

Fueling the Living Income Debate: Modelling Household Income of Cocoa Growing Smallholders in Ghana

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List of Acronyms and abbreviations

CPI	Consumer Price Index
IPL.....	International Poverty Line
PPP	Purchasing Power Parity
SCB.....	Sustainable Cocoa Business

Table of Conversion Rates

Implied PPP Conversion Rate (National Currency (GhS) per current international dollar)

Country	Subject Descriptor	Units	2010
Ghana	Implied PPP Conversion Rate	National Currency per Current Int. Dollar	0.711

Source: International Monetary Fund, World Economic Outlook Database (2013)

Exchange Rates GhS with US\$ in 2010

Month	GhS/US\$ 2010	Month	GhS/US\$ 2010
January	1,4263	July	1,4414
February	1,4301	August	1,4190
March	1,4289	September	1,4264
April	1,4093	October	1,3925
May	1,4275	November	1,4449
June	1,4313	December	1,4525
Average 2010	1,42751		

Source: Bank of Ghana

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1. Executive Summary

Ensuring sufficient financial means on a household level is an important factor in the debate around eradicating global poverty. 70% of the world's poor live in rural areas. Hence it is vital when aiming at reducing global poverty to understand composition, condition and source of rural household incomes. Within this context falls the debate around a living income for rural households, aiming at eradicating poverty from a basic needs perspective. The report defines a living income, before enlarging on ways a living income and hence a basic acceptable standard of living of a household is calculated. It highlights that quantifying an acceptable minimum standard of living is always subjective, involving assumptions and judgement, which need to be subject to national consensus and debate¹. Hence, it is of great importance to be transparent in choice of method and values and elements used. Subsequently, the report debates calculation of household income in an agricultural context, which is compared against a living income, stressing the importance of reliable, accurate and representative field data. Means and measures on a micro, meso and macro level to close a potential gap between household income and living income are discussed.

In the second part the paper employs the example of cocoa – producing smallholders in Ghana to fuel the living income debate, given continuing socio-economic challenges in the cocoa sector. The report, firstly conducts household income calculations of two cocoa producing smallholder model farms, varying in farm and household size. It compares the model farms' conducted household income to selected poverty reference lines (which are used as an estimate for a minimum standard of living), identifying whether a gap between calculated household income and reference line exists. In a second step it shows various scenarios, aiming at demonstrating to what extent cocoa productivity and price (micro level levers) have to change for cocoa producing smallholder households with different household and farm size characteristics to reach selected reference line. It proposes that at a 2 ha level (4, 5 and 6 household members) an increase in cocoa price of 54% to 216% and cocoa yield of 99% to 375% is needed to reach the upper reference line, suggesting that mere yield improving methods (of cocoa and other crops) are no longer sufficient to reach provided reference line and hence measures going beyond productivity improving activities are needed. Whereas for a 3.6 ha farm (4, 5 and 6 household members) cocoa price improvements of 11 to 71% and cocoa yield improvements of 31 to 165% are needed to reach the employed reference line. Here the gap can be closed through good agricultural practices. Optimization of all assumed crops cultivated can lead to household income notably above the utilized reference line. At a 6 ha farm for each of the suggested household sizes no gap could be observed. In the majority of cases a greater change in yield than price for equivalent ha size and household size is needed to reach given reference line. However, considering those results the report highlights that due to missing field study and methodological limitations given results can only be regarded as a contribution to

¹ Anker, R. (2011), "Estimating a living wage: A methodological review", Conditions of Work and Employment Series No.29, ILO Geneva

already existing literature, but by no means as the ultimate measure of income levels and household structures of cocoa producing smallholders in Ghana.

Overall, the report emphasizes the need for enlarging the income debate, stressing that next to a basic needs perspective, identifying whether a household earns sufficient to live on, it should be asked if the farmer earns a fair share of the value chain and its final product, as well as opportunity costs and risks need to be considered. Only if the discussion is regarded in a holistic manner will one be able to put it successfully in perspective

2. Context

One of the most important UN's Millennium Development Goals is to half the global poverty rate by 2015. 70% of the world's poor live in rural areas – consequently are central when addressing global poverty. Insufficient income is one of the major causes of poverty. In rural areas, in most parts in the world the main source of income and employment is agriculture, where the majority is engaged in smallholder activities and is hence self-employed. Smallholders are usually cultivating 1-3 ha with support of their family, producing either for their own consumption or for sale at local and international markets. Frequently, they earn some additional income from sources such as freelance, handcraft or provision of other services. As a result, when aiming at reducing global poverty an understanding of composition, conditions and sources of rural income is required to enable households to earn sufficient income to ensure a basic standard of living and thus escape poverty. Within this context falls the debate and recent initiatives aiming at facilitating a “living income” for rural households.

The report first outlines context and definition of a living income. Secondly, it enlarges on household income calculations in an agricultural context. It describes how a smallholder's calculated household income is compared to an aspired living income, identifying if a gap exists. Subsequently, it discusses levers to achieve a living income, in case a gap between household income and living income exists. The case of cocoa growing smallholders in Ghana is employed as an example, before concluding on overall results.

3. Definition

The term living income has its origin in the discussion around ensuring an “adequate living wage” for workers. The idea behind living wage and living income is similar². At its core lies the objective of eradicating poverty, reaching a level above the defined poverty level. Therefore, its definition is closely related to definitions of poverty.³

Living income implies: Income (in cash and kind) sufficient to meet basic needs of the income earner and his or her family. This applies to entrepreneurs, and/or self-employed people, such as smallholder farmers. Basic needs are understood as, food, housing, clothing and other expenses, such as education and medical costs, transport as well as some discretionary income for unexpected events (illness, drought etc.).

Consequently, the definition covers the two first tiers of Maslow's pyramid of needs: physiological needs (food, water, shelter, warmth), and safety aspects (personal security, financial security, health and wellbeing, safety net against accidents/illnesses etc.), with emphasis being put on stability of income.

² *Living Wage: Remuneration received for a standard work week by a worker in a particular place sufficient to afford a decent standard of living for the worker and her or his family. Elements of a decent standard of living include food, water, housing, education, health care, transport, clothing, and other essential needs, including provision for unexpected events.*

³ *Poverty= “the inability to obtain a minimum standard of living” (World Bank, 1990)*

4. Living Wage/Living Income Calculation Methods and Poverty Reference Lines

The idea of measuring a living wage / living income rate and measuring poverty with absolute national poverty lines are closely related. Both approaches aim at defining a certain acceptable minimum standard of living.

There are different ways of calculating absolute national poverty lines. Most countries calculate their absolute national poverty lines, in terms of model diets, food and non-food costs. The food basket is normally based on calorie assumptions and a model diet, constructing a food basket and its prices that meet given calorie requirement and model diet for an average person. “Non – food costs are estimated by multiplying food costs by a non – food “multiplier“that increases with development level to represent the relationship between non – food expenditures relative to food expenditures”⁴ (Engels curves). Adding per capita food and non – food costs reflects an absolute national poverty line per capita.

The same method is applied for living income/living wage calculations. The difference is that after having conducted the cost of an average person (food and non-food costs) those are multiplied by a scalar for household economies of scale⁵ and a suggested family size. Often a certain percentage is added to account for discretionary income, aiming at an acceptable living standard. This is the rate that needs to be earned to support one household and hence is suggested to represent a living income. In the case of a living wage, the given poverty line for a household is divided by the number of full-time workers per couple (considering full time weekly hours and holidays) to highlight the hourly wage rate a full time worker should earn to support a given family.⁶ Different methodologies exist to calculate a living income and a living wage. Whilst there is agreement on the elements of the formula (for a living wage, living income), the main distinction lies in the values used for those elements, which is subjective.⁷ Assumptions such as household size can be difficult to make. (Appendix overview of living wage calculation methods) Values of the components depend on time, place and the development level of the country⁸.

Overall, estimating what an acceptable minimum standard of living entails always involves “assumptions and judgment”⁹, being subject to national consensus and debate.

