ghana, as described, suggests that people (adults and children) involved in cocoa farming are exposed to injury or health risks. This is an issue that can partly be addressed by extension effort to eliminate or reduce the health risks for sustainable cocoa production in Ghana. But currently, there is very little information on activities performed by children in cocoa farm households and the risk associated with them, apart from the sensational child labour reports on Ghana and Côte d'Ivoire which raised some serious child labour issues in cocoa farming in the two countries (Tulane University, 2011). Other works have focused on the various hazards and injuries associated with cocoa farm operations in general (Bosompem & Mensah, 2012; International Institute of Tropical Agriculture (IITA), 2009; Muilerman, 2013; Mull & Kirkborn, 2005).

In spite of the growing concern of children's involvement in cocoa farming as earlier mentioned, and the possible negative effect it could have on their education if not managed, the Ghanaian cocoa extension system is yet to fully grasp the dynamics of the phenomenon and to comprehensively deal with it within its strategic youth in cocoa production agenda. The focus of cocoa extension over the years has been on adult farmers. In addition, the Ghanaian basic education system has not laid emphasis on Agricultural Science education, which is expected to prepare the youth into taking up farming as a vocation. Currently, Agricultural Science is no longer a teaching subject at the basic education level in Ghana, despite the critical economic role agriculture play in Ghana. The Agricultural Science subject since 2008 has been made part of an Integrated Science subject, with limited topics on agriculture. Besides, there are limited facilities (e.g. model farms, laboratories) for teaching and practical work of Agricultural Science at the basic and secondary education levels in the country. The recognition that children are engaged in cocoa production and thus subject to injury, together with the growing concern for child-sensitive labour practices and targeting of the youth for sustainable cocoa production have called for the need to assess these parameter and incorporate them into cocoa extension programming.

The Purpose of the Study

This paper discusses the injury risks of farm households in the Western Region of Ghana focusing on children or wards who are members of the household – not as hired labour. The specific objectives are to: 1) describe the cocoa farm operations that children in cocoa farm households are involved, 2) assess the injury risks associated with the operations, and 3) provide some suggestions for improving cocoa extension education in Ghana.

Research Methods

The Western Region was chosen for the study as it is the largest cocoa producer in Ghana (World Bank, 2011). The research data was collected using quantitative and qualitative methods. From a supervised cross-sectional survey, 398 randomly sampled cocoa farm households, in the Western Region of Ghana, represented by household heads were used for the research. The assumption is that a household head oversees home management, which include division of labour and health of the family, and is thus, in a best position to give information on children in the household. The sampled household heads (farmers) were drawn from an estimated 92,639 farm families in the Region based on the proportional sampling technique, in 4 randomly selected (out of 13) districts. These include Sefwi Akontombra (75), Juaboso (101), Asankragwa (146) and Wassa Akropong (76), all in the Western Region of Ghana. Structured interview schedule was used in the collection of the survey data. This was pre-tested for reliability on the Likert-type scale questions. The Cronbach's alpha coefficient value calculated based on 30 selected farm household heads in the study area was 0.78. The farmers answered questions on the type of farm activities they make children undertake, the frequency of injury occurring with specific activities, and the consequences or severity of the injury.

The qualitative data was based on personal interviews of 12 community (field-level) extension agents from the selected districts to understand how the extension system is responding to the involvement of children in cocoa production in their operational areas in the Region. The author's own work experience and interviews with farming groups and extension agents as an agricultural extension educator for over 15 years, and engagement with the Ghana

Cocoa Board for over 5 years as extension consultant in the Division of Cocoa Health and Extension also provided some insight into the phenomenon and its implications to extension education in Ghana. As such, the study drew on multiple sources of information (data triangulation) from interviews, documents, personal observations and different stakeholders (extension agents, farmers and policy makers) to ensure the validity of the results. Further, the informants were provided with summaries of the interviews to check the data and the interpretations to improve accuracy of the findings. All respondents in the study were also assured of confidentiality and anonymity.

Descriptive statistics were used to analyse and present the quantitative data.

