



## Market Analysis Tool

# How to Estimate Household Net-Seller/Buyer Status and the Welfare Impact of Shocks?

December 2009

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The views expressed herein can in no way be taken to reflect the official opinion of the World Food Programme.

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### **Note**

This document is intended to be a 'living' one which will be revised on the basis of the lessons learned from the field application. The current version reflects the collective insights and experience of WFP staff on initial attempts to integrate the concept of net-seller/net-buyer status in the food security analysis indicators. As such, those preparing to conduct a household survey (e.g. **CFSVA** or **in-depth EFSA** or **P4P baseline surveys**) may well find it useful to peruse the entire document to familiarize themselves with what needs to be done and how to proceed from data collection to analysis and report writing (see box 1).

Technical Guidance Sheets  
and other related resources are available at:  
<http://www.wfp.org/food-security>

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## Box 1 Purpose and scope of this guidance sheet

The **purpose** of this technical guidance sheet is to provide sufficient information to WFP Country Office and partner staff to identify and profile households as net-sellers and/or net-buyers of food within a specified time period, typically on a seasonal basis or over a year. **This is a living document that will be adjusted according to feedback received from those who attempt to pilot it in future food security analyses.**

This guidance sheet defines what is meant by a household that is a net-seller/net-buyer of food. Households may market various agricultural and non-agricultural products that they produce; however in this guidance sheet the **definition of net-seller/net-buyer status of household will be restricted to the sale and purchases of staple foods relevant to the regions under study.** As such, throughout the guidance sheet the use of “net-seller/net-buyer” will always refer to staple foods.<sup>1</sup>

Also, the guidance focuses on the net-seller/net-buyer status of **households who belong to agriculture-based livelihood groups, as typically it is households who belong in agriculture-based livelihood groups that market production of staple foods.**

Furthermore, this guidance will discuss the various implications this profiling has on the interpretation of the **short-term impacts of price or income shocks. In this context,** WFP-specific programme interventions, such as local purchases and in particular Purchase for Progress are considered as positive shocks in that they aim to increase households’ incomes. The net-seller/net-buyer status of households is an integral part of livelihood and food security analysis.

**Part I** of this guidance sheet deals with the basic concepts of the net-seller/net-buyer status;

**Part II** presents a 4-step approach for collecting and analysing the necessary data

## Part I Basic concepts

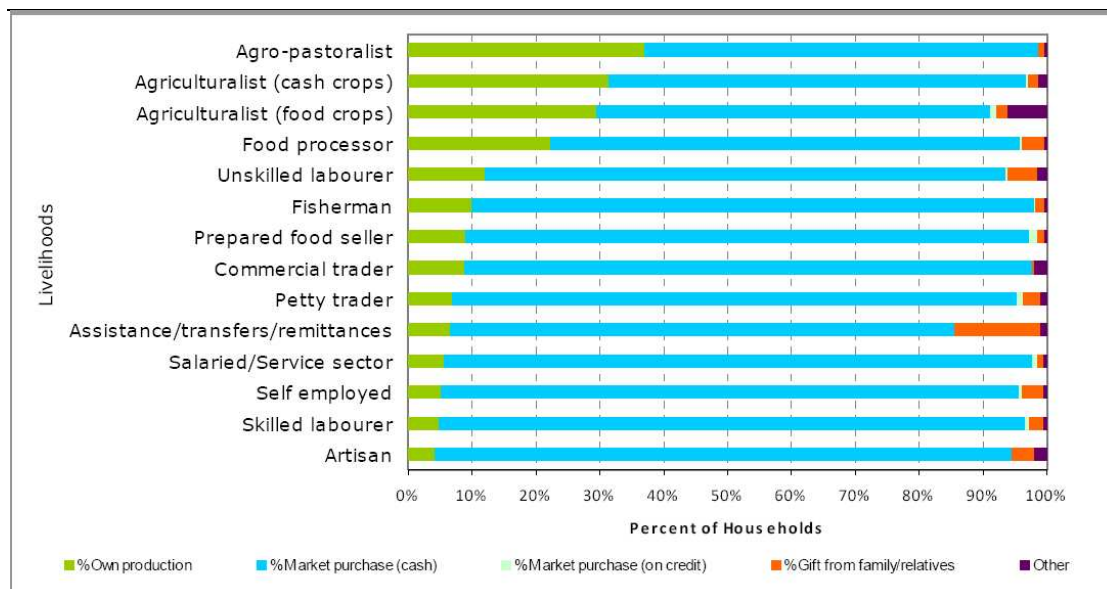
### 1. Defining households as net-sellers and/or net-buyers of food

A substantial proportion of households are dependent on agriculture-based livelihoods, whether they are agricultural wage labourers or farmers. In food security analysis, livelihood profiling is often linked directly to the way in which households can secure access to sufficient food for themselves – i.e. according to their primary productive activity (see EFSA guidance 2009 for further details). For households who face an adverse economic, political and social environment, relying on markets for their food security is risky, and so **many households engage in own-production of staple food where possible.** This protects them to a certain extent from market-related volatility and shocks (WFP 2009a). As such, **they do not necessarily buy all their food needs nor sell all their food production on the markets.**

Typically in livelihood profiling, households are classified not only according to their main income sources but also in relation to their food sources. This helps to identify those households and those livelihood profiles that are more dependent on markets for their access to food on the one hand and on their own production on the other (see Figure 1 below).

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<sup>1</sup> It should be noted that this guidance sheet can be applied to a variety of other contexts including cash crops, non-staple foods and also to livelihood groups that do not include agricultural production such as wage labourers.