⁴ Anker, R. (2011), “Estimating a living wage: A methodological review”, Conditions of Work and Employment Series No.29, ILO Geneva

⁵ Scalars decrease with development level, since household economies of scale rise with development level and relative importance of non – food expenses; Anker, R. (2011), “Estimating a living wage: A methodological review”, Conditions of Work and Employment Series No.29, ILO Geneva

⁶ Anker, R. (2011), “Estimating a living wage: A methodological review”, Conditions of Work and Employment Series No.29, ILO Geneva

⁷ Moazzem, K.G. et al. (2013), “Estimating a Minimum Living Wage for the Ready Made Garment Sector in Bangladesh”, Berenschot Groep B.V

⁸ Moazzem, K.G. et al. (2013), “Estimating a Minimum Living Wage for the Ready Made Garment Sector in Bangladesh”, Berenschot Groep B.V

⁹ Anker, R. (2011), “Estimating a living wage: A methodological review”, Conditions of Work and Employment Series No.29, ILO Geneva

International Poverty Reference Lines: Further, instead of using a living income methodology as mentioned above, one might consider applying the World Bank's International Poverty Lines (IPL) at \$2 PPP/person/day, and the Extreme IPL at \$1.25 PPP/person/day as a reference line, in order to compare the calculated income to a reference line which represents a certain standard of living. The IPLs are a way to measure poverty at an international level and are represented in USD 2005 PPP per person per day. This is a simple method; however, it incorporates significant drawbacks. The lower (1.25 USD PPP) international World Bank poverty line is the mean of the 15 poorest countries' absolute national poverty lines identified by the WB, whereas the upper IPL (International Poverty Line) is arbitrarily set at two times the original 1 USD IPL¹⁰. Consequently, given IPLs embody whatever subjectivity and judgments are included in each national poverty line employed, including differences in data and methods used. Furthermore utilizing IPLs the application of Purchasing Power Parity (PPP) conversion rates is needed, which incorporates various disadvantages, since PPP estimates are not available for a range of countries and "are benchmarked only every several years with values for each year updated annually using national Consumer Price Index (CPI) which adds imprecision"¹¹. In addition, PPP estimates vary sometimes noticeably with new benchmarks. Hence, there is justifiable doubt whether IPLs are representative in a national and local context. The World Bank itself does not recommend its application in a local context. If it can be avoided they should certainly be circumvented on a national and local level.

Overall, each of these methods has its advantages and disadvantages. Choice of methods and determining values of elements used have to be made transparent, as those imply inherent subjectivity.

5. Household Income Calculation in an Agricultural Context: What to incorporate?

Once one has decided on a living income calculation method or reference line, this leaves the question how to calculate income of a smallholder family in order to be able to compare it to above named living income or reference line.

Household income in an agricultural context is generally defined as sale of goods + self consumed output – cost of production + (revenue of external income¹² – related costs). Cost of production being variable costs (comprising labour, input costs) + fixed costs (including e.g depreciation on capital equipment) + interest payments +taxes. In contrast profit = sales – cost (including opportunity costs of own labour).

Field data to conduct household income and living income is essential. Transparency, accuracy and representativeness of employed field data are indispensable factors in compiling a smallholder's family income and living income estimate.

¹⁰ Anker, R. (2011), "Estimating a living wage: A methodological review", Conditions of Work and Employment Series No.29, ILO Geneva

¹¹ Anker, R. (2011), "Estimating a living wage: A methodological review", Conditions of Work and Employment Series No.29, ILO Geneva

¹² E.g. remittances, employment outside of the farm, non-agricultural income generating activities

Once a living income and income of chosen smallholder family have been identified, these can be compared highlighting if a living income is earned.

In case a per capita reference line (as the WB IPLs) is employed the calculated household income is divided by an assumed number of household members, to be able to compare the household income to chosen per capita reference line.

In case a gap between a living income or per capita reference line and the smallholder family's income is observed, this leaves the question which levers to employ to close the identified gap.

6. Measures/Activities Towards a Living Income

On a micro level small scale households' income can be increased by rising productivity and quality, an increase in scale and/or shifting to alternative crops and livestock with higher return. Capacity building measures aiming at empowering smallholders through supporting informed decision making, improving technical and business skills, while enabling access to markets and resources are central elements of a living income supporting strategy on a micro level. Furthermore, through inclusive business arrangements (e.g. with processors and/or traders) smallholders can benefit from advisory services, market access and economies of scale. Additional options are cottage processing or increased supplementary agricultural and non - agricultural off-farm income. In addition, on a meso level levers can be membership in producer groups (e.g. cooperatives) to benefit from improved negotiation power (higher producer prices and lower input prices) and improved market access.

On a macro level main instruments are the strengthening of legal frameworks and their implementation concerning setting of minimum prices, as well as policy support, such as structural policies and infrastructure enhancements, national export/import strategies, national provision of subsidized goods such as seeds, pesticides, fertilizers and extension services, or government purchase, to name a few.

A strategy to achieve a living income demands to be determined given local circumstances and needs and certainly implies a combination of several levers.

The following looks at practical examples in the living income debate, considering the income situation of cocoa growing smallholders in Ghana. The main levers considered are on a micro – level, comprising change in cocoa price and productivity.

7. Example - Cocoa in Ghana

As mentioned above, over 70% of global cocoa supply is produced by smallholder farmers in West Africa. Ghana is one of largest producers next to Cote d'Ivoire. Cocoa is one of Ghana's most important export commodities and provides income to a large part of Ghana's population. Yet, the cocoa sector has been facing continuing challenges, including enduring poverty among farming communities.

A the same time there is genuine concern by the private sector that there will be a 500K – 1M ton cocoa supply deficit by 2020, while facing a risk of reputation with their consumers, concerning environmental and social sustainability of sourcing of cocoa beans.¹³

In order to secure cost-effective, long term supplies and to maintain sustainable relationships between producers and exporters it is vital to support the socio and economic development of cocoa smallholdings, to ensure decent working and living conditions. Hence, there is a strong need and interest by all actors including the private sector to better understand the main challenges and livelihood conditions of cocoa producing farms and households in the region.

7.1. Aim

The aim is to identify income structures of self-employed cocoa producing small-holders in Ghana for the year 2010. Further, an attempt is made to work towards a method addressing the living income debate for cocoa producing households within this context. In addition it shall be identified if a gap between current household income and a proposed reference line exists and to what extent this gap can be closed through a change in either productivity, price, ha size or household composition, while the level of diversification and all other factors remain constant.

7.2. Data

The report is a desktop study employing available primary and secondary data predominantly from the GIZ Sustainable Cocoa Business Programme (SCB), the 2013 WCF 9th Steering Committee Pre-read report, provided by Dalberg for the Cocoa Livelihoods Program and a Baseline Study, conducted by Hainmueller, Hiscox and Tampe (2011) for the Cadbury Cocoa Partnership. Data from the SCB Program is made use of, comprising gross margin calculations for various chosen crops for current and improved cultivation practices for the year 2010. Model calculations have been conducted with farm, family size and external income assumptions taken from Hainmueller, Hiscox and Tampe (2011) and the 2013 WCF 9th Steering Committee Pre-read report.

Due to time and financial limitations, a field study, producing representative data was not possible. Thus the following calculations face the drawbacks of being premised purely on analysis of provided information, limited to data available via journals and the SCB project - which certainly does not cover all relevant features as some aspects are only identifiable within the scope of a field study or practical experience. (A further description of additional limitations of provided models can be found in the Appendix.)

In sum, one should keep the drawbacks mentioned in mind and see this as a contribution to already existing literature and by no means as the ultimate measure of income levels and household structures of cocoa producing smallholders in Ghana.

¹³ Dalberg (2013), "WCF CLP 9th Steering Committee Pre-read", World Cocoa Foundation

7.3. Methodology

Household income calculations of two model cocoa producing smallholder households are constructed given gross margin calculations for relevant chosen crops and farm and household size assumptions as outlined below (Table 1 and 2). The models imply assumptions made concerning, household size, farm size, crops cultivated, level of diversification, yield, maturity of cocoa trees and external revenue. For each model the overall household income is calculated, considering off and on farm income for given farm and household sizes. In addition, two productivity levels are considered for each model, depicting improved and non-improved cultivation practices. The main differentiating factor being application of fertilizer and improved cultivation practices (e.g. pruning). In order to account for different levels of hired labour supporting the given model smallholder households – two states representing a minimum and maximum are constructed: one assuming all labour is hired, the second suggesting the household is undertaking all required labour itself, not implying any labour costs. It is proposed that the household income lies within this given range. (For further explanations see Appendix).

