InfoBridge

Guide How To Calculate Fair Prices

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Cover photo: Goats as a source of additional income, Burkina Faso (Photo by author)

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SUMMARY

A practical example is given how to calculate Fair Prices for agricultural products originating from small-holders. It starts with the calculation of a Living Wage as it is known in industry (esp. textile), based on the needs of a worker to maintain his/her family. This Living Wage is the basis for the calculation of a Living Income for the farmer. The Living Income per household combined with production costs, determines the amount the farmer has to receive for his products. Based on this income needed and the actual production costs, a Fair Price can be calculated for each different crop.

An Excel-sheet is attached showing the different steps to be taken to calculate a Fair Price.

INTRODUCTION[1]

Common opinion is that a market price is the right price, because it is the result of supply and demand. It is a pity that this belief is so widespread, because the market price is only an equilibrium price, when and if, all conditions are fulfilled. That means perfect competition without any distortions like monopolies, oligopolies etc. When we look at markets like those for cocoa, coffee and tea, it appears that a small number of large companies dominate the market. Since they all have to compete, none of them is inclined to pay more than the others. As for the small farmer, he does not have a choice; he has to accept the price offered to him.

There are numerous reports that small farmers have a larger output/ha than large farms, see among others Hazell et al (IFPRI), Reardon et al, van der Ploeg. For the small farmer who wants to market his products, not only the price he is paid is important. Other important factors are the availability of markets, roads and other infrastructure, availability and price of inputs, subsidies and taxes, etc.

In practice however, emphasis is laid on these other aspects, while leaving out the price received by the producer for his products. Prices are taken as an objective factor that cannot be changed unless the whole system is changed to a situation wherein it is not the market anymore that leads to equilibrium prices.

Therefore we have to make a brain shift to a situation where not the theory of supply and demand with all its theoretical assumptions and problems, is in the centre, but the question how to use the pricing mechanism to ensure not only a decent price to the consumers, but to the producers as well.

It is in this context that the Living Income / Fair Price approach may be useful.

Before we can discuss the question why thinking about fair prices might be important, first we should define what we mean by a fair price.

We can define a **Fair Price** to the producer as *the price that enables the producer to earn a Living Income, which means the net income a household would need to earn to enable all members of the household to afford a decent standard of living.*

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[1] I would like to thank Marc Bleijenbergh for his critical support and advices, as well as Eberhard Krain and Friederike Martin, both of GIZ, for sharing ideas on their and my work on Living Income. Karel Dekker has kindly provided the excel sheet in the Annex.

Of course I remain solely responsible for any faults and mistakes in both approach and calculations.

One of the means necessary for agricultural growth is financial means. Farmers can only invest when their basic needs are satisfied. This means that they must receive a price for their products that enables them to fulfil their basic needs as well as a small surplus to invest.

There is a habit to subsidize inputs (seeds, fertilizer) because small farmers cannot afford them otherwise. This system is vulnerable for fraud and corruption. Should the farmer have enough income from the sale of his products, however, he can afford to purchase these essential items himself, without being dependant on governments, financial institutions, NGO's etc.

In that case financial institutions do not have to give loans to farmers but can assist them to save, in line with recent developments where many institutions already have shifted their attention from giving loans to assisting the customer to save.

Calculation of FP's may be especially useful for policy makers, be it in government, donors, cooperatives or NGO's. It can help them to formulate clear policies, geared towards the needs of the target group.

Examples how calculated FP's can support policy decisions:
-    Differences between market prices and the prices farmers should receive in order to be able to continue farming can immediately be seen
-    These differences highlight the question of the long term consequences should these differences continue (e.g. accelerated growth of the cities with poor citizens)
-    By changing data in the model, several alternatives can be examined, for example: when conditions of delivery of inputs change (think of price, availability, training, infrastructure), different plot-sizes, ways of production, mechanization, imports and labour needs, changes in family size
-    When it is not expected that the calculated fair price can ever be achieved (think of dry and infertile soils where production is very low like semi-desert areas where pastoralism may be more rewarding than agriculture), it shows that other alternatives than agriculture should be explored.

What follows is a practical example how to calculate fair prices for agricultural products originating from small-holders. It is not meant as an elaborate calculation of a fair price, but is rather a basis to proceed from when the need for calculating a fair price arises. Each situation is different, so in each situation the parameters to be used will be different as well, but this example provides a basic structure to start from.
It consists of three basic elements, first the calculation of a Living Wage and following that, of a Living Income and then the calculation of the fair price.
Since this is not an all-inclusive, detailed study with a lot of field-work, use has been made as much as possible of existing data. This to show that indications of what a fair price should be can be made without costly research as well. For a method for calculating Living Income in a more sophisticated way, see Anker 2014.