**Figure 1 - Main sources of food by livelihood group**  
**Source: WFP Ghana CFSVA 2009 (WFP 2009h)**

The example from Ghana shows that a fairly high proportion of households who are agriculturalists involved in the production of food crops rely on market purchases with cash. This is not necessarily unique to Ghana, and similar patterns may be observed in different contexts.

Within the scope of households who are classified as dependent on agriculture-based livelihoods, these households gain their income through the sale of their food production on the markets, to acquire food in markets, except where households produce enough amounts of food commodities themselves to meet their needs. A population's dependence on markets despite their active engagement in food production can result in a **pattern of increased risk and vulnerability depending on the seasonality of their dependence on markets**, as dictated by the interaction between their agricultural income and their sales and/or purchases on the markets.

For this reason, it is not sufficient to identify an aggregate measure of household dependence on markets, but rather identify the seasonality related to this dependence. In other words, adjust typical post-harvest sales with lean-season purchasing over a year, representing the idea of 'net' in the expression 'net-buyer/net-seller'.

The broad framework for the definition of the net-seller/net-buyer status of households is based upon these components:

1. sale of production for income (income source)
2. purchase of food on market (expenditure)
3. own-production (stocks for consumption, seed or storage)

These three components are evaluated in the net-seller/net-buyer status of households to adjust typical post-harvest sales with lean season purchasing over a year for those households mainly engaged in agricultural production of food staples. As such, the definition of net-seller and net-buyer are as follows:

- A household which is **net-seller of food staples is defined as a household that sells more food on the market either in weight or in value (that is quantity times price) than what they buy on the market for a given season or a year**, either in relation to a single staple or to a combination of staple foods – depending on how one wants to construct the profile. See Part II for more information.
- Similarly, a household that is **a net-buyer buys more food staples (either in weight or value) on the market than they sell for a given season or a year**. Urban households, for example, are typically characterized as net-buyers as they often do not produce their own food and rely mostly on markets to buy their food.

- **Self-sufficient households are those who sell the same amount of food as they buy on the markets, either in terms of weight or value.<sup>2</sup>**

#### **Numerical Example:**

Essentially this means that a net-seller or net-buyer is defined in terms of quantitative (kgs, tonnage) gain or deficit:

If a household produces 200 kgs of wheat at the end of the harvest season, and sells 100 kgs of it on the market, and later in the year buys 200 kgs of wheat, that household is a net-buyer of wheat denominated in weight.

In value terms, a net-seller or a net-buyer is defined in terms of economic gain or deficit, i.e. expenditures for a given commodity are lower or higher than income obtained from sales of this commodity on a monthly, seasonal or yearly basis.

For example, a household may sell 250 kgs of corn and gain US\$200, and then later in the year buy 100 kgs of corn and spend US\$250. This household will end up a net-buyer of corn, even though it has sold a greater amount in weight than it has bought.

In short, the definition of net-seller/net-buyer can be interpreted either based on the weight of food bought and sold, or on the value of food bought and sold. Households who are involved in agricultural production, specifically of food crops, make decisions on their buying and selling behaviour based on a variety of factors, mainly relating to household needs, mitigating risks, and ultimately ensuring their own welfare. The demands on household budgets are dynamic, and as such the net-seller/net-buyer status of households may change from month-to-month, season-to-season, or year-to-year.

#### **Considerations and Caveats in interpreting the net-seller/net-buyer status of households**

1. Household stocks: In fact, the classification of households as net-sellers or net-buyers also requires due consideration for household stocks. Household capacity to keep stocks can be very important for households to buffer seasonal price variations in staples. This can be sufficient to enable them to be net-sellers instead of net-buyers due to the capacity to obtain better prices if stocks are sold later after the harvest (see Chapter 2 for more details). As such, the impact of certain shocks on households whose stocks are insufficient to cover consumption compared to households who have sufficient stocks can be significant.

2. Consumption needs: It is important to note that while the context of household consumption needs, among other needs, is important to understand in order to explain the seasonal pattern relating to the purchasing and selling behaviour, and consequently of the net-seller/net-buyer status of households, the consumption needs are not an explicit part of the calculation. The focus is simply on looking at the relative importance of purchases and sales of staple foods over a certain period of time.

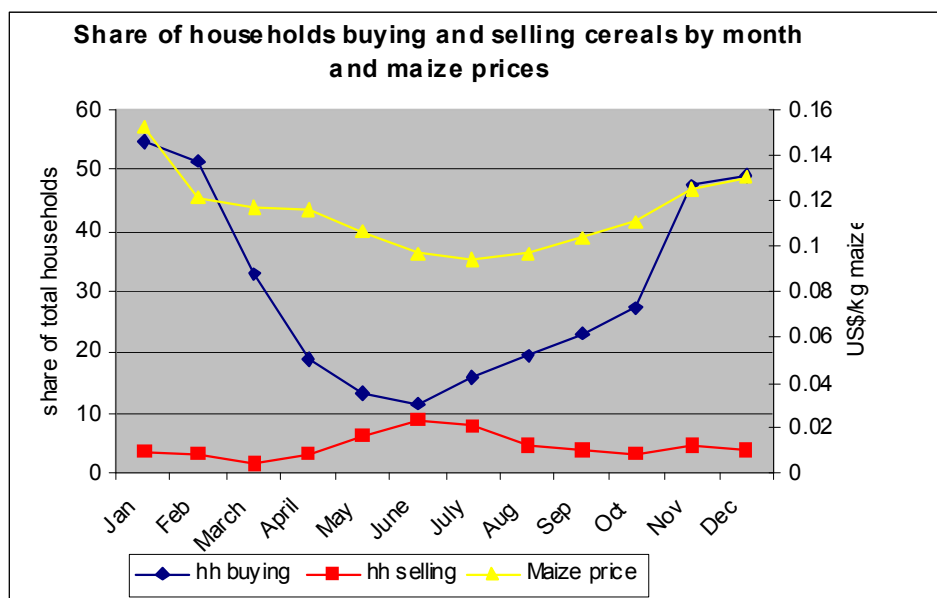
3. Net-producer/net-consumer vs. net-seller/net-buyer: There is an important difference between household production and own-consumption and the sale of their own production and purchase of food for their needs. It is possible that households may produce what they consume, however this obviates the household's interaction with markets. Even the quantity definition of the net-seller/net-buyer status discusses the amount that a household *sells* of their own production, and how much they *buy* on the market.