A reference line is determined as the World Bank international poverty line at 2 USD PPP/person/day. Consequently, the 2010 adapted PPP rate is utilized to convert the calculated per capita per day household income in USD PPP; as mentioned above this provides substantial limitations. In the case of Ghana, U.Gentilini and A. Sumner (2012) argue that the differences between national and international poverty rates for Ghana are minimal (-0.09%).¹⁴ Employing IPLs has been considered the most feasible method given available data (no updated national poverty line could be found), time and financial constraints. Nonetheless, one has to be aware of its limitations, which need to be addressed in future research.

In a subsequent step various scenarios are constructed for smallholder households with different characteristics and farm sizes, aiming at demonstrating to what extent productivity and price of cocoa need to change for those cocoa producing smallholder households to reach 2 USD PPP.

Overall provided calculations depict specific models of cocoa producing small-holdings. This helps to organize complexity, yet one has to be aware that it only represents a number of possible scenarios, involving implied bias.

7.4. Description of model cocoa producing small-holdings in Ghana

The following, as pointed out above, describes two chosen models of cocoa producing small - holdings. It highlights key assumptions made and sources utilized in comprising two model cocoa producing small-holdings in Ghana, as well as results shown from given income calculations.

The two models chosen represent two distinct farm ha size and family composition assumptions. Model 1 shows an average farm of 3.6 ha and family size of 6 as suggested for Ghana by the 2013 WCF 9th Steering

¹⁴ Which might be explained by the fact that Ghana's national poverty line was used to construct the IPLs

Committee Pre-read report. Model 2 represents an average farm of 2 ha and family size of 5 as estimated from information found in Hainmueller, Hiscox and Tampe (2011).

This shall provide a more detailed picture of different income structures and their economic viability before conducting scenarios for 2, 3.6 and 6 ha households, comprising 4, 5, and 6 members.

Model 1

*Key Assumptions*¹⁵ **Model 1:**

Table 1: Key Assumptions Model 1

	Assumption	Source
Household Size	Average household size of 6 members ¹⁶	2013 WCF 9 th Steering Committee Pre-read report
Capacity of productive workforce	240 working days per year (allowing for weekends and leave days, such as funerals)	GIZ Sustainable Cocoa Business Programme (SCB)
Total productive workforce	2.5 Proposing a young family structure	GIZ Sustainable Cocoa Business Programme (SCB)
Production		
Total Farm Size	Average 3.6 ha ¹⁷	2013 WCF 9 th Steering Committee Pre-read report
Types of crops cultivated	Main crop cocoa, followed by cassava and maize; groundnut is employed as “dummy crop” for a highly nutritious product	GIZ Sustainable Cocoa Business Programme (SCB)
Diversification: crops and ha cultivated	55% cocoa at maturity plateau, 20% cassava, 20% maize and 5% groundnut, assuming that all land available is cultivated; ¹⁸	GIZ Sustainable Cocoa Business Programme (SCB)
Yield – non improved	Cocoa: 370 kg/ha; Cassava: 10 000 kg/ha, Cassava bundles: 120; Maize: 1500 kg/ha, Groundnut: 1720 kg/ha;	GIZ Sustainable Cocoa Business Programme (SCB)
Yield -	Cocoa: 850 kg/ha; Cassava: 28 000 kg/ha,	GIZ Sustainable Cocoa Business

¹⁵ Further assumptions taken can be found in the Appendix.

¹⁶ Drawback of mean in comparison to median estimate

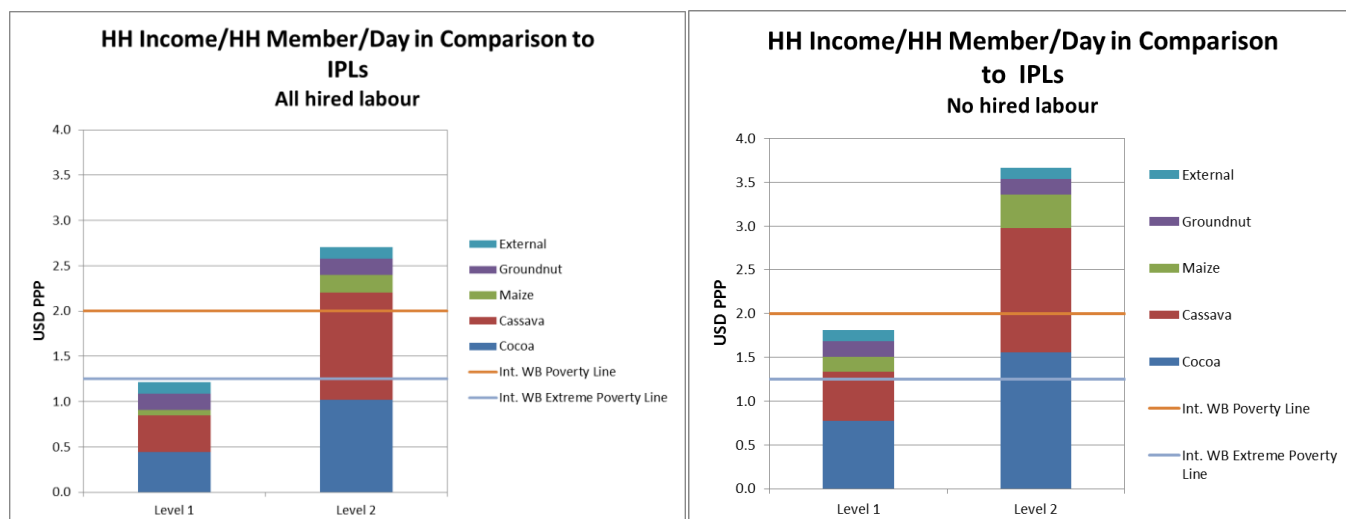
¹⁷ Drawback of not using median ha sizes

¹⁸ High level of diversification to account for mitigation of risk and nutritious diet

improved	Cassava bundles: 150; Maize: 4000 kg/ha, Groundnut: 1720 kg/ha;	Programme (SCB)
Off – farm income	200 GhS	Hainmueller, Hiscox and Tampe (2011)

Model 1 Results: Income calculations in comparison to IPLs

Figure 1: Model 1 - HH Income/HH Member/Day in Comparison to IPLs



Given household income calculations for Model 1 (3.6 ha and 6 members) state that per capita household income/day lies between 0.87 GhS (1.22 USD PPP¹⁹) and 1.29 GhS (1.81 USD PPP²⁰) at a non – improved Level (1) and between 1.92 GhS (2.71 USD PPP) and 2.60 GhS (3.66 USD PPP) concerning an improved Level (2) (See figure 1).

This implies that at a non – improved level in case all labour is hired per capita household income/day is almost on a par with the 1.25 USD PPP²¹ international poverty line, leaving a gap of 0.78 USD PPP to reach 2 USD PPP²². In case no labour is hired, the per capita household income/day is above the 1.25 USD PPP IPL, leaving a gap of 0.19 USD PPP to reach the 2 USD PPP IPL. (See figure 1)

At Level 2, representing improved cultivation methods, both scenarios (all hired and no-hired labour) show per capita/day household income noticeably above 2 USD PPP, leaving no gap.

This suggests that improved cultivation methods have the potential to achieve an income sufficient to reach 2 USD PPP. Yet, Level 2 suggests an optimized production state, which in practice might be difficult to achieve on a continuous basis, given possible adherent factors such as, unexpected events, bad weather conditions, pest and diseases or shortage in available labour, etc among others.

¹⁹ 2010 PPP conversion rate

²⁰ 2010 PPP conversion rate

²¹ At 2005 PPP conversion rate

²² At 2005 PPP conversion rate

At the same time it proposes that at a non-improved production level per capita/day household income does not suffice to provide an economically sustainable per capita/day household income under given assumptions. Nevertheless, it proposes that support enhancing productivity of existing crops can help to achieve economic sustainability.