Smallholder rice field in India (Kerala)
Photo by author

Schematically the calculation of a Fair Price (FP) is made in the following way:

Steps
1. Calculation of Living Income (LI) required
2. a. Calculation of production, marketing, storage and other costs
   b. Production in kg of target crop
3. Calculation of price/kg that will lead to a Living Income.

This price is the so-called 'Fair Price'.

The main steps of this approach are worked out in the next example.

For an integrated approach of the LI/FP method in project analysis see Bronkhorst 2014.

In The Annex an Excel model is given that can be used to calculate a Fair Price.

CALCULATION OF A LIVING WAGE

In the region Boucle du Mouhoun in Burkina Faso, farmers grow maize, millet and sorghum as food products and cotton for cash income. This example will show that even in a situation where many relevant data are lacking, it is possible to arrive at satisfactory outcomes and that way gain important insight.

Definitions :

- *For Living Wage the following formula is used:*

Average household size x (cost of food + cost of non-food per person)

$$\overline{\hspace{10cm}} + \text{ savings (set at 10\% of income)}$$

Average number of adult earners per household

Whereby:

- *The local average household size (which can be different from a standard family) and the average number of adult earners per household are used*
- *The sum of the weights of its members is calculated by valuing adults as 1, and persons aged under 18 as 0.5*
- *For the adult earners both men and women are calculated as 1[2]. Children between 14 - 18 years may be calculated as 0.5[3].*
- *Where the non-food component cannot easily be determined, the extrapolated approach with percentages adapted to local circumstances can be used*
- *For the food component a norm of 2400 kcal/day could be used*
- *Deduct all provisions provided*

- *Living income is the net income a household would need to earn to enable all members of the household to afford a decent standard of living. Elements of a decent standard of living thereby include: food, water, housing, education, health care, transport, clothing, and other essential needs including provision for*

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[2] Productivity of men and women in agriculture can be different, as is the case between two people of the same sex. In this approach the Living Wage that people should earn is independent of their productivity. What counts here is that everyone who works full time should earn a Living Wage at least

[3] It is everywhere usual that children during peak periods work with their parents on the farm, during their school holidays, after school hours etc. Therefore they cannot be left out, but also cannot be valued as adult full-time workers.

unexpected events (Living Income Practitioners' Workshop hosted by ISEAL & GIZ, Eschborn, February 2015).

- *'Fair' prices are the prices that result when Total Revenue equals production costs plus Living Income (Living Income equals the total of Living Wages at the farm plus 10% investment costs).*

For our Burkina Faso case, we will start by taking the poverty line as basis for our calculations, since for this country no Living Wages have been calculated so far (for other countries Living Wages can be found at WageIndicator.org (www.wageindicator.org).

By taking the poverty line as basis we are faced with the problem that, although the methodology for how the poverty line has been established, namely on basis of known costs of food and non-food[4], different poverty lines exist, namely a national poverty line of CFAF[5] 72,110, a rural poverty line of CFAF 71,737 and an urban poverty line of CFAF 73,557 (data INSD in World Bank 2005).

For our calculations it seems appropriate to take the rural poverty line[6] as our point of departure because our case is about the rural areas of Burkina Faso, Boucle du Mouhoun. This rural poverty line has been calculated at CFAF 71,737.

The next step is to look at the average size of the family to calculate the Living Wage.

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[4] From World Bank Report No. 29743-BUR: **Box 4: How is the Official Poverty Line Computed?**
"INSD constructs a poverty line using the "cost of basic needs" approach, in three steps:
First, the food component of the poverty line is estimated by valuing a set of food items providing the recommended intake of 2283 calories per capita per day at the prices prevailing during the survey. The food items used by INSD consist of four staples most consumed by the households in Burkina Faso, namely sorghum, millet, com and rice. **A** standard conversion table is used to determine the caloric content of each Kg of product. The composition of this food basket reflects the share of these four staples in the consumption of the households for each survey, and thus changes from survey to survey. The basket is evaluated at the prices of the four staples prevailing in Ouagadougou markets at the time of the survey.
Second, the non-food component is equal to the non-food expenditures observed for the households whose food consumption is close to the food poverty line estimated above. The ratio of non-food to food consumption is estimated for each household. Then, the share of non-food consumption in the total poverty line is chosen to be the share reported by those households whose food consumption is close to the value of the food poverty line (for instance, ±1 percent). The ratio obtained thus far is multiplied by the food poverty line to get the non-food component of the poverty line. In other words, if the typical household near the food poverty line consumes food and non-food items of about equal value, the non-food component would be set equivalent to the food poverty line.
The official poverty line then is determined as the sum of the food and non-food components."

[5] FCFA stands for Franc CFA, the currency used in West-Africa. It has affixed exchange rate to the Euro: 100 FCFA = 0.152449 EUR.