Rural households' dependence on markets to access food typically increases in the lean season. In Malawi, for example, more households buy cereals on markets during the lean

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<sup>2</sup> There is an important distinction between a self-sufficient household that buys and sells on the market so that there is neither a surplus nor a shortage of funds (or food), versus an autarkic household that produces what it consumes, making it independent of markets. Indeed the distinction is between a group that engages in market transactions and a group that rarely does.

season (November to February), and the percentage of households selling cereals peaks during the harvest season (May to July) (see figure2 below).<sup>3</sup>



**Figure 2 Households' sales and purchases of maize in Malawi**

Source: WFP 2007

Farmers sell food crops even when their harvest might not be sufficient for their own consumption needs through the year. They sell at low prices at harvest time and buy at high prices during the lean season. This paradox – known as the **sell-low, buy-high behaviour** – is common in sub-Saharan Africa. Need for cash, shortage of storage capacity and lack of financial services all contribute to the sell-low buy-high behaviour. Cereal-producing **households that need cash and have no access to credit have no option other than selling their only liquid asset – the cereals harvested**<sup>4</sup> (WFP, 2009a). In the context of P4P these constraints should also be accounted for before making any decision based on the net-seller/net-buyer status of households<sup>5</sup>, as purchasing from smallholder farmers that sell as a coping mechanism as opposed to those that produce a marketable surplus may do harm than good to their welfare.

**In fact, wealthier households and those cultivating in zones of higher potential are more likely to sell to the market than others.** As such, they are able to produce sufficient agricultural products for a **marketable surplus**. Research in Zambia found strong positive correlations among households' net maize sales, incomes, landholdings, values of other crop production, off-farm incomes, values of farm assets and education levels. When households were ranked from low- to high-income, those in the top income tercile were generally sellers of maize, and those in the bottom buyers of maize (Zulu, Jayne and Beaver 2007; WFP, 2009a). The agricultural income of those households who produce on a small-scale (smallholders) is highly sensitive to prices, because their production level is limited by the small area of land cultivated and access to inputs, as well as to weather conditions as they most often operate on marginal land where yield increases are difficult (see Box 2 for more details on the links between the net-seller/net-buyer status and food security).

<sup>3</sup> For more detailed guidance on price seasonality, its uses and calculation please refer to the forthcoming PDPE Market Analysis Tool on Seasonality.

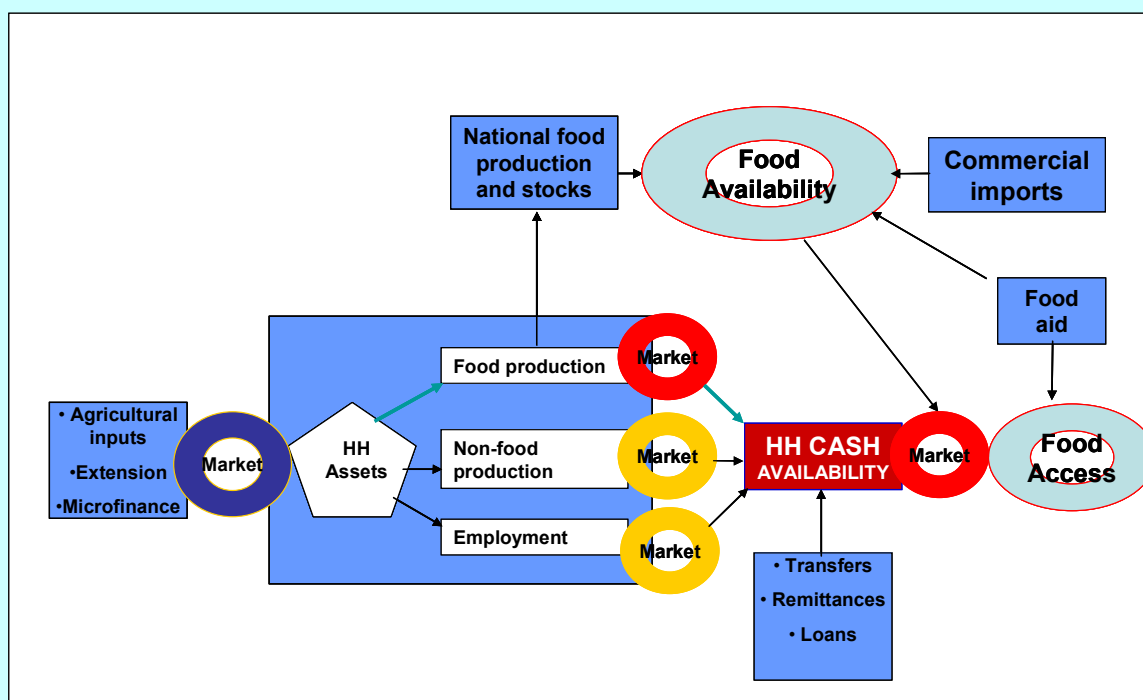
<sup>4</sup> Households, of course, have other liquid assets which they can draw upon. Households with diversified livelihood strategies may have liquid assets ranging from cash crops, livestock and other assets. Within the purview of this Technical Guidance Sheet, the focus is given to food production and food crops to ensure clarity of the basic concepts.