Model 2

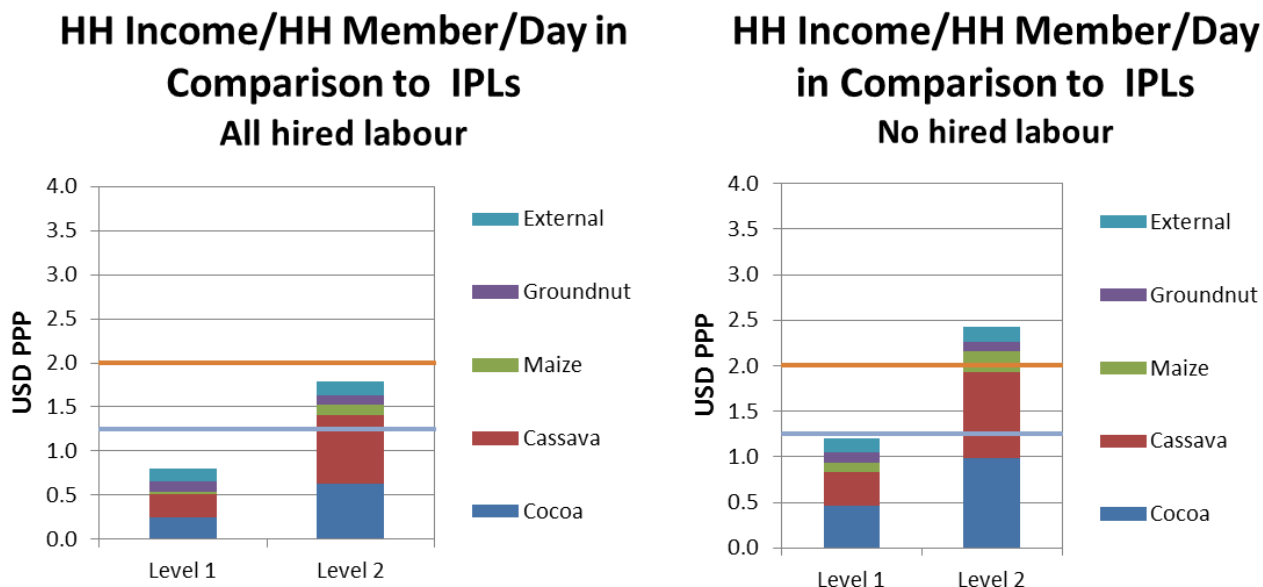
Key Assumptions Model 2: (2 ha and 5 member household)

Table 2: Key Assumptions Model 2

	Assumption	Source
Household Size	Median household size of 5 members	Hainmueller, Hiscox and Tampe (2011)
Capacity of productive workforce	240 working days per year (allowing for weekends and leave days, such as funerals)	GIZ Sustainable Cocoa Business Programme (SCB)
Total productive workforce	2 proposing a young family structure	GIZ Sustainable Cocoa Business Programme (SCB)
Production		
Total Farm Size	2 ha	Assumptions made given information provided by Hainmueller, Hiscox and Tampe (2011)
Types of crops cultivated	Main crop cocoa, followed by cassava and maize; groundnut is employed as “dummy crop” for a highly nutritious product	GIZ Sustainable Cocoa Business Programme (SCB)
Diversification: crops and ha cultivated	55% cocoa at maturity plateau, 20% cassava, 20% maize and 5% groundnut, assuming that all land available is cultivated;	GIZ Sustainable Cocoa Business Programme (SCB)
Yield – non improved	Cocoa: 370 kg/ha; Cassava: 10 000 kg/ha, Cassava bundles: 120; Maize: 1500 kg/ha, Groundnut: 1720 kg/ha;	GIZ Sustainable Cocoa Business Programme (SCB)
Yield - improved	Cocoa: 850 kg/ha; Cassava: 28 000 kg/ha, Cassava bundles: 150; Maize: 4000 kg/ha, Groundnut: 1720 kg/ha;	GIZ Sustainable Cocoa Business Programme (SCB)
Off – farm income	200 GhS	Hainmueller, Hiscox and Tampe (2011)

Model 2: Results Income calculations in comparison to IPLs

Figure 2: Model 2 - HH Income/HH Member/Day in comparison to IPLs



Model 2 (2 ha, 5 member household) suggests that in this particular case per capita household income/day lies between 0.57 GhS (0.81 USD PPP²³) and 0.85 GhS (1.20 USD PPP²⁴) at Level 1 (non – improved) and between 1.27 GhS (1.78 USD PPP) and 1.72 GhS (2.42 USD PPP) at Level 2 (improved). (See figure 2)

Consequently, at a non-improved state (Level 1) one can observe a gap of 0.05 to 0.44 USD PPP to the lower IPL and 0.80 – 1.19 to the upper IPL. (See figure 2)

At an improved Level (2) no gap can be identified with the 1.25 USD PPP/person/day IPL. In case all work is done by hired labour a gap of 0.22 USD PPP exists to reach the upper IPL, yet no gap prevails if all labour is undertaken by the family itself. (See figure 2)

This underlines that at a non – improved level a 2 ha farm comprised of a 5 member household is far from economic sustainability, hardly being able to reach the lower IPL (which is regarded as not economically viable), highlighting a significant gap towards the upper IPL.

This situation can be enhanced at a state where productivity of all crops is optimized. Yet, even in this case merely a state around the upper IPL can be achieved.

This raises the question of economic viability of given farm and household structures and existing support mechanisms. It seems provisions need to go beyond traditional agricultural capacity enhancing methods which in this case might only achieve an economically sustainable situation in an ideal state.

²³ At 2010 PPP conversion rate

²⁴ At 2010 PPP conversion rate

Having, in both models identified a gap at a non-improved production state, this raises the question which levers would need to be employed to which extent in order for the gap to close. To what degree would cocoa prices and yields need to increase at a non-improved state to reach given IPLs?

7.5. Scenario Analysis:

Main factors influencing household income are considered to be yield, price, ha size, household composition and level of diversification.

Subsequently, various scenarios are conducted for given variables to demonstrate to what extent productivity, price, ha size and household composition at a non – improved state can lead towards closing the described gap. As the main crop cultivated is cocoa, it will be identified to what extent the cocoa price and yield would need to increase to close the identified gap with given IPLs. The level of diversification is assumed to remain unchanged, since a high level of diversification is regarded as desirable to mitigate production risk, as well as to ensure a nutritious diet.

The following tables show to what extent price and yield of cocoa have to change for three different smallholding sizes (2 ha, 3.6 ha and 6 ha) and three distinct household formations (6 member hh, 5 member hh and 4 member hh) at a non – improved state, if all other factors and assumptions remain constant, in order to reach the provided IPLs.

Table 3: Living Income scenario all labour is hired

Table 1: All Labour is Hired						
Minimum Price / Yield of cocoa necessary to reach PLS (6 member HH), diversification (55% of total ha cocoa)						
Price (Ghs)	Size (Ha)	Poverty Line 1,25 USD	Poverty Line 2,0 USD	Price / Yield 2010	Percentage Change Needed	Needed 2USD
	Small (2 ha)	4,56	7,43	2,35	94%	216%
	Medium (3,6 ha)	2,42	4,01	2,35	3%	71%
	Large (6 ha)	1,35	2,30	2,35	-43%	-2%
Yield (kg/ha)	Small (2 ha)*	1130	1756	370	205%	375%
	Medium (3,6 ha)	404	980	370	9%	165%
	Large (6 ha)	144	360	370	-61%	-3%
*Once it exceeds 850 kg/ha no real proposition can be made, as data is only available up to a yield level of 850 kg/ha. In addition the current cost structure can no longer be considered as new planting of hybrid varieties would be required						
Minimum Price / Yield of cocoa necessary to reach PLS (5 member HH), diversification (55% of total ha cocoa)						
Price (Ghs)	Size (Ha)	Poverty Line 1,25 USD	Poverty Line 2,0 USD	Price / Yield 2010	Percentage Change Needed	Needed 2USD
	Small (2 ha)	3,76	6,15	2,35	60%	162%
	Medium (3,6 ha)	1,98	3,30	2,35	-16%	40%
	Large (6 ha)	1,08	1,88	2,35	-54%	-20%
Yield (kg/ha)	Small (2 ha)	906	1503	370	145%	306%
	Medium (3,6 ha)	285	758	370	-23%	105%
	Large (6 ha)	83	264	370	-78%	-29%
*Once it exceeds 850 kg/ha no real proposition can be made, as data is only available up to a yield level of 850 kg/ha. In addition the current cost structure can no longer be considered as new planting of hybrid varieties would be required						
Minimum Price / Yield of cocoa necessary to reach PLS (4 member HH), diversification (55% of total ha cocoa)						
Price (Ghs)	Size (Ha)	Poverty Line 1,25 USD	Poverty Line 2,0 USD	Price / Yield 2010	Percentage Change Needed	Needed 2USD
	Small (2 ha)	2,97	4,88	2,35	26%	108%
	Medium (3,6 ha)	1,53	2,6	2,35	-35%	11%
	Large (6 ha)	0,82	1,45	2,35	-65%	-38%
Yield (kg/ha)	Small (2 ha)	637	1212	370	72%	228%
	Medium (3,6 ha)	185	486	370	-50%	31%
	Large (6 ha)	23	168	370	-94%	-55%
*Once it exceeds 850 kg/ha no real proposition can be made, as data is only available up to a yield level of 850 kg/ha. In addition the current cost structure can no longer be considered as new planting of hybrid varieties would be required						