[6] The high seasonality of prices of the main staples, especially during the lean period, contributes to the fluctuation of the nominal poverty line, and generates dramatic swings in the share of food in total household consumption from one survey to the other.

According to the Burkina Faso household survey, 2003 – SARPN the average household size in 2003 was 6,4 (SARPN).

ONAPAD estimates average household size in Boucle du Mouhoun at 7,8[7] (ONAPAD).
Since ONAPAD figures relate to Boucle du Mouhoun only, while the SARPN data are the average for the whole of Burkina Faso, it seems preferable to use for our calculations the data provided by ONAPAD, so an average household size in Boucle du Mouhoun of 7,8.

In the case of African households the wife works as much on the land as the husband. Also children are involved in agricultural activities in their spare time. Therefore both men and women between the age of 18 and 60 are valued as 1, and persons from 14 to 18 years as 0.5. both children < 14 yrs and elderly (>60 yrs of age) are valued as 0.

Akresh counts a number of 10.6 per household (Number of Members per Household 10.6, Number of Wives per Household 1.5, Children Under Age 18 per Household 3.6, Children Above Age 18 per Household 3.2 and Number of Additional Other Members per Household 1.3) (Akresh 2005), whereas ONAPAD counts 7,8 household members (ONAPAD 2004). Unfortunately, ONAPAD provides no details about the composition of the households.

If the percentages would be equal in both cases, we can use the data to calculate the following composition of households in Boucle du Mouhoun:

Number of Members per Household 7.8

Head of the household 1

Number of Wives per Household 1.1

Number of Children Under Age 18 per Household 2.6

Number of Children Above Age 18 per Household 2.3

Number of Additional Other Members per Household 0.9

Total comes at 7,9 because of round-offs.

Since we do not know the number of children between 15 and 18 years of age, we will not include a figure for them in the calculations.

So we may estimate the number of adult family wage earners (>18<60 yrs) at 1 + 1.1 + 2.3 = 4,4[8], and the size of the household at 1+1.1+2.6/2+2.3+0.9 = 6,6.

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[7] A possible explanation for these large families given by ONAPAD is that an important part of the heads of the households is polygamy (33,6%).

Graph I shows the relationship between the number of family members, the weighed family size and the number of wage-earners.

Graph I Relation family size and wage-earners
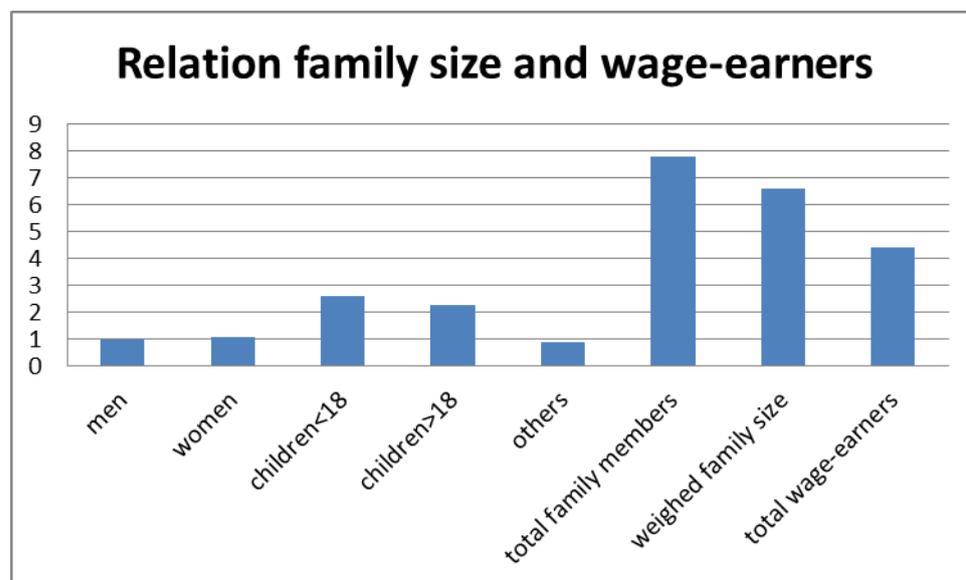
When applied to the formula of the Living Wage, that is

Average household size x (cost of food + cost of non-food per person   )

_____   + *savings (set at 10% of income)*

Average number of adult earners per household

This results in: (6,6 * 71.737) / 4,4 + (10% * 107606) = 118.366 FCFA as amount for the Living Wage per adult worker in Boucle du Mouhoun in Burkina Faso.

It should be noted that the calculation of a Living Wage is based on averages, so a Living Wage will not be sufficient for everyone. Both for family size and expenses averages are used so it seldom fits a real situation. Yet, working with averages is the best we can do to approach reality.

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[8] Reality is often more complicated than this. Besides that, African men may have more than one spouse, there often is a close cooperation between several households (brothers, sisters, parents) so that it is preferable to look at the Unit of Production and the Unit of Consumption to make a better calculation. For this example, this would lead too far however.