<sup>5</sup> Please refer to the P4P Guidance and the Farmer Livelihood Baseline Survey for further information.

## Box 2 The Analytical Framework for Markets and Household Food Security

The focus of this guidance is on the impact that market participation has on household (HH) welfare and food security. There is a particular analytical framework which is utilized within this guidance sheet that draws specifically on the role that markets play in household food security, and therefore attempts to provide an understanding as to the nature of household participation in markets and its impact on their food security and welfare.

The framework, shown in the diagram below, outlines generally the different ways in which markets relate to households, their livelihoods and their food security.



The profiling of households as net-sellers or net-buyers is directly linked to the **livelihood strategies** that are employed by households throughout the year, as well as the **impact that the exposure to certain shocks and hazards** (or vulnerability) will have on households depending on their net-seller/net-buyer status. This can be understood in relation to the direct contact that households have with markets from their access to inputs and credit (on the input markets side), to their access to employment and food production to their access to food through market channels.

For a more complete treatment of the way in which markets relate to household food security, please refer to the World Hunger Series: Hunger and Markets at <http://www.wfp.org/content/world-hunger-series-hunger-and-markets>

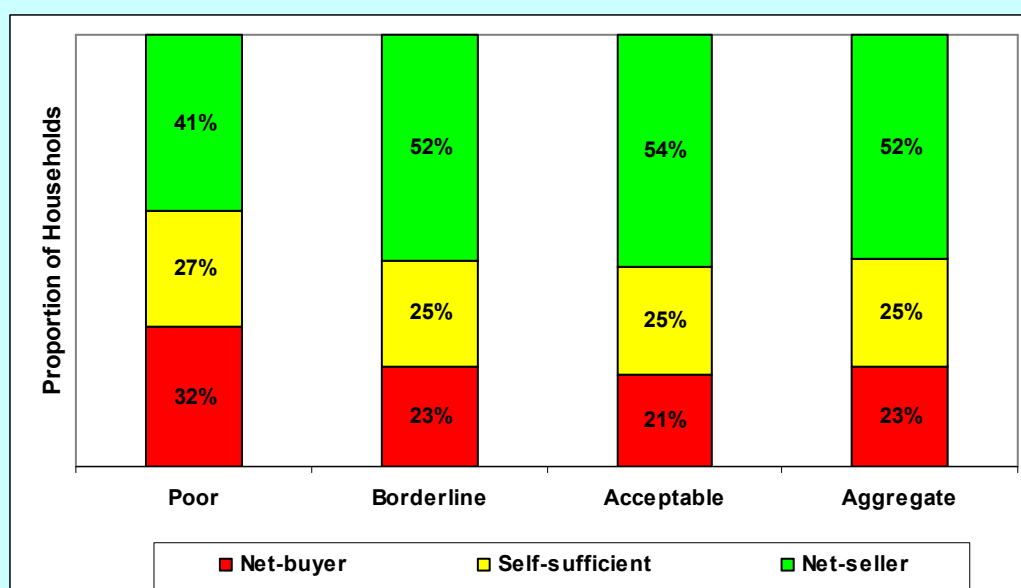
WFP household surveys in selected countries suggest that most households consider markets a main source of food, especially during the lean season. Households with poor and borderline food consumption tend to devote larger proportions of their expenditures to food than those in other food consumption groups. **These groups are therefore likely to be more vulnerable to price shocks, and especially those with borderline food consumption risk falling into the poor food consumption group when a price hike occurs** (see Box 3 for an example from Benin).

### Box 3 Food Security and Net-Seller/Net-Buyer Status in Benin

According to the 2009 Benin CFSVA it has been ascertained that 23 percent of households engaged regularly in agriculture are net-buyers as opposed to 52 percent who are net-sellers. The proportion of self-sufficient households is 25 percent.

The table below shows the relationship between the net-seller/net-buyer status of households who are engaged in food production. The proportion of households that are net-sellers of food crops (54 percent) is higher among food secure households as opposed to food insecure households for which 41 percent of households are net-sellers. In fact, net-buyers are more prevalent among food insecure households (32 percent) as opposed to food secure households (21 percent).

25 percent of all households are considered self-sufficient, with a higher prevalence of self-sufficient households in the food insecure category (27 percent).



These findings would raise two questions for response analysis and programmatic decision making:

1. If Purchase for Progress were contemplated in this context then the question of targeting households to be included in Purchase for Progress (P4P) might arise: should they be net-sellers and food-secure or net-sellers and food insecure; or should they be self-sufficient?
2. How to ensure that self-sufficient households become net-sellers in the context of P4P without jeopardizing their food security.

This is discussed further in Chapter 2.

The example of Benin shows the complexity which underlies the relationship between food security and the net-seller/net-buyer status. It is difficult to make any assumptions related to the welfare of households based upon their net-seller/net-buyer status, and the implications that this might have in relation to programming must also be carefully considered.

Assessing whether a household is a net-seller or a net-buyer over the course of a particular time of the year in value terms, **allows for a better assessment of that household's vulnerability to food insecurity and the ability to study the impact of a production or supply shock** as long as the net-seller/net-buyer status of households is calculated as the **value definition**.