Table 4: Living income scenario no labour is hired

Table 2: No Labour is Hired						
Minimum Price / Yield of cocoa necessary to reach PLS (6 member HH), diversification (55% of total ha cocoa)						
Price (Ghs)	Size (Ha)	Poverty Line 1,25 USD	Poverty Line 2,0 US	Price / Yield 2010	Percentage Cha	Change
	Small (2 ha)	3,3	6,17	2,35	40%	163%
	Medium (3,6 ha)	1,16	2,75	2,35	-51%	17%
	Large (6 ha)	0,09	1,05	2,35	-96%	-55%
Yield (kg/ha)	Small (2 ha)	644	1471	370	74%	298%
	Medium (3,6 ha)	183	486	370	-51%	31%
	Large (6 ha)	14	165	370	-96%	-55%
*Once it exceeds 850 kg/ha no real proposition can be made, as data is only available up to a yield level of 850 kg/ha. In addition the current cost structure can no longer be considered as new planting of hybrid varieties would be required						
Minimum Price / Yield of cocoa necessary to reach PLS (5 member HH), diversification (55% of total ha cocoa)						
Price (Ghs)	Size (Ha)	Poverty Line 1,25 USD	Poverty Line 2,0 US	Price / Yield 2010	Percentage Cha	Change
	Small (2 ha)	2,5	4,89	2,35	6%	108%
	Medium (3,6 ha)	0,72	2,05	2,35	-69%	-13%
	Large (6 ha)	-0,18	0,62	2,35	-108%	-74%
Yield (kg/ha)	Small (2 ha)	414	1104	370	12%	198%
	Medium (3,6 ha)	113	322	370	-69%	-13%
	Large (6 ha)	-28	98	370	-108%	-74%
*Once it exceeds 850 kg/ha no real proposition can be made, as data is only available up to a yield level of 850 kg/ha. In addition the current cost structure can no longer be considered as new planting of hybrid varieties would be required						
Minimum Price / Yield of cocoa necessary to reach PLS (4 member HH), diversification (55% of total ha cocoa)						
Price (Ghs)	Size (Ha)	Poverty Line 1,25 USD	Poverty Line 2,0 US	Price / Yield 2010	Percentage Cha	Change
	Small (2 ha)	1,71	3,62	2,35	-27%	54%
	Medium (3,6 ha)	0,27	1,34	2,35	-89%	-43%
	Large (6 ha)	-0,44	0,2	2,35	-119%	-91%
Yield (kg/ha)	Small (2 ha)	269	736	370	-27%	99%
	Medium (3,6 ha)	43	210	370	-88%	-43%
	Large (6 ha)**					
** Exceeds Family Labour Available						

7.6. Results and Observations

Given scenarios suggest that for a 2 ha smallholding a gap with both IPLs exists for all household sizes, apart from a 4 member household which is able to close the gap to the lower IPL if it undertakes all labour itself. In all other cases (household size, hired and non-hired) a gap of 6% - 94% in price and 12% - 205% in yield has to be overcome to reach 1.25 USD PPP. Further a 54% - 216% increase in price and 99% - 375% rise in yield is required to acquire 2 USD PPP per capita/day. In addition, it can be observed that in the case of a 2 ha small-holding if no external labour is hired the smallholding is able to close the gap with the 1.25 USD PPP IPL applying fertilizers and improved production methods for cocoa²⁵. This is not the case in a scenario where the farm comprises a 5 and 6 member household not working on the farm, which is, yet, regarded as unrealistic.²⁶ However, in order to reach the upper international poverty line, which in this case we assume to be economically viable when applying IPLs, only a 4 member household is able to reach it when all labor is undertaken by the family. In all other scenarios in order to reach 2 USD PPP, the required yield increase exceeds 850 kg/ha (SCB) and can hence no longer only be achieved through short-term improved cocoa production methods and fertilizer, but requires new planting of hybrid varieties. This incorporates a significant investment for the smallholder. It is beyond this report to identify to what extent the household is able to make this investment (future study will need to consider this). Improvement of other crops will be required to address this issue. Yet, scenarios have shown that a “so called” sustainable situation can only be achieved at a 4 member household if all crops are optimized. In addition given calculations do not consider additional drawbacks smaller farms might face, such as higher transaction costs and lower prices, due to weaker bargaining power and poor market information, despite same level of productivity.

Further it is proposed that regarding a 3.6 ha smallholding no gap exists towards the 1.25 USD PPP IPL, only with the exception of a 6 member household where all required labour is undertaken by hired labour. In order to reach the upper IPL an increase in price of 11 to 71% and a growth in yield of 31 – 165% is required. Yet, in comparison to a 2 ha smallholding those gaps can be mainly closed through improved cultivation of currently employed local cocoa varieties, applying fertilizers and improved cultivation practices.

In addition the scenarios suggest that a 6 ha cocoa smallholding provides sufficient per capita/day household income (2 USD PPP and above) for a 4, 5 and 6 member household at both ends of suggested labour cost spectrums.

It can be observed that in the majority of cases a greater change in yield than price for equivalent ha size and household composition is required to reach the same IPL.

Given scenarios highlight the impact factors such as farm size, household size, yield and diversification of crops have on household income calculations and hence should be considered with caution when calculating household income.

²⁵ as the required yield increase does not exceed 850 kg/ha

²⁶ See Appendix, describing suggested labour capacity

8. Conclusion

The report highlights the significance of understanding smallholders' living conditions and needs, of which the income situation is a central one, to be able to put in place measures that truly benefit them, in order to reduce poverty and enable long-term sustainable cocoa supply. It underlines that no "one fits all method" exists.

The report provides two cocoa producing smallholder models as an example and develops various scenarios to identify income situations for different farm (2, 3.6, 6 ha) and family sizes (4, 5, 6), which are believed to be representative, identifying the change in cocoa price and yield needed to reach the upper IPL.

It is observed that a 2 ha smallholding at a non-improved level is unlikely to be economically sustainable for each of the tested household sizes. An increase in cocoa price of 54% to 216% and yield of 99% to 375% is needed to lift a 2 ha farm up to reach the 2 USD PPP/capita/day poverty line. Yet, those required yield increases go beyond what can be achieved through fertilizers and improved cultivation methods, asking for significant investment, planting higher yielding hybrid varieties. Total optimization of all crops cultivated can only achieve a situation attaining an income around 2 USD PPP/capita/day (merely at a 4 member household can it achieve 3 USD PPP/capita/day if no labour is hired). This asks for measures going beyond pure productivity improving activities.

In addition, it is suggested that at a 3.6 ha farm in a non-improved state for all household sizes assumed no economically viable household living situation is achieved. Yet, it is proposed that cocoa price improvements of 11 to 71% and yield improvements of 31 to 165% employing improved cultivation methods and fertilizers can achieve a household income of 2 USD PPP/capita/day. Optimization of crops cultivated can lead to household income notably above the 2 USD PPP/capita/day international poverty line.

At a 6 ha farm for each of the suggested household sizes no gap to the 2 USD PPP/capita/day IPL could be observed.

As has been outlined, one has to consider the results identified with caution, being aware of its limitations. Consequently, the outcomes must be used carefully and are not suitable for policy advice or to set norms for standard setting purposes. The intention of this report is of theoretical nature, as a form of exercise to address income calculations within the living income debate and to highlight the difficulty of making assumptions given the implications they carry.