CALCULATION OF LIVING INCOME

The Living Wage per adult worker for an average family of 7,8 persons with 4,4 wage-earners has been calculated above and amounts to 118.366 FCFA. This means that a family with 4,4 adult wage earners should receive 4,4 * 118.366 = 520.811 FCFA as income for the produce. At the level of the firm (household) this amount should be raised by another 10% to have some additional income for small investments (hoe, shovel etc.) as well, so total income of the household should amount to 520.811 + 10% * 520.811 = 572.892 FCFA in order to achieve a Living Income.

Graph II shows the difference between the calculated Living Wage and Living Income.

Graph II: Living Wage and Living Income in FCFA
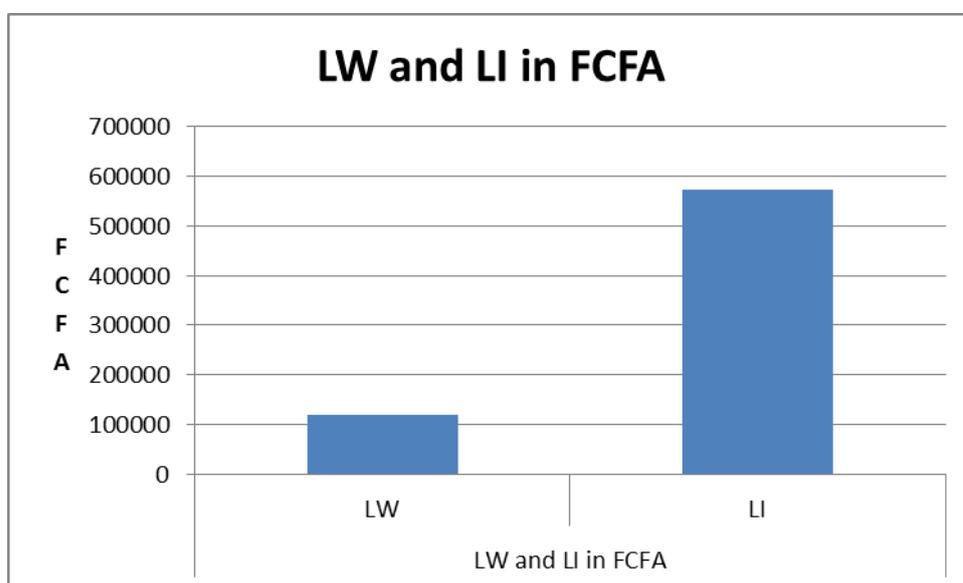
CALCULATION OF A 'FAIR' PRICE

Our case is an area that can be exploited of 4.4 ha in Boucle du Mouhoun, Burkina Faso, where sorghum, millet and maize are grown. As additional cash income cotton is produced.

We will take the example of one crop, maize. This will give the equilibrium price should the peasant produce one crop only and be dependent on that crop only to achieve a Living Wage. We assume that all adult family workers work all year full-time at the farm.

   a. *Calculation of production, marketing, storage and other costs*

Maize

Maize is cultivated either on a terrain that requires fertilisation or on the same plot where previously cotton was grown. As the cotton was fertilised the maize doesn't require further fertilisation.

There are four cases to be distinguished with regard to the way the work is done:
   1. With Plough, no fertilizer
   2. With Plough, fertilizer used
   3. With Tractor, no fertilizer
   4. With Tractor, fertilizer used

The next table indicates the number of working days required per ha for maize when working with a plough, and fertilizer is applied.

Table I: Working days and other costs for 1 ha. maize working with a plough on soil enriched with fertilizer

Maize   days   Costs in FCFA

costs with plough and fertilizer		labour costs	other costs
	Working days	labour costs	other costs
Clearing	10 working days at 750 FCFA a day (500 F salary + 250 F food)	7500	
Stump removal	10 days	7500	
Ploughing	16 days	12000	
Seeding and shelving	5 days	3750	
Hoeing and weeding	16 days	12000	
Earthing up	16 days	12000	
Harvesting	10 days	7.500	
Packaging, handling, transport	7 days	5250	19750

Fertilizing	150 kg NPK (150*225) and 100 kg urea (100*215)		55250
Total	90 days	67500	75000

(Source: calculated from data provided by MARH)

Total cost of production is 67.500 + 75.000 = 142.500 FCFA. It is important to realize that labour costs consist of hired workers only; the cost of family labour is included in the Living Income.

b. *Production in kg of target crop*

Table II: Maize production in kg/ha

	Production per ha
Fertilizer applied	4500kg/ha
No fertilizer applied	3000 kg/ha

(Source: MARH)

c. *Calculation of price/kg (Fair Price) that will lead to a Living Income*

What can be calculated now is the price the producer should receive for his produce in order to obtain a Living Income when producing maize only.