Based on a risk assessment model adapted from the Government of Southern Australia (Ogoe, 2015; Table 1), the injury risks in cocoa farming were rationalised into various risk levels as low, medium, high and extreme. These were determined, based on frequency of occurrence of an injury and the level of severity. Low level of risk means minimal risks that are unlikely to occur; medium represents some risk hazards that occur occasionally; high level means serious risks that occur frequently; and extreme level of risks mean catastrophic and critical injuries/ailments/disorders that occur frequently. The qualitative data collected were summarised to provide a logical explanation to meet the research objectives.

		Consequences/Severity				
		Insignificant : Dealt with by in-house first aid, etc.	Minor: Medical help: Treatment by medical professional/hospital out-patient, etc.	Moderate: Significant non-permanent injury. Overnight hospitalisation (in-patient)	Major: Extensive permanent injury (e.g. loss of finger/s) Extended hospitalisation	Catastrophic: Death. Permanent disabling injury (e.g. blindness, loss of hand/s, quadriplegia)
Frequency of Occurrence*	Frequent: When an injury has occurred 10 times or more to a farm worker	High	High	Extreme	Extreme	Extreme
	Occasional: When an injury has occurred 5 to 9 times to a farm worker	Low	Moderate	High	Extreme	Extreme
	Seldom: When an injury has occurred 2 to 4 times to a farm worker	Low	Low	Moderate	High	Extreme
	Rare: When an injury has occurred 1 to 2 times to a farm worker.	Low	Low	Moderate	High	High

Figure 1. Risk Matrix Template for Determining the Levels of Risk of Cocoa Farmer

**The frequency of occurrence in the matrix refers to the entire farming life of the farmer*

Source: Ogoe (2014), adapted from the Government of Southern Australia (2006).

Results and Discussion

As smallholder producers, most of the farmers had an average farm size of 3.3 hectares, with almost half of them (43%) operating on less than 2 hectares and using mainly family labour including their children and wards who are members of the household. The estimated average annual yield per hectare in the study area was 463 kg, slightly higher than the reported 389 kg by Hainmueller, Hiscox and Tampe (2011) for the Western Region. The average household size of the sampled farmers was eight, also higher than the average (4.5) for the Region (Ghana Statistical Service, 2013). The Western Region has a population of 2,376,021, with children (those less than 18 years) constituting about 45.35%.

Cocoa farm operations by children and adults

Table 2 shows the type of cocoa production activities that children are engaged in and the percentage of cocoa farm households that are involved in the practice. From the study, it was evident that all farm households engage children in one form of cocoa farm operation or the other as part of their training as household members. The extent of involvement by percentage of households engaging children is however, low – ranging from 0 to 24.42% for the various operations. The operations included land preparation, planting, farm maintenance and sanitation, harvesting, post-harvest handling, and others including carrying of load to and from farm. The practice of engaging children in farming is not unusual (Finnegan, 2007; GSS, 2008; West Africa Cocoa and Commercial Agriculture, Project(WACAP), 2003). A cocoa labour survey in Ghana found about 50% of children of cocoa farm households engaged in one or more cocoa farming

operations, with most of them being males (GSS, 2008). Berlan (2004) gave even a higher percentage (95%) of children involvement in cocoa farming activities. According to WACAP (2003), about 14% of labour on cocoa farms in Ghana is supplied by children. For Mull and Kirknorn (2005), many of these children are less than 14 years of old.

The predominant cocoa farming operations in which most households engage children include carrying of seedling, water, cocoa beans, fuel wood, and food stuff; land preparation, including initial clearing, brushing and weeding; planting of cocoa seedlings; fertilizer application; harvesting of cocoa; and gathering and breaking of cocoa pods (Table 2). The highest engagement of children by the household was in planting and harvesting/postharvest activities (11.68% and 13.05%) respectively. Generally, these activities (planting, harvesting and fertilizer application) are repetitive and can be stressful and injurious when not supervised by adults. Few households engage children in the mixing (0.7%) and spraying of agro-chemicals (1.36%), and the cleaning up of spraying equipment after use (2.28%).

Interaction with cocoa farmers in different parts of Ghana over the years shows that farmers do not necessarily regard the mere involvement of children in cocoa farming as child labour. They consider the practice as necessary part of children's upbringing in cocoa farm households. Besides, the farmers indicated that involvement of children in hazardous farm activities is unacceptable, although it cannot be ruled out as absent in Ghana. There have been reported cases of child labour, slavery and trafficking in the cocoa industry in West Africa, including Ghana by the International Programme on the Elimination of Child Labour (2005) and Tulane University (2011). The current research focused on children who are

members of the household and play a supportive role not as hired labour.