When discussing a living income one always has to be aware that knowing that a smallholder earns a living income does not necessarily mean this is a "fair" or adequate remuneration for the work he/she is doing or the value of the product he/she is producing. It solemnly means that his/her household earns a

minimum to survive and even this can be a matter of debate, given implied subjectivity of income calculations and chosen living income estimates and reference lines. Consequently, the income debate should be enlarged and regarded from several viewpoints. Next to identifying whether a household earns sufficient to live on, it should also be asked if the farmer earns a fair share of the value chain and its final product, as well as opportunity costs and risks should be considered. Only if the discussion is regarded in a holistic manner will one be able to put it successfully in perspective.

9. Future Research:

Future Research in this regard should aim at identifying a representative living income based on national consensus. In addition accurate and representative data acquired in the field is needed to clarify uncertainties, which prevail; as well as further identified limitations need to be addressed. In addition, the income debate needs to be regarded from various angles to be able to draw more meaningful conclusions.

10. Appendices

10.1. Appendix 1: Limitations

Additional underlining constraints need to be highlighted, since described models imply limitations which have a significant effect on suggested results.

1) International World Bank Poverty Lines:

See methodology

2) External Income:

A proposition concerning external income has been made to acknowledge occupation and income from work or revenue outside of cocoa smallholdings. However, data on this matter is missing. As such it does not change with family, ha size and available opportunities and can hence not be regarded, as adequate representation.

3) Hired Labour:

Information as to family labour capacity has not been available. In addition the report is missing data on number and days daily labourers are employed. Due to this lack of information model specific labour costs can only be allocated in a minimum and maximum spectrum, not allowing making suggestions as to in which part of the household income range the considered model small-holding is allocated.

4) Other Agricultural Activities: Livestock and Processing

Moreover, frequent important income generating activities, such as cultivation of livestock are neglected, due to lack of data. Furthermore, additional income from processing crops is ignored. This is particularly relevant for maize and cassava and will need to be addressed in future scenarios.

5) Timing and quantity of sales; Loan costs and Savings:

Timing of sales, amount sold and subsequent storage costs and post harvest and storage losses could not be identified and leaves room for precision, as well as missing information on relevance and size of loan costs or available savings, which is especially relevant for the improved cultivation state, as household income from the non – improved state suggests that investment for an improved state can only be achieved through savings or acquisition of loans.

6) Diversification:

The level of diversification is regarded as given and constant and does not change with farm size, despite the fact that smaller farms are likely to grow fewer crops than bigger farms.

Further this does not allow to make suggestions as to the degree diversification can influence household income. Focus is laid on improvements in cocoa yield and price to reach the IPLs and hence does not consider improvements of other crops.

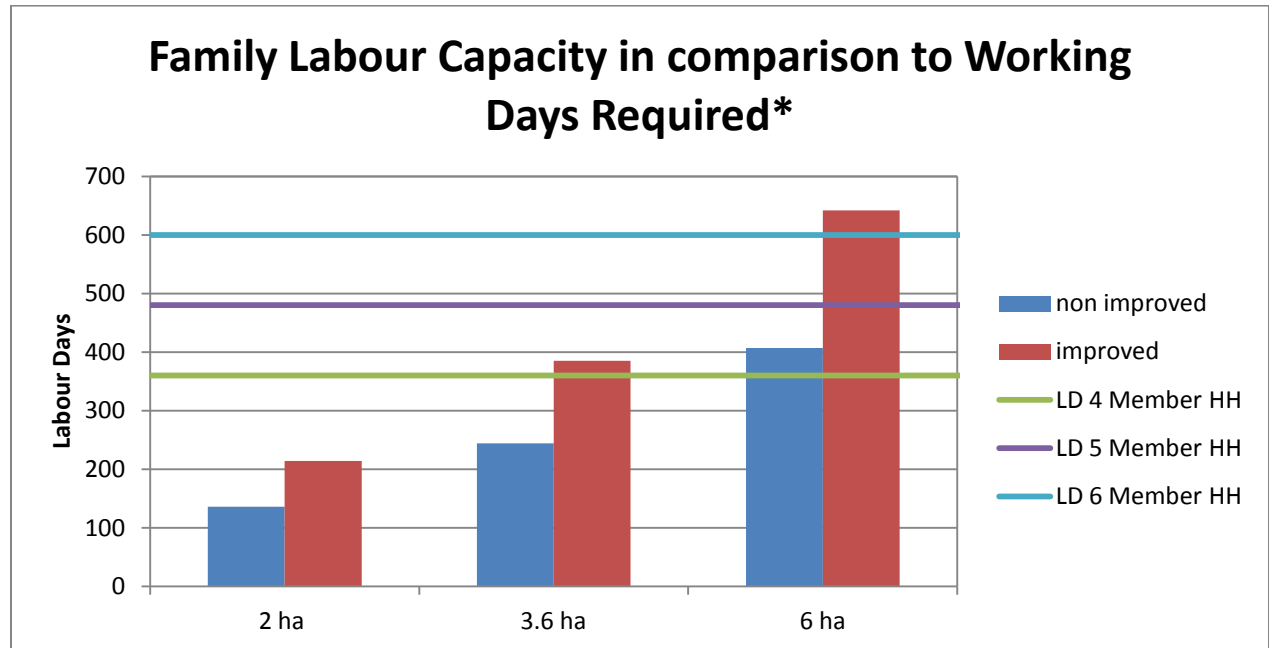
Moreover, information on production is only available for two states a non – improved and improved level.

Overall provided calculations depict specific models of cocoa producing small-holdings. This helps to organize complexity, yet one has to be aware that it only represents a number of possible scenarios, involving implied subjectivity.

10.2. Appendix 2: Family labour capacity in comparison to working days required

In order to account for different levels of hired labour supporting the given model smallholder household – two states representing a minimum and maximum are constructed: one assuming all labour is hired, the second suggesting the household is undertaking all required labour itself, not implying labour costs. It is proposed that the household income lies within this given range. Following tables describe family labour capacity in comparison to working days required, neglecting peak times.

Figure 3: Family labour capacity in comparison to working days required



There seems to be some support for proposing that small cocoa producing households (such as 2 and 3.6 ha farms) and smallholdings comprising larger family sizes are more likely to be closer to a scenario where all required labour is undertaken by the household itself. However, studies such as Hainmueller, Hiscox and Tampe (2011) have shown that for a median 2 ha farm and 5 member household around 71% of farmers interviewed report that they hired day labour in the past 12 months. 90% answered that they did not hire any long-term labour.

Data to add precision as to where smallholders' household income is located in the spectrum is missing for this report and should be subject of future considerations.

10.3. Appendix 3: Methodologies for developing countries to estimate a living wage

Methodologies used for developing countries to estimate a living wage

Taken from: Anker, R. (2011), “Estimating a living wage: A methodological review”, *Conditions of Work and Employment Series No.29*, ILO Geneva

3 categories:

- Country-specific data used to estimate a living wage
- Living costs from another country to estimate a living wage
- Factory – specific studies and data used to estimate a living wage

Advantages/ Disadvantages of the three methods

Categories	1. Country-specific data	2. Living costs from another country used to estimate a living wage	3. Factory – specific studies and data
Advantage	<ul style="list-style-type: none"> - More generic assumptions hence can be better applied to others - Most widely used 	<ul style="list-style-type: none"> - Specific - Interesting aspects otherwise often not covered - Considering specific/local basic needs 	<ul style="list-style-type: none"> - Specific - Interesting aspects often not covered - Considering specific/local basic needs
Disadvantage	<ul style="list-style-type: none"> - Sometimes lacking transparency - Assumptions can vary widely - Depends on approach taken 	<ul style="list-style-type: none"> - Sometimes lacking transparency - Too specific to universally apply formula, hence not representative for all other developing country cases 	<ul style="list-style-type: none"> - Sometimes lacking transparency - Too specific to universally apply formula, hence not representative for all other developing country cases