For sake of analysis we distinguish three cases of peasants. One group does not commercialise food, a second group that does commercialize part of its produce and a third group that has a larger surface to work and commercializes part of its produce as well. All groups, however, may produce and sell cotton. The groups are defined according to the findings of the research done by TASIM/AO[9]

1. A group that does not commercialise food and has an average of 2,8 ha. at its disposal, and
2. A group that commercializes part of its produce has an average of 4,4 ha. at its disposal, and
3. A group that commercializes part of its produce and has an average of 6,8 ha. at its disposal.

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[9] Unfortunately TASIM/AO provides data at U.P. (production unit) only. UP's do not necessarily coincide with families. By lack of data at family level the data for UP's are used in the calculations.

The first group with an average of 2,8 ha does produce food but that is mainly for auto-consumption and barter. They are outside the marketing system for food products (not for cotton) and therefore market prices of cereals don't affect them much. For our analysis of cereal market prices, we leave them therefore out and concentrate on those peasants that commercialise (part of) their produce. Here we will discuss peasants with an average of 4,4 ha at their disposal.

The case of 4,4 ha

Table III : Maize production costs and production in kg for 4.4 ha

Maize	Cost/ha (FCFA)	Cost 4.4 ha (FCFA)	Production/ha (kg)	Production 4.4 ha (kg)
tractor and fertilizer	181500	798600	4500	19800
tractor, no fertilizer	118750	522500	3000	13200
plough and fertilizer	142500	627000	4500	19800
plough, no fertilizer	79750	350900	3000	13200

In the case of production of maize on 4,4 ha with plough and fertilizer 19.800 kg must be equal to 627000 (costs for 4,4 ha) + 572.892 (household income needed) in order to achieve a fair price (Living Wage for each worker plus production costs plus 10% investments) for the producer. This means a price to the producer of (627000 + 572.892) / 19.800 = 60,60 FCFA/kg. This is the FP for a producer when producing maize only on 4.4 ha.

This way we get the following 'fair' prices for different cases:

Table IV : 'Fair' price in case of 4.4 ha maize only

'Fair' price (FCFA)
    a. tractor and fertilizer   69,27   FCFA/kg
    b. tractor, no fertilizer   82,98   FCFA/kg
    c. plough and fertilizer   60,60   FCFA/kg
    d. plough, no fertilizer   69,98   FCFA/kg

Graph III: Fair Prices maize under different production methods

Fair Price maize 4,4 ha in FCFA
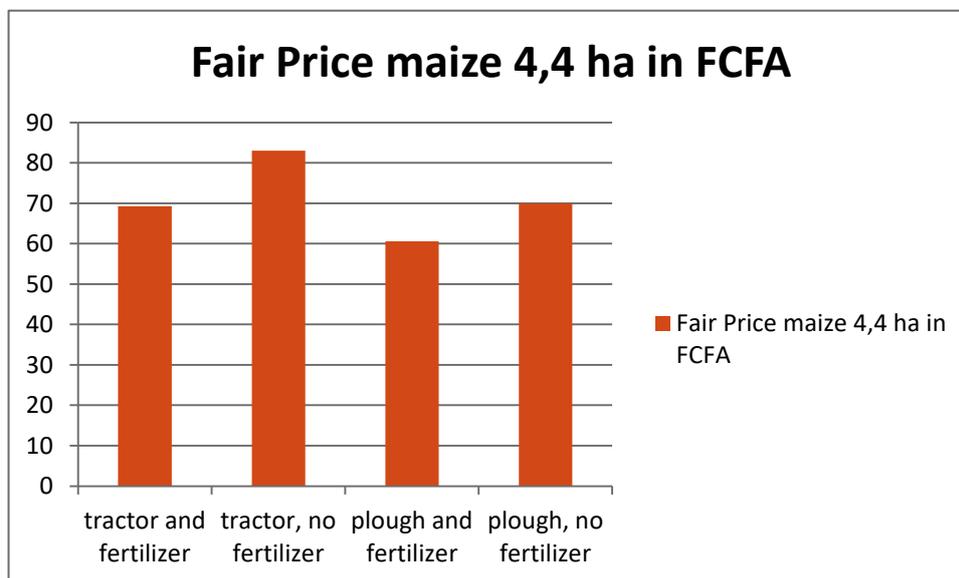
It is interesting that this table appears to show that in this case the combination plough and fertilizer is most profitable for the farmer. This shows the necessity of a good availability of fertilizer at a low price. It also raises the question in what circumstances the use of a tractor becomes more profitable than use of the plough. This may have to do with investment costs, size of the farm and the availability of labour.

We can now compare the calculated Fair Prices with the paid producer prices during 1985 – 2005. This is shown in the next graph.