Cocoa production, which has been the work of adults, demands substantial energy, experience and alertness, especially in handling agro-chemicals,

heavy loads/equipment and sharp farm tools. In almost all the activities, there is more male children involvement than female, although the differences are comparable.

Table 2

Cocoa farm operations engaged in by children and adults in the study area

Farm operations	Children (%)			Adults (%)
	Male	Female	Total	
Land preparation	1.52	1.34	2.86	97.14
Initial Land clearing	3.03	2.85	5.88	94.12
Felling and chopping of trees	0.67	0.67	1.34	98.66
Burning	0.22	0.22	0.44	99.56
Stumping and debris gathering	2.17	1.63	3.80	96.20
Planting	6.14	5.54	11.68	88.32
Digging of holes for seedlings	5.35	4.26	9.61	90.39
Carrying or supply of seedlings	8.18	7.59	15.77	84.23
Planting of seeds or seedlings	4.88	4.76	9.64	90.36
Farm maintenance and sanitation	2.46	2.44	4.90	95.10
Brushing/Weeding	4.79	4.66	9.45	90.55
Fetching of water for spraying	12.21	12.21	24.42	75.58
Mixing and loading of agro-chemicals for spraying	0.47	0.23	0.70	99.30
Chemical application/spraying	0.68	0.68	1.36	98.64
Cleaning up of spraying equipment after use	1.37	0.91	2.28	97.72
Disposal of empty agrochemical containers	0.47	0.23	0.70	99.30
Storage of un-used/left-over agrochemicals	0.00	0.00	0.00	100.00
Pruning of cocoa trees	0.00	0.22	0.22	99.78
Mistletoe control	0.23	0.46	0.69	99.31
Fertilizer application	4.44	4.77	9.21	90.79
Harvesting and post-harvest handling	6.67	6.38	13.05	86.95
Harvesting of pods	4.18	3.68	7.86	92.14
Gathering of pods	10.05	9.93	19.98	80.02
Breaking of pods	9.22	9.44	18.66	81.34
Construction of drying patios	2.46	2.66	5.12	94.88
Carrying of fermented beans from farm to the house	9.50	9.26	18.76	81.24
Stirring of beans during drying	1.38	1.08	2.46	97.54
Bagging and carrying of beans to buying centres	7.41	5.90	13.31	86.69
Other activities	3.65	3.90	7.55	92.45
Sharpening/preparing tools and equipment for farm	1.27	0.85	2.12	97.88
Planting of intercrop/food crops	3.61	3.76	7.37	92.63
On-farm cooking for farmers	1.78	3.16	4.94	95.06
Maintaining food crops	1.82	1.82	3.64	96.36
Harvesting of food stuffs	5.39	5.09	10.48	89.52
Fetching of fuel wood	8.06	8.71	16.77	83.23
Carrying food stuffs and fuel wood home	10.51	11.19	21.70	78.30
Carrying farm tools and equipment to and from farm	2.74	2.56	5.30	94.70

Source: Field Survey, 2014.

Level of risk to injuries in cocoa farming

This section discusses the levels of risk of injuries in cocoa farming activities affecting farmers in the Western Region of

Ghana in general. The farmers assessed the frequency of occurrence and severity of various injuries to in cocoa farming in the Region. The injuries were grouped into: 1) repetitive strain injuries, 2) injuries

from lifting and carrying of loads, 3) injuries from sharp tools, 4) injuries from the environment, 5) agrochemical use injuries, 6) machinery injuries, and 7) injuries from falls from heights (Table 3). Computing from the Risk Matrix in Table 1, the results show a high perceived risk (Mean, 2.02; SD, 0.30) of injuries in cocoa farming, a finding well supported by Mull and Kirknorn (2005), IITA (2009), and Bosompem and Mensah (2012). The authors reported that cocoa farming is one

of the most hazardous occupations in Ghana. The results of the study show significant differences among the risk levels based on the scale: Low (0.01 – 1.00), Moderate (1.01 – 2.00), High (2.01 – 3.00) and Extreme (3.01 – 4.00). The F-Value was higher than its critical value, an indication that the risk of injuries to the farmers is significantly ($p < 0.00$) different from each other and that the observed different levels of injuries are not just by chance.