1. Country-specific data:

	ORGANISATIONS				
Indicators	Social Accountability International (SAI) SA8000 corporate code of conduct	Asian Floor Wage Alliance (AFWA), 2009	Institute of Labour Science and Social Policy and World Bank, Minimum wage setting technical report, 2007	Anker 2005 and 2006 (also author of the used article)	World of Good Development Organization, 2010
Formula	(Food cost per person*average HH size/ proportion food of total HH expenditure) / 2 full-time workers in HH +10% for savings	(Food cost per adult*3 adult equivalent consumers) / .50 for proportion of HH expenditure for food Separate LW estimated for 7 Asian countries. Each value expressed in 2005 PPP. Average of the 7 LWs in PPP calculated – slightly adjusted – arrive at an Asian Floor wage 475 PPP(internal negotiations)	1.7*(Cost of food + non-food at BN level per adult) (1.7 used as each worker is responsible for one child whose calorie needs assumed to be .7 of an adult's)	((Cost of model diet per person/food share of HH expenditure)*HH size) / full-time workers per couple +10% for emergencies	Cost of housing, food, electricity, cooking fuel, transport, medical, school, clothes
Expenditures included	2 groups (food and non-food) +Savings (10% added)	2 groups (food and non-food)	2 groups (food and non-food)	2 groups (food and non-food) Emergencies (10%)	8 groups
Definition food costs	<ul style="list-style-type: none"> - Model diets - 2100 calories per person 	<ul style="list-style-type: none"> - Model diet - 3000 calories per adult <p>(Slightly high estimate)</p> <p>(2250 calories per person for four-person household)</p>	<ul style="list-style-type: none"> - Model diets - 2300 calories for adults, 1600 calories for children aged 4-6 - Set at observed food consumption of households in income quintile where required calories per person reached (second quintile) - Alcohol included (3.3% of food expenditure) 	<ul style="list-style-type: none"> - Model diets - ~ 2260 calories (depends) - Includes acceptable number of calories, proteins, fats and carbohydrates (according to WHO recommendations and consistent with national food preferences) - Low cost diet - Consumption of pulse/beans, potatoes and cereals determined using FAO data on national food 	

				<ul style="list-style-type: none"> - consumption - Cost estimated using national food prices from ILO October Inquiry - Model diets change with development level 	
Definition non-food costs	<ul style="list-style-type: none"> - Engel's law - Non-food (100%-%food) 	<ul style="list-style-type: none"> - Non-food (50%) - Engel's law - A difference of 10% can be applied. Determined by the individual country to account for level of development 	<ul style="list-style-type: none"> - Non-food (~55%) (observed level in second HH income quintile) - Engel's law 	<ul style="list-style-type: none"> - Non-food (100%-%food) - Engel's law 	
% Food	Region specific %	50%	~45%, - Region specific	Country and development level specific	
Household size	Estimated for each locality	4 (2 adults and 2 children) = (3 adult equivalent consumers = 4 persons)	4 (Every worker supports 1 child)	4& (2 + total fertility rate)	
Number of full-time workers in household	2	1	2	1& (average number of full time workers per couple, using labour force participation rates by age and sex, part-time work rate and unemployment rate)	
Working hours	Living wage must be earned in normal working hours	Must be earned in legal working hours. At most 48 hours		Average 40 (high income), 35 (transition economies) 44 LA, 48 Asia, SSA, Middle East/NA	
Who has been considered?	Locations and factories	All Asia	Regions in Vietnam	For 12 countries drawn from all development levels	
DATA	Estimated for each locality by SAI certified auditors		Based on observed consumption in national income and expenditure survey Cost of diet estimated using observed food prices	<ul style="list-style-type: none"> - Online data (WHO; FAO; ILO etc.) - National food prices from ILO October Inquiry 	Based on self-entry on web of living costs by unknown persons
Advantage	<ul style="list-style-type: none"> - Simple clear living wage formula - Measuring living wage locally 	<ul style="list-style-type: none"> - Simple clear living wage formula - Avoids possible race to bottom in highly 	<ul style="list-style-type: none"> - Example of reasonably well done estimate of worker needs as input to national minimum wage setting 	<ul style="list-style-type: none"> - Data required available online - Transparent 	

	<ul style="list-style-type: none"> - Take home pay (hence including legally mandated social benefits) - Qualitative analysis, considering inputs from workers, worker rights groups and unions 	competitive garment industry			
Disadvantage	<ul style="list-style-type: none"> - Differences between auditors as each uses his own model diet, food costs and food share of household expenditure - No suggestion on composition of diet or principles used - No indication how food prices are determined <p>→ Lack of transparency</p>	<ul style="list-style-type: none"> - Composition of model diet or principles used not reported - No indication how food prices are determined <p>→ Lack of transparency</p> <ul style="list-style-type: none"> - Assumption that food share of hh expenditure is 50% - Use of one LW in real terms for all countries in Asia questionable <p>→ LW assumptions do not differ with development level of country</p>	<ul style="list-style-type: none"> - Not clear if costs are set per adult or person - How good this standard is depends on quality of expenditure data (which are often under-reported) and how many hh are living at an acceptable level - Observed spending might not tell much about meeting basic needs 	<ul style="list-style-type: none"> - Dependence on available online data - Inability to estimate living wages by localities within countries 	<p>Not representative</p> <p>Overly simplistic</p> <p>Intended mainly for commercial purposes</p> <p>Necessary expenditure excluded</p>

Sensitivity analysis in Anker (2005) has shown that living wage estimates have been significantly sensitive to: additional earner per couple, one less/more child per couple and sensitive to no-food necessities multiplier

Further issues which could be accounted for:

- Food and non-food costs in urban vs rural areas (e.g. housing, transportation etc. is much higher)
 - E.g. No consensus on how to estimate housing costs (e.g ignore owner-occupied housing, result: reported food share can be under or over-reported)
- Outdated or lacking expenditure data in countries (e.g. food price data (not for all food items, different kinds and regions etc.))

- Food eaten away from home
- Differences between mean and median food share can be large
- Realistic diets (neither ideal nor cheapest), (miscellaneous additional food costs (e.g. spices, guests)
- Including “unnecessary or undesirable” expenditures e.g. alcohol or tobacco
- Total number of calories varies with age, body size, basic metabolic rate, sex, health, climate, pregnancy, lactation and level of physical activity.
- Number of calories per 100 grams used
- It is not advisable to use the same per capita calorie requirements for all countries
- Scalars for food and non-food items (age and economies of scale)
- Household sizes in urban vs rural areas
- Further dependents (e.g. family members in rural areas)
- Number of single-person households, Different average family sizes in the world (fertility and mortality rates)
- Additional costs when both parents work (e.g. child care) (e.g. 1.5 full time workers)
- Accounting for part-time, unemployment – inability to always find work
- Private cost of typical public goods such as health care and education (some countries provide subsidized goods, others do not, in addition quality has to be considered)
- Taxes (e.g. payroll, sales and income taxes)

Issues that can be included/discussed when comparing existing wage or income to poverty lines or living wage rates:

- Ignoring home production work that is self-consumed
- In-kind earnings (+ benefits, housing etc.)
- Subsidized goods and services
- Remittances
- Debt and interest payments

Comparison country specific data methods, including national poverty lines. In comparison to WB international poverty lines (2nd category)

	ORGANISATIONS		
Indicator	National poverty lines (absolute) consumption based	World Bank poverty lines (2\$ /person/day)	World Bank extreme poverty line (1,25\$ /person/day)
Formula	Most of the time:	“..Calculated by doubling the	- Mean of absolute national poverty lines of the 15 poorest

	Normative basis food costs and non-food costs Poverty line = Food cost*(% spent on nonfood/%spent on food) Other approaches see e.g income approach ²⁷	amount of the 1990 lower poverty line... reflecting poverty lines more commonly used in lower-middle income countries” (WB, 2000/2001) ²⁸	countries with personal consumption expenditure per capita of less than \$60 a month; - countries include – Malawi, Mali, Ethiopia, Sierra Leone, Niger, Uganda, Gambia, Rwanda, Guinea-Bissau, Tanzania, Tajikistan, Mozambique, Chad, Nepal and Ghana - Poverty lines are converted in 2005 PPP and the mean taken
Expenditures included	Often two expenditure groups (food and non-food)	Depends on national poverty lines employed	Depends on national poverty lines employed Normally 2 expenditure groups (food and non-food)
Definition food costs	In most cases: Nutritious low cost diet, Number of calories Assumptions depend on country (e.g. from 1800 to 2400) 2100 calories is approx. the value used by nat. authorities and WB	Depends on national poverty lines employed	Depends on national poverty lines employed In most cases: Number of calories, assumptions depend on country
Definition non-food costs	Depends on assumptions made by the country Majority of cases: Engel's law is applied	Depends on national poverty lines employed	Depends on national poverty lines employed
% Food of total expenditure	Depends on assumptions made by the country (Median low income countries: 65% ²⁹ , median lower middle income 60%)	Depends on national poverty lines employed	Depends on national poverty lines employed
Household size	Depends on country estimate (e.g. 4), Depends on scalars applied ³⁰	Poverty line is communicated as capita per day	Poverty line is communicated as capita per day
Number of full-time workers in household	N/A	N/A	N/A