Graph IV: Producer prices and calculated fair prices for maize in Burkina Faso during 1985 – 2005
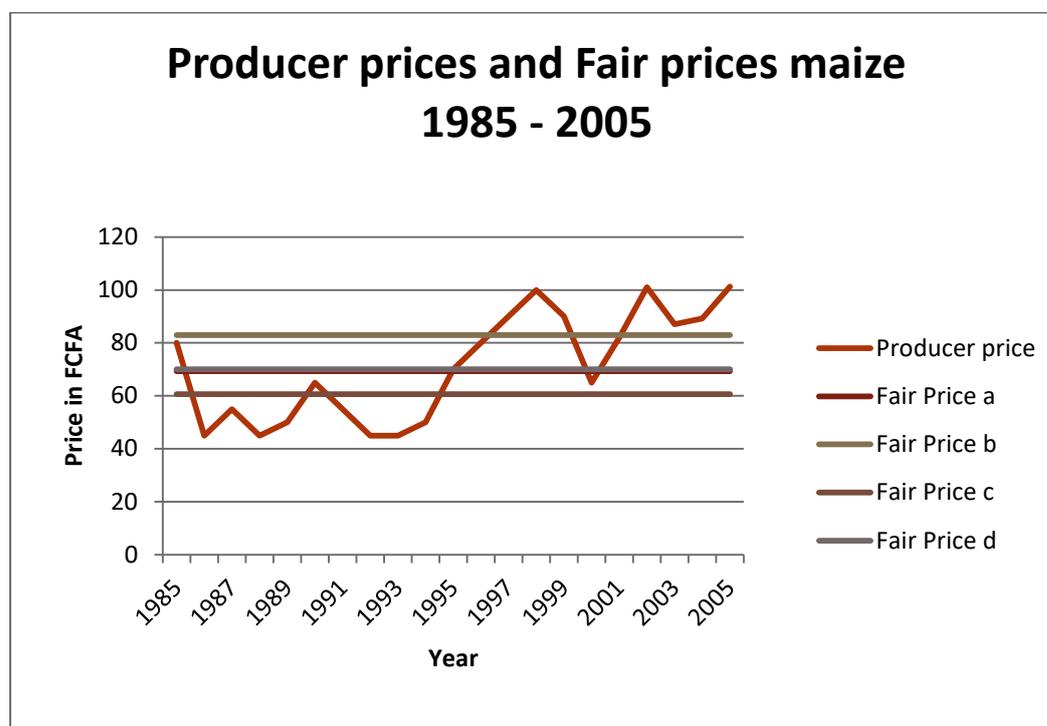
Source: Production prices DPSAA/DGPER, Fair prices calculated

It can be very clearly seen that producer prices vary enormously from year to year. This is due to the erratic rainfall in the country. So the difference between producer price and fair price is also each year different again.

When calculating 'fair' prices for three products instead of for maize only, we may examine the case where the peasant grows all three crops during the year, on let's assume 1, 2 ha millet, 1,1 ha sorghum and 2,1 ha maize. Total 4,4 ha. The total income the peasant derives from it with 'fair' prices equals the amount of Living Income he has to earn.

Production costs are different though for the three crops. So the calculation for maize will be:

(Production cost maize + 2,1/4,4 * LI) / Quantity produced = Fair Price maize.

So the FP for maize in the case of 2,1 ha maize with production cost of 142500/ha *2,1 = 299250 FCFA and 9450 kg production (4500 kg production/ha) will be:

(299250 + 2,1/4,4* 572.892) / 9450 = 60,60 FCFA / kg.

As could be expected, this amount is the same as when calculated for production of maize only on all surface.

To summarise

Maize: plough and fertilizer

	Costs/ha
Fertilizer, transport etc.	87000
Labour (74 days at 750 F/day))	55500

Total costs	142500
To be earned (LI/ha)	130203

Total	272703
Production in kg.	4500 kg/ha
Minimal to be earned (FP) per kg	272703 / 4500 = 60,60 F/kg

About labour: labour costs are calculated at actual costs which is higher here than LW. In LI labour costs are calculated at LW though. This way labour costs are not calculated double. Labour consists of external labourers, which is a costs factor. Labour by the farmer and his family costs are implied in the costs of LI. It may follow from this that working for another is financially more rewarding than working on the peasant's own farm. But if one chooses the option of working for another farmer for higher wages, this will provide income for a short period only.

Should the market price for labour be equal to LW though, we get the following picture:

	Costs /ha
Fertilizer, transport etc.	87000
Labour (74 days at 428,86F/day)	31736

Total costs	118736
To be earned (LI/ha)	130203

Total	248939
Production in kg.	4500 kg/ha
Minimal to be earned (FP) per kg	248939 / 4500 = 55,32 F/kg.