**Even farmers who sell 60 percent of their harvest in weight are likely to be net-buyers in value, because the 60 percent they sell could be worth less than the 40 percent**



**they buy.** A household may keep 40% of its own production, say 150 kg, and still need to buy 200 kg to cover its consumption requirements. That means that the total requirements are 350 kg and not 150 kg, showing clearly that the motivating factor for the purchases and sales, in relation to production, is consumption needs. This is due partly to the seasonality governing households' buying behaviour, as well as the dynamics between the quantity and the value of goods bought and sold on the market (WFP, 2009a).

As outlined in both the CFSVA and EFSA Guidance, vulnerability analysis is aimed at assessing community and household exposure and sensitivity to current and future shocks, and their ability to cope with them. This ability is determined largely by household characteristics, most notably a household's asset base and the livelihood and food security strategies it pursues<sup>6</sup>. The value definition of the net-seller/net-buyer status of households provides greater insight into the vulnerability of households to certain types of shocks, mainly those related to sharp and unexpected changes in prices and/or production because it includes the price and the quantity of food bought and sold. This profiling can provide even greater insight into the identification of household characteristics in order to undertake response analysis and to make programming decisions on food assistance interventions. Knowing the seasonality related to households' net-seller/net-buyer status is important when **considering the impact of a shock on food security (so within the purview of an EFSA); when considering the timing of cash and voucher interventions; and also when considering the timing of Purchase for Progress procurement (see chapter 2 for more details).**

### Net-Seller/Net-Buyer Status and Impact Analysis

**The shift in status of households from net-seller to net-buyer and vice versa over time may occur due to a supply or price shock, in addition to normal seasonal variations.** If households were to buy and sell the same amount of food at different prices, it is the difference between the selling price and the buying price that will determine their net-seller/net-buyer status. This was exemplified during the food and fuel price crisis, where even though the prices on the markets were high, the sale gains were eroded because of increased production and marketing costs. As a result, it is important to have a very clear understanding of how a particular economic shock that is transmitted through prices will impact households who are engaged in the selling and buying of food crops. This is done through the direct use of the net-seller/net-buyer status of households.

In fact, it is possible to look at the distributional impact of a variation of the price in a food crop, or food crops, of interest in the study by looking at the **Net Benefit Ratio (NBR)**. The NBR **relies on the value of the bought and sold quantities of food (the net-seller/net-buyer status) over the total expenditure of households.** In other words, the NBR represents the budget share of a particular crop, or crops, for a particular household. This ratio allows for an understanding of how a particular price shock will impact household revenues at different income levels, in different geographic locations, in different livelihood groups (see Box 4 for an example from Benin).

Furthermore, the NBR can be more applied to a variety of livelihoods. The net-seller/net-buyer status can also be defined in relation to commodities, food and non-food, that are sold on the market by households for income in relation to the amount spent on food purchases. The commodities sold by households for income on the markets can include livestock, cash crops, and their own labour. Therefore, the scope of definition of the net-seller/net-buyer status, and more importantly of the NBR, can be wider than just food producing households. As such, the impact of price shocks can be estimated on a variety of livelihood groupings.

However, the formulation of the NBR in the short-term assumes that there is no change in household production and/or consumption decisions. Therefore, there is no consideration for the supply and demand food price elasticities or wage elasticities<sup>7</sup>.

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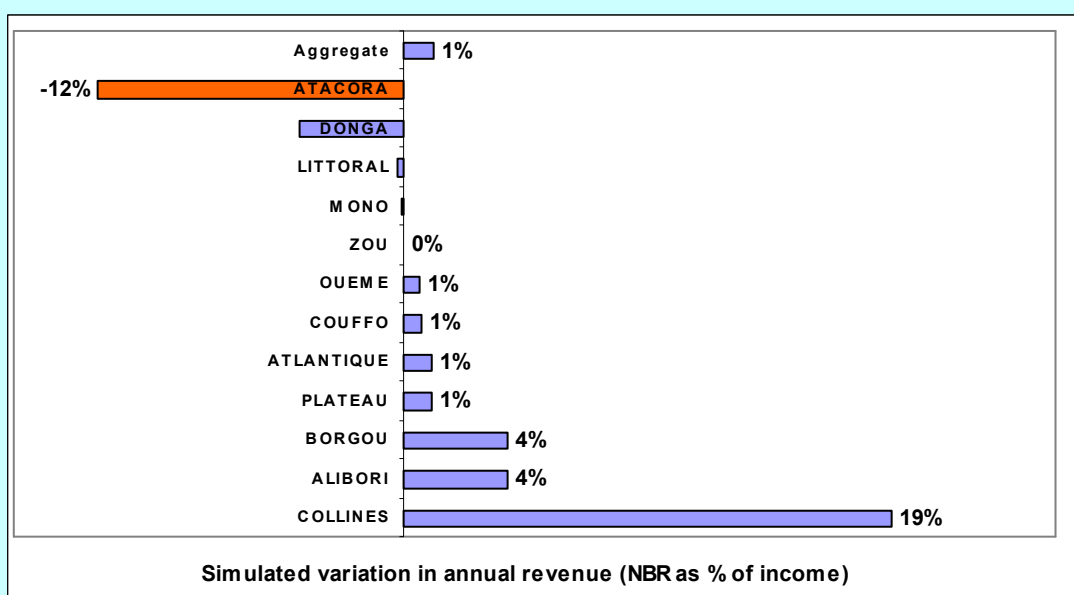
<sup>6</sup> Please refer to the introductory sections of the EFSA and CFSVA Guidance for further information.