²⁷ India income level of households which consume just above the number of required calories per capita (2400 calories per day for rural areas and 2100 calories per day for urban areas) (does not consider if other nutritional or non-food requirements are met) (A. Introduction and background on poverty and living wage rate)

²⁸ Anker (2005)

²⁹ E.g. India (80%, Pakistan 55%) , Anker (2005)

³⁰ India implied a 3.20 scalar for family of four; Ghana family of four: scalar is 2.50 (assumes 0.2 for ages 0-2, 0.3 for ages 7-12, and 0.5 for ages 13-17)

Working hours	N/A	N/A	N/A
Who has been considered?	Country for which the national poverty line is calculated	1990 poverty line (33 countries in the sample)	15 poorest countries (in the sample) Malawi, Mali, Ethiopia, Sierra Leone, Niger, Uganda, Gambia, Rwanda, Guinea-Bissau, Tanzania, Tajikistan, Mozambique, Chad, Nepal and Ghana
DATA	National household surveys, income data and account estimates	1990 poverty line 2005 PPP	National poverty lines and 2005 PPP
Advantage	Country specific	Simple number Easy to apply	Simple number Easy to apply
Disadvantage	<ul style="list-style-type: none"> - Problems with reliability of samples and data (e.g. unreliable national account estimates e.g. see Ghana) - Problems with quality of household surveys (changes in sampling methodology etc. - Urban vs rural lines 	<ul style="list-style-type: none"> - See extreme poverty line, as used as basis for calculation - PPP, (extreme poverty line) 	<ul style="list-style-type: none"> - Not representative (the 1,25\$ PPP poverty line is not supposed to be used to measure the poverty line at the national level) - Difficulties with PPP (PPP have not been made for a number of countries, PPP estimates are benchmarked only every several years with values for other years updated annually using national CPI which adds imprecision³¹; PPP values sometimes change substantially with new benchmarks; PPP focuses on consumption baskets for the general population - Different countries use different methodologies and assumptions³² - Embodies whatever subjectivity and judgments are included in each national poverty line employed - Differences in data and methods used in setting national poverty lines (e.g. income vs consumption based poverty lines, urban or rural poverty lines, age of the line and data (e.g. oldest from 1985) or country specific effects); poor statistical capability of countries – hence poorest 15 might not be the poorest 15 in the sample - Subjective use of the lowest 15 countries with an existing absolute poverty line, of which 13 are African countries. Only countries with an absolute poverty line are considered, a relative component is not accounted for - Some countries use absolute poverty lines over time others do not and adjust

³¹ CPI weights and national poverty line weights differ. CPI weights for food are often notably lower, as they represent average consumption for the entire population.

³² 80% use a version of the basic needs method, but even within the basic needs methods a variety of different assumptions are taken between countries

2. Living costs from another country to estimate living wages:

PARAMETERS	ORGANISATIONS	
	Novartis, 2009	SweatFree Communities, 2010
Formula	<p>((Cost in urban Mexico for average person for food, housing, clothing, education, child care and education, transportation, health care, other) *(4 in HH) /1.33 full-time workers in HH) *(PPP in country x/PPP in Mexico) + 5% savings</p> <p>Use of ratio of PPP for country x to Mexico PPP Result: One living wage in real terms for all developing countries</p>	<p>(1.2*PL in USA for HH with 1 adult and 2 children) * (GDP per capita in PPP in country x)/ (GDP per capita in PPP in USA)</p> <p>2080 hours per year (52 wks*40 hours) Result: LW per hour</p> <p>LW per hour reduced by \$1.55 PPP when employer provides health care</p> <p>American poverty line multiplied by 1.2 to account for low value, but still too low</p>
Expenditures included	7 expenditure groups	2 expenditure groups Food and non-food
Definition food costs	<ul style="list-style-type: none"> - 2,082 calories per adult - Food costs are median expenditures of households with between plus and minus 5 % of required calories per adult - Food (27.3%) 	
Definition non-food costs (Proportion Food/Non-food items)	<ul style="list-style-type: none"> - Non-food costs median expenditures of households with between plus and minus 5 % of required calories per adult - Housing (27.3%), clothes (6.2%), child care and education (2.1%), transport (11.3%), health (2.5%), other (23.4%) + Savings (5%) 	
Household size	4 (2 adults and 2 children) Equal to 3.83 equivalents for food expenditure, 2.7 adult equivalents for non-food expenditure	3 (1 adult, 2 children)
Number of full-time workers in household	1.33 (each parent assumed to work 2/3 time to allow for child care and household work)	1
Working hours	48 hours	
Who has been considered?	Urban Mexico	
DATA	2000 household survey	WB; CIA (poverty line etc.)
Advantage	Interesting elements (e.g. different adult equivalents for food and non-food	Simple formula

	costs etc.	
Disadvantage	<ul style="list-style-type: none"> - Uses same real living wage for all countries - Very specific assumptions (urban Mexico not necessarily representative for all developing countries and regions) - Methodology for calculating living wage for all too simplistic 	<ul style="list-style-type: none"> - Living standard applied in country x not known - GDP per capita PPP relative to US often inappropriate scalar - Use of United States as a base not appropriate for developing countries

3. Factory – specific studies and data used to estimate living wage

PARAMETERS	ORGANISATIONS		
	Prasanna and Gowthaman, 2006	Chandararot and Dannet, 2009	Institute for Social and Economic Research, Education and Information, 2003
Formula	2 Formulas A) ((Cost of food per person + cost of non-food items per person) * 1.1 for underreporting of expenditures * 1.25 for consumer - durables and savings) * average HH size/ average number of workers in HH B) ((Cost of food + cost of non-food items per person)*1.1*1.25) + fixed amount for support worker's family	(BN of worker + (BNs per person in rural*HH size in rural)) / # earners in HH	Basic Needs of single urban worker+(.15*BNs of dependent in rural * # dependents in rural) + 15% for discretionary spending
Expenditures included	Non-food costs Food costs	Not indicated	Not indicated Workers reported 155 expenditure items Discretionary spending
Definition food costs			40% food
Definition non-food costs (Proportion Food/Non-food items)	Non-Food costs: Estimated separately for clothing, housing, personal care, medical, electricity, education, transportation, communication, other		<ul style="list-style-type: none"> - 16% housing - 8% clothing - Basic needs cost for rural is less than urban (and 15% of worker's basic needs costs)
Household size	For A: Average HH size of women apparel workers surveyed For B: 1	4 (urban)	2.5 for urban
Number of full-time workers in household	For A: Average number of workers in HH of women apparel workers surveyed For B: 1	1&2 (2 is average number observed in factory HHS)	1 & 1.4
Working hours	-	-	-

Who has been considered?	Women apparel workers in survey factories in Sri Lanka	One Cambodia factory with mostly single migrant women workers	Surveyed factory workers in Indonesia
DATA	Surveys: ~ 700 women apparel workers in Sri Lanka	<ul style="list-style-type: none"> - Average expenditure in survey of 343 workers - Average expenditure from 2004 National Income Survey 	Survey data for 1,140 workers and seven focus group discussions in four Indonesian factories
Advantage	Some useful ideas (e.g. estimation of range of living wages and support of family in rural areas)	Some useful ideas (adding cost of supporting family in rural area, assuming rural cost is less than urban cost, using data from two sources)	<ul style="list-style-type: none"> - Questionnaires and qualitative data - Useful ideas (differentiation between urban and rural and inclusion of dependents in rural areas, estimation of more than one living wage)
Disadvantage	<ul style="list-style-type: none"> - Too factory specific - Suspect quality survey data 	Too factory specific	<ul style="list-style-type: none"> - BNs in part determined using perceived needs - Too factory specific to apply it universally

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