Should the market price of labour be below the Living Wage for our calculations we still have to take the LW into account and not the lower market price, because the FP is based upon the payment of LW and not on actual prices. So the FP cannot be below 55,32 F, unless production costs or production/ha change.

All this only applies when the farmer spends a certain amount of his time on this crop, in this case with 74 days/ha as well. When he spends less time on this crop, production will go down as well. So for the calculations it is necessary to put a norm to calculate the FP. When he spends less time on this crop, the FP will not change, but he will not be able to achieve a LI with this crop (this may be compensated by spending more time on other crops so that in total he may end with a higher LI).

Additional income

Cattle as a source of additional income, Kerala, India

Photo by author

Additional small income (chickens, eggs, milk etc.) can be included at market prices. So when they sell and eat for let's say 1.000 FCFA chicken and 500 FCFA eggs at market prices, the amount of 1.500 FCFA is deducted from the LI amount. This LI becomes 572.892 − 1.500 = 571.392 FCFA, or 571392/4.4 = 129862 F/ ha.

So taking into account this additional income, the FP calculation for maize becomes:

Maize: plough and fertilizer

	Costs/ha
Fertilizer, transport etc.	87000
Labour (74 days at 750 F/day))	55500

Total costs	142500
To be earned (LI/ha)	129862

Total	272362
Production in kg.	4500 kg/ha
FP per kg	272362/ 4500 = 60,52 F/kg

So the extra activities of the household do influence the FP for maize, but to a minor degree.

Suppose net household income of the cultivation of cotton, home grown food and labour for others amounts to 200.000 FCFA. Maize and cotton are cultivated on the same plot. Then again the equilibrium prices will change, because net income to be derived from these food crops may be less. In the formula for calculating the equilibrium price an amount of 572.892 FCFA has been used (Living Wage for each worker plus investment costs) in order to achieve a fair price.

Now we can diminish the 572.892 FCFA with the 200.000 received from other sources, the amount then to be used in the formula becomes 372.892. The amount of 200.000 FCFA is deducted from the LI amount. This LI becomes 572.892 − 200.000 = 372.892 FCFA, or 372.892/4.4 = 84.748 F/ha.

This has the following effects on the equilibrium prices:

Maize: plough and fertilizer

	Costs/ha
Fertilizer, transport etc.	87000
Labour (74 days at 750 F/day))	55500

Total costs	142500
To be earned (LI/ha)	84748

Total	272703
Production in kg.	4500 kg/ha
FP per kg	272703/ 4500 = 50,50 F/kg

So where small extra activities of the household do influence the FP for maize to a minor degree, the situation is only different when those activities comprise a larger part of income.

CONCLUSIONS

With the amount required for a Living Income and production costs known, ´fair´ prices that the peasant needs to receive for his crops can be calculated.

It appears that the Fair Price calculated does not determine Living Wage and Living Income. On the other hand, both Living Wage and Living Income, as well as the market price for labour when this price is above the Living Wage, influence the amount of the Fair Price. Differences in number of working hours/days do not influence the Fair Price because we are working with average working hours/days/ha. This way mismanagement of time is not reflected in the Fair Price.

Minor extra activities of the household do influence the Fair Price, but to a minor degree.

Whereas small extra activities of the household do influence the Fair Price to a minor degree only, the situation is different when those activities comprise a larger part of income. This requires a new calculation of the Fair Price.

When market prices are lower than ´fair´ prices, the reasons for this should be analysed. On the basis of those results policies can be formulated. Possibilities include among others removal of market distortions (such as subsidized food imports, food aid that is sold on the market, power positions in the marketing chain) that have a negative effect on market prices of agricultural products, as well as by providing infrastructure and inputs together with technical advice, giving income- or production- subsidies or by creating more remunerative employment in the rural areas.

Use of the Living Income and Fair Price concept in the agricultural context is not easy and requires a lot of work, but it can be done even when little information is available, as shown in this Burkina Faso case.

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ANNEX

This Annex contains an Excel sheet with the necessary steps to be taken to calculate a Fair Price. The amounts and quantities respond to the amounts and quantities in the example, but it can be used as a framework to work with for any crop.

Annex 1 is the calculation in the local currency, while annex 2 contains the same calculations now expressed in US $.