<sup>7</sup> For more detailed guidance on price elasticities, their uses and calculation please refer to [PDPE Market Analysis Tool on Price and Income Elasticities](#)

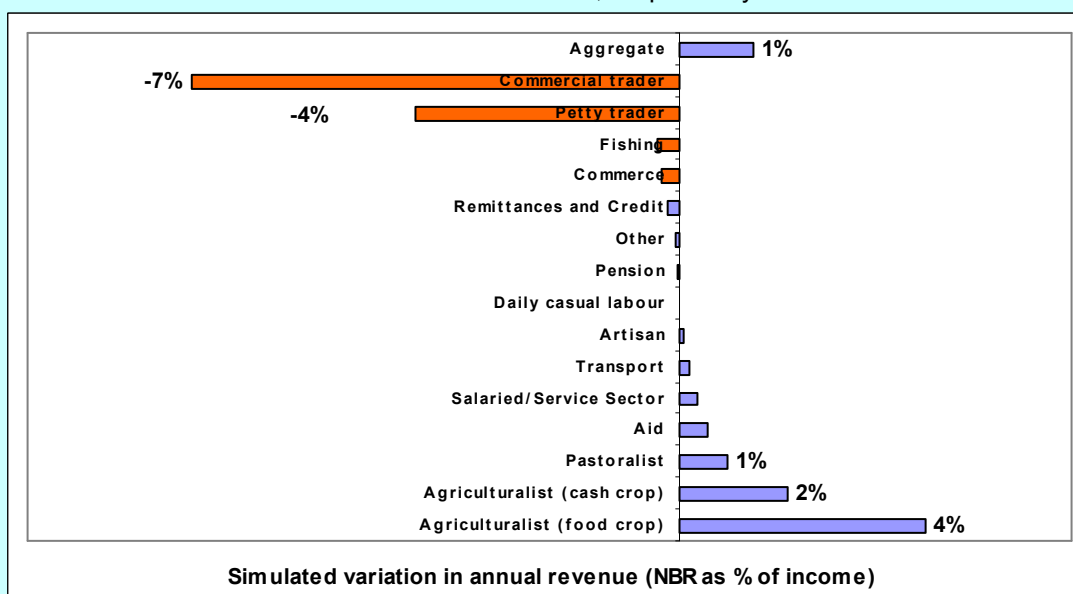
### Box 4 Net Benefit Ratio Benin (CFSVA 2009)

The analysis of the NBR in Benin was undertaken assuming a 10 percent price rise analysed across districts, livelihood groups and wealth groups. Holding all other factors constant, a 10 percent increase in food prices across the board translates to a 1 percent increase in annual revenues (i.e. variation of the NBR) of households in Benin. Nonetheless, the distributional impact is uneven revealing disparate impacts:

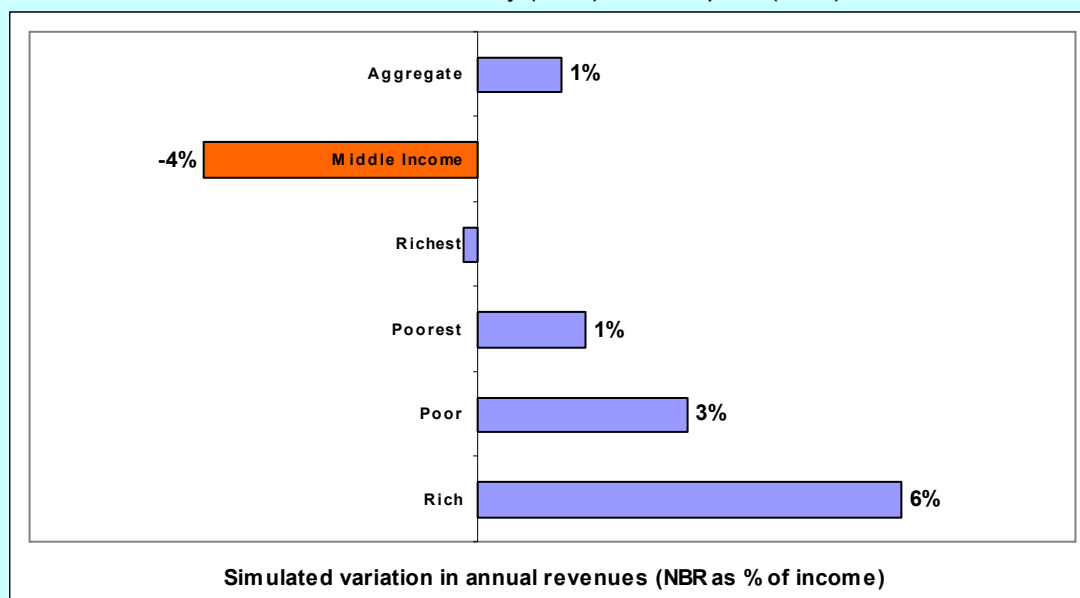
- Rural vs. Urban impacts: A supposed 10 percent increase in prices is beneficial mainly to rural households who would encounter a 3 percentage point increase in revenues, while urban households' revenue would decrease by 6 percentage points.
- District level impacts: A 10 percent increase in prices would ultimately provide the greatest benefits to households in the Collines district (+19%), and of Alibori and Borgou districts (+4%), while households in Atacora would be negatively impacted with a 12 percentage point decrease in revenues.



- Livelihood Groups: The agricultural producers (food crop, cash crop and livestock owners) are those that would gain the most from a 10 percent increase in prices across the board, while there is no impact on other livelihood groups except large and small traders who lose on the order of -4% and -7%, respectively.



- Wealth groups: The wealth quintile that would lose most from a 10 percent increase in food prices is from the middle quintile (-4%). The other wealth groups stand to gain from the increase, both the wealthy (+6%) and the poor (+3%).



This example of Benin illustrates how the NBR could be used to simulate, for instance, the short-term welfare impact of a P4P project that aims at increasing farmers' incomes. The effective use of the NBR given certain livelihood characteristics can help to model the distributional impact that a price shock could have on households also in a more generalized context.