Table 3
Level of injury risk in cocoa farm operations

Type of Injury	Risk Levels		
	<i>M</i>	<i>SD</i>	Level of risk
Repetitive strain injuries	2.45	0.15	High
Injuries from lifting and carrying of loads	2.20	0.34	High
Injuries from use of sharp tools	2.20	0.30	High
Injuries from the environment	2.10	0.45	High
Agrochemical injuries	1.86	0.28	Moderate
Machinery injuries	1.76	0.32	Moderate
Injuries from falls from heights	1.57	0.31	Moderate
Grand Mean/S.D./level	2.02	0.30	High

F-Value: 5.07; P-value: 0.00; F-Critical: 2.34
Source: Field Survey, 2014.

Repetitive strain injuries including palm blisters, general body pains, neck muscle pain and injury to the lower back and waist, was the highest with high level of risk to cocoa farmers in the study area. This is followed by risk injuries from lifting and carrying of loads, risk injuries from use of sharp tools, and risk injuries from the environment. Most of the activities in cocoa farming are repeated over a long period usually with little rest, exposing farmers to repetitive strain injuries. Mull and Kirknorn (2005) and the IITA (2009) have reported the impact of repetitive strain injuries in cocoa farming in Ghana. This is more critical for the children, whose involvement tends to concentrate on repetitive activities including carrying of loads (seedling, water, cocoa beans, fuel wood, and food stuff), land preparation, planting, fertilizer application, and harvesting and breaking

of cocoa pods. Given that farmers in developing countries are highly exposed to the risk of repetitive strain injuries including musculoskeletal disorders (Cowie et al., 2005; Donham & Thelin, 2006; Forastieri, 2001; Pyykkönen & Aherin 2012), it is very important to supervise and protect these children, who are in their vulnerable stages of life.

The results showed that the risk of agrochemical injuries was moderate. Agrochemical injuries considered in this research include feeling of weakness, body itching, severe headache, excessive sweating, difficulty in sleeping, pain in the chest, feeling of dizziness, nausea and vomiting, restlessness, stomach ache, diarrhoea and collapse. It means the farmers perceived the preceding injuries to occur seldom or occasionally and their effects as non-permanent, and at worst requires an overnight hospitalisation. Two

possible reasons may account for the moderate risk of agrochemical injuries. The first is that agrochemical injuries take a relatively long time to manifest, and thus, may not be easily perceptible to the farmers. The second reason is that the extent of direct involvement in agrochemical spraying by farm families is reduced due to government supported programme called Cocoa Pests and Diseases Control Programme (CODAPEC). In the past 10 years, the CODAPEC has supported farmers with teams of experienced pesticide applicators including hired men and CODAPEC staff to apply pesticides on cocoa farms to enhance productivity (Baah, 2012). Besides, farmers continue to apply their own agro-chemicals to supplement what is provided by CODAPEC.

The finding that the risk of agrochemical injuries was moderate in the Western Region of Ghana does not support the view that cocoa farmers are highly exposed to risk of agrochemicals injuries, as reported in the literature (Bosompem & Mensah, 2012; IITA, 2009; Mull & Kirknorn, 2005; Sosan & Akingbohungebe, 2009). This is probably due to the declining involvement of farmers in pesticide application in Ghana as already highlighted. However, the fact that some farm families still spray their cocoa farms, supervise CODAPEC applicators and live in the environment where the sprayings are done still raise some concerns of risk of agrochemical injury (perceived as moderate), to the children involved because of their vulnerability, and the fact that agrochemical effects might take longer time to manifest. The effects may include respiratory disorders and cancers which were not considered in the research. As reported by Forastieri (2001), Finnegan (2007), and Sosan and Akingbohungebe (2009), agrochemical injuries may result in chronic diseases such as cancers and respiratory disorders in the long-term. This may take over 20 years to manifest (Sosan & Akingbohungebe, 2009). As discussed

earlier in Table 2, some farm households engage children in chemical spraying (1.36%) and cleaning of spraying equipment after use (2.28%), something that can be managed holistically through extension education. The key point is that children must be protected as much as possible from agro-chemicals if they are to grow and mature properly to replace the ageing cocoa farmers in the Western Region of Ghana.