ANNEX

Table 1

Calculation model for Fair price　[　　]input

XOF is currency code for FCFA

Family size	Head of HH	Wives per HH	Child < 18yrs	Child > 18yrs	≥ 60 yrs	Total
Family members	1,0	1,1	2,6	2,3	0,9	7,90
Weigh factor	1,0	1,0	0,5	1,0	1,0	
Weighed family members	1,0	1,1	1,3	2,3	0,9	6,6
Cost of food pp /year	XOF 35.000	XOF 35.000	XOF 17.500	XOF 35.000	XOF 35.000	XOF 231.000
Cost of non -food pp/ per year	XOF 36.737	XOF 36.737	XOF 18.369	XOF 36.737	XOF 36.737	XOF 242.464

Total		XOF 473.464
Needed savings	10%	XOF 47.346
Needed hh income/yr		**XOF 520.811**

	Head of HH	Wives per HH	Child < 18yrs	Child > 18yrs	60 yrs /Additional	
Average number of adult earners per household	1,0	1,1	0,0	2,3	0,0	4,4

LW pp/yr (per earning adult)　　**XOF 118.366**

Working days/ yr = calendar days – Sundays – festivals – social obligations - calamities – sick days

	Total days/yr	Sundays	free days	sickness	Total working days / yr
Working days/ yr	365	52	20	18,25	275

LW per adult earning family member per working day　　**XOF 431**

On basis of this Living Income (LI) can be calculated	factor>	1,1	**XOF 572.892**

*LI/yr= (Number of Adult earners * LW)x 1,1*

Size of the farm in ha　　4,40 ha

LI/ha = LI / size of the farm　　**XOF 130.203**

Needed to calculate costs per crop / ha (these costs may differ, depending on way of cultivation, e.g. with/without fertilizer and/or improved seeds)

	a	b	c	d	
Investments / repayments (interest and depreciation)					a. maize: plough no fertilizer
Inputs					b. maize: plough and fertilizer
Hired labour	XOF 67.500	XOF 67.500			c. rice
Field operation costs					d. wheat
Harvest and post harvest costs					
Transformation costs					
Storage, Handling and Transport	XOF 12.250	XOF 19.750			
Fertilizing		XOF 55.250			
Costs of the umbrellla organization					
Taxes					
Other					
Total production costs / ha	XOF 79.750	XOF 142.500			

+

Production in kg per ha. per crop for different ways of cultivation

	a	b	c	d
	3000	4500	3000	4500
FP per ha = (costs/ha + LI/ha) /production/ha	**XOF 69,98**	**XOF 60,60**		

In case of Additional income	a	b	c	d	
Home grown food	XOF 7.000	XOF 7.000			
Labour (working for third parties)	XOF 6.462	XOF 6.462			15 days
Remittances					
Subsidies					
Other	XOF 186.538	XOF 186.538			
Total additional	XOF 200.000	XOF 200.000			
Additional income is deducted from LI, so the LI becomes	XOF 84.748	XOF 84.748			
LI / ha					

	a	b	c	d
FP per ha = (costs/ha + LI/ha) /production/ha	**XOF 54,83**	**XOF 50,50**		

Table 2

Calculation model for Fair price in US $			input		calculated	
	XOF is currency code for FCFA		Currency XOF related to $$		XOF 1	$0,0017
Family size	Head of HH	Wives per HH	Child < 18yrs	Child > 18yrs	≥ 60 yrs	Total
Family members	1,0	1,1	2,6	2,3	0,9	7,90
Weigh factor	1,0	1,0	0,5	1,0	1,0	
Weighed family members	1,0	1,1	1,3	2,3	0,9	6,6
Cost of food pp /year						
Cost of non -food pp/ per year						
Total pp/yr						$122
				Needed savings	10%	$12
				Needed income pp/yr		$134
				Needed hh income/yr		$885
	Head of HH	Wives per HH	Child < 18yrs	Child > 18yrs	60 yrs (Additional)	
Average number of adult earners per household	1,0	1,1	0,0	2,3	0,0	4,4
				LW pp/yr (per earning adult)		$201
Working days/ yr = calendar days – Sundays – festivals – social obligations - calamities – sick days	Total days/yr	Sundays	free days	sickness	Total working days / yr	
	365	52	20	18	275	
			LW per adult earning family member per working day		$0,73	
On basis of this Living Income (LI) can be calculated			factor>	1,1		$974
LI/yr= (Number of Adult earners * LW)x 1,1						
Size of the farm in ha				4,4		
LI/ha = LI / size of the farm						$221
Needed to calculate costs per crop / ha (these costs may differ, depending on way of cultivation, e.g. with/without fertilizer and/or improved seeds)						
	a	b	c	d	a. maize: plough no fertilizer	
Investments / repayments (interest and depreciation)					b. maize: plough and fertilizer	
Inputs					c. rice	
Hired labour	$115	$115			d. wheat	
Field operation costs						
Harvest and post harvest costs						
Transformation costs						
Storage, Handling and Transport	$21	$34				
Fertilizing		$94				
Costs of the umbrella organization						
Taxes						
Other						
Total production costs / ha	$135,58	$242,25				
+						
Production in kg per ha. per crop for different ways of cultivation						
	a	b	c	d		
	3000	4500	3000	4500		
FP per kg = (costs/ha + LI/ha) /production/ha	$0,119	$0,103				