## 2. How does knowing the net-seller/net-buyer status of households help response analysis and decision making?

The net-seller/net-buyer status of households principally contributes to understanding:

- Current and future food availability conditions for the household, relating production and purchases with needs and sales;
- Current and future sale and purchase conditions for households, linked to food access; and
- Impact of supply and price shocks on households.

The profiling of households as net-seller or net-buyers, or profiling the seasonal pattern of the household status is a type of analysis that is particularly useful within the scope of **Comprehensive Food Security and Vulnerability Analyses (CFSVA) or other baseline studies including P4P and Monitoring & Evaluation**. The net-seller/net-buyer status can be usefully included in the process of **food security profiling and highlighting key possible causal factors of food insecurity**. Furthermore, the more dynamic view of the net-seller/net-buyer status of households can provide value-added to **household vulnerability and risk analysis, and scenario building**. This was exemplified in both examples from Bangladesh and Benin in which the net-seller/net-buyer status were effectively used to draw conclusions related to vulnerability and furthermore the identification of those households who were at greater risk.

As such, the information needs to effectively profile households as net-sellers or net-buyers should be **incorporated into the household surveys of baseline and chronic food insecurity assessments** in the absence of secondary data from typical Household and Income Expenditure Surveys (HIES). Having a baseline profiling of households will help in the preparation for eventual shocks and crises.

In the case of a **sudden or slow-onset emergency**, the profiling of households as net-sellers/net-buyers can be useful for household food security assessments. In particular, the profiling can contribute to **situation analysis**, as well as **forecast analysis**. In fact, the net-seller/net-buyer status profiling is not particularly far from the calculation of the **food gap**<sup>8</sup> for households in a particular point in time. This is particularly useful if a seasonal profiling has already been done in the baseline giving assessors a head start in identifying who is a net-buyer during a shock, and as such at greater risk. The details of these can be found in the [EFSA Handbook \(WFP 2009\)](#).

Furthermore, this profiling can provide specific inputs to **response analysis** as it could contribute to the identification of most appropriate response options. As outlined in both the CFSVA and EFSA Handbooks (WFP, 2009) the status of households can be a factor related to risk. Once the net-seller/net-buyer status of households is cross-tabbed with other descriptive factors of households (e.g. land ownership or access to land, physical access to markets by season, purchasing power...), it can effectively be used to fine tune **targeting criteria**, and can help to identify the timing and duration of assistance.

In **cash and voucher programming** there are several criteria that relate to the net-seller/net-buyer status of households when assessing the feasibility, timing and targeting. Knowing whether or not households deal with cash and the seasonality with which they are more bound by markets than their own consumption makes it easier to determine how a cash programme would be received and the proper timing. The net-seller/net-buyer profiling can help to have a baseline understanding of when demand for cash is greatest during the year and by what type of households.

For example, an initial assessment has identified the breakdown of the net-seller/net-buyer status of food insecure households in a community of interest for a possible cash and voucher programme. The assessment has identified that of the food insecure households 70% are net-buyers, 20% are net-seller and 10% are self-sufficient at that time. Assuming that the timing of the assessment and of the intervention is the lean season, those households who are self-sufficient and net-sellers would not be targeted. The households who are net-buyers should be the target of any potential food assistance intervention. However, given the low availability of food on the market, and that the households even though they produce food are net-buyers, food distribution may be the appropriate response. If however, this profiling was during the harvest season, then cash intervention for the net-buying households would have been more appropriate.

The profiling of households as net-seller or net-buyers is also relevant to surveys conducted for **local procurement**, and in particular, in the context of **Purchase for Progress (P4P)**. Specifically, this profiling is important to take into consideration within the scope of the M&E system which uses the impact assessment approach. Furthermore, it has been identified as an important selection criterion of farmer households (see [Purchase for Progress Monitoring & Evaluation Strategy guidance](#) (WFP 2009e)), and is also an important part of the M&E system that tracks the impact of P4P activities on vulnerable populations.

The baseline profiling of smallholder/low-income farming households as net-seller and/or net-buyer could be useful in the **impact assessment approach** by looking at the NBR for P4P households in relation to non-P4P households. In identifying households who are net-buyers and net-sellers in each group, the differential impact of participation in P4P could be traced using the NBR. Furthermore, understanding properly the household characteristics of smallholder/low-income farming households might help to identify important **timing and targeting criteria for P4P interventions**. For example, if a low-income household is

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<sup>8</sup> The food gap calculation provides the basis for the estimation of food needs of the affected population in an emergency. The food gap has three distinct elements:

- The food availability gap, which is the shortfall between a region's aggregate food needs and its aggregate food availability;
- The food access gap, which is the shortfall at the household level; and
- The food consumption gap, which is the shortfall between nutrition needs and actual food consumption.

In simple terms, the food access gap is the difference between the level of household food stocks, or access to food, and the actual amount of food needed to ensure adequate nutrition and health for every member of the household. For further details regarding the food gap please refer to the [WFP EFSA Guidance 2009](#).

identified as a food-insecure net-buying household there could be the risk of making such a household worse off by including them in the P4P initiative if the prices are estimated to increase in the market as a result of the P4P intervention. If they have been identified as vulnerable then buying up their remaining surplus will expose them further to risks later in the season (refer back to the sell-low buy-high phenomenon in Chapter 2), in the absence of any risk mitigation intervention.