The involvement of children in some of the activities in cocoa farming – though on a limited scale – is disturbing because they do not have the necessary skills and capabilities to deal with the hazards associated with the activities, thus the high risk of injuries. The results showed that children were involved at varying levels in land clearing, felling and chopping, burning, agrochemical application and related activities, mistletoe control, plucking pods and breaking pods. The GSS (2008) report posit that some of the activities, such as land clearing, felling and chopping are laborious and may involve the use of dangerous tools; burning can lead to smoke inhalation, respiratory diseases, burns and even death; agrochemical-related activities such as the mixing and application of pesticides and fertilisers have implications on present and future health; mistletoe control which involves climbing cocoa trees increases the risk of fall and injury; plucking overhead cocoa pods with harvesting hooks predispose children to injury from falling blades as well as bring about neck and shoulder problems; and breaking pods, especially with a cutlass, can lead to accidental cuts with other complications such as haemorrhage and tetanus.

From the preceding discussion, it is apparent that the engagement of children in cocoa production as practiced in the Western Region, if not properly managed through extension education and supervised by adults, can lead to child labour issues, as pointed out by the Ministry of Manpower, Youth and

Employment (MMYE) (2008). According to the MMYE report, the main issue of child labour in Ghana's cocoa sector is involvement of children in hazardous work including being present in the vicinity of pesticides application and carrying of heavy loads. Although the Children Act prescribes 18 years as the minimum age for engagement in hazardous work (GoG, 1998), experience over the years with cocoa farmers shows that enforcement mechanisms are weak and compounded because farmers are generally uninformed of the requirements of the Act – in the interest of the child whose livelihood, the farmers themselves, are seeking to secure.

Conclusions and Implications

The study highlights the importance of defining Child Labour in the context of the kind of activities undertaken by the child and the risk involved – all in the best interests of the child which not surprisingly, includes sustainable production of cocoa by farm families – the very families of which the children are members. The study shows that cocoa production in the Western Region of Ghana, involves children but, to a limited extent. As part of the socialisation process, cocoa production households engage children generally in carrying of loads to and from farm, land preparation, planting, fertilizer application, harvesting, and gathering and breaking of cocoa pods. Notably, the study found that, farmers engaged in the above operations are at high risk to injuries, especially from repetitive strain, lifting and carrying of loads, sharp tools, and the nature of the environment. This pre-supposes that cocoa farm households in the Western Region engaging children in cocoa farming expose them to high injury risk if they are not properly equipped and supervised by adults.

For sustainable production of cocoa for generations in particularly the Western Region and Ghana in general, cocoa extension education must consider

injury risk management and other child-sensitive farm practices. This is to protect children from potential long-term adverse health consequences and to attract their interest in to cocoa farming as future vocation. These considerations will imply the need for a more holistic and child-sensitive cocoa extension approach. This approach will require an increasing role of the extension system (private and public) to influence national policy towards agricultural education, and the provision of appropriate competencies needed by children to properly socialise them at little or no risk to take up agriculture (cocoa production) as vocation if they wish to do so.

The new extension strategy will require advocacy and lobbying for possible re-introduction of Agricultural Science in the curriculum of Ghanaian Junior High School to help the youth to understand the basic principles of farming which include cocoa production. Furthermore, through collaboration, facilitation and training using various methods including the use of school gardens, agricultural shows and clubs, farmer learning groups and sensitisation campaigns, the extension system in Ghana can support cocoa farming communities and households. The approach should go beyond simply telling farmers about child labour laws that must be obeyed, to provide appropriate technical and other competencies. This should include basic knowledge in first aid and treatment procedures, and home management knowledge that can influence household labour practices in the interest of the child and sustainable cocoa production. Such extension strategy should also be able to identify and report situations of serious violation of children rights, including child labour and trafficking to the appropriate agencies for redress. Finally, the strategy will require retooling of frontline cocoa extension staff in Ghana with the requisite competencies to respond effectively to the broader

training needs of cocoa production households.

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