The link to final decision-making on response options is three-fold:

- The outlook on purchase and sale conditions and household food availability (through understanding household stock levels) influences the expected severity and scope of food insecurity, and, in turn this influences the size, timing and targeting of food assistance;
- The impact of a shock on households can be modelled using the net-seller/net-buyer status; and,
- Understanding the conditions, constraints and capacities of households related to their net-seller/net-buyer status allows for concluding whether or not local procurement, P4P and/or cash and voucher programming are desirable.

## Part II: Constructing the Net-Seller/Net-Buyer Status: Data Collection and Data Analysis

Though the concept of the net-seller/net-buyer is quite clear, accurately reflecting the concept in the calculations is somewhat more complex. In fact, there are various formulations that have been used in different studies to describe net-sellers and net-buyers analytically (see Annex I). This section will present the **formulation of the net-seller/net-buyer status**. Then, there will be a discussion relating the key principles to consider when deciding to include a net-seller/net-buyer status analysis in a food security assessment, and a four-step approach that provides guidance for an ‘average’ implementation of the net-seller/net-buyer profiling.

<b>Step 1: Formulation of assumptions</b>	<b>Chapter 4</b>
<b>Step 2: Organization of field work</b>	<b>Chapter 5</b>
<b>Step 3: Development of the questionnaire</b>	<b>Chapter 6</b>
<b>Step 4: Analysis and reporting</b>	<b>Chapter 7</b>

### 3. What are the key principles for including net-seller/net-buyer analysis?

#### ***Integrate net-seller/net-buyer into existing food security analysis and reporting***

The net-seller/net-buyer status of households is not a stand-alone characteristic of households. The net-seller/net-buyer status of households becomes interesting and useful once it can be effectively linked with other important household characteristics, such as land size, income, and geographical location among others for targeting purposes. It is recommended to include the net-seller/net-buyer status of households in the survey plan of the overall food security assessment/analysis (e.g. EFSA, CFSVA, FSMS and P4P baselines). In fact, in the existing EFSA guidance, the data requirements are already elaborated in the Market indicators section for households (see pg. 71-71 of EFSA 2009), and as such the issue is of ensuring that the data that is collected is properly used in the appropriate context.

#### ***Aim for results***

The profiling of households as net-sellers/net-buyers should answer clearly defined questions. The reflection upon the value-added of including this into any food security analysis should be in relation to decision-making and programming options that might become elucidated as a result of the anticipated response analysis and the analysis itself. This profiling carries the risk of complexity and turning into ‘nice-to-have’ information if the analysis is not properly followed through and response options identified as a result.

#### ***Use existing information where possible***

While the actual calculation to determine the net-seller/net-buyer status is rather straightforward, as it simply takes the difference (subtracts) between the market value of the amount of food sold (at producer price) and the market value of the amount of food bought (at consumer price), the resources and time required to collect the data needed varies with the desired formulation of the question. In most cases, the data will be collected from a household survey unless such information is provided by a Household Income and Expenditure Survey (HIES) already conducted in the country. Also, in order to simplify the questionnaire, price data may be obtained from an already-existing, reliable Market Information System (MIS) in the country (this will be further detailed in Chapter 6).

### **Formulate working assumptions as a first step**

If quantitative data from secondary sources is not available, then a net-seller/net-buyer status module can be included in household food security surveys. This module can either aim to profile households based on the quantitative formulation, or on the qualitative formulation. The qualitative formulation of the net-seller/net-buyer status cannot be found in secondary sources, and if this formulation is chosen in the interest of time and resources, it should be included in the household food security survey (this is most likely the most appropriate formulation to use in the case of a Rapid Assessment and EFSAs in general).

### **Identify which formulation of the net-seller/net-buyer profile is best suited to needs**

The methodology in setting up the calculation will determine the type of module that is included in the household questionnaire; it will dictate the formulation of the NBR or other impact analysis methodology, and it will also impact the types of conclusions that can be drawn from the profiling. The main considerations that are likely to dictate the choice between the two include availability of time and resources, availability of secondary quantitative information, and also based on the anticipated possible response strategies and programming options that should be anticipated to uncover the key issues to be analyzed, possibly including the net-seller/net-buyer status. Quantitative formulations are particularly important in decision-making with regards to P4P and procurement, as well as baseline formulations, while EFSAs are likely to benefit more from a qualitative assessment, unless the particular shock is economic or market-related in nature, in which case a quantitative formulation is encouraged.

## **4. Step 1: Formulation of assumptions**

The first step in all food security, nutrition or household surveys should be the formulation of assumptions. These provide the general direction of the survey and analysis that is to be undertaken. The specific assumptions that might be necessary to consider in constructing the net-seller/net-buyer status of households are typically information that is of interest in general when preparing a household survey. As such, this process should not necessarily be considered as a separate step, but rather should be implemented as general good practice when planning for CFSVAs, EFSAs, P4P assessments and even FSMSs.

In this guidance, the focus is on information needed to effectively collect and analyse data in order to profile the relevant households as net-sellers or net-buyers of specific food crops. These needs include knowing/having: a set of basic data and assumptions with respect to the population covered in the food security analysis; their food security situation; the relationships of the household to the market; and the type and magnitude of the (expected) shock (if any) and its impacts on these issues. Possible response strategies should be anticipated to uncover key issues to be analysed. This is especially true of programming decisions related to P4P and cash & voucher programming.

### **Sub-step 1a: Population Characteristics**

The identification of population characteristics will be important in determining for which households it will be appropriate to administer the net-seller/net-buyer module. For the scope of this guidance sheet, the net-seller/net-buyer profile is only applied to households who are engaged in the production of staple food crops.

As such, the following information should be ascertained based on existing secondary information and local knowledge:

- List the affected areas. In the case of a baseline, all the areas are potentially affected and should therefore be considered;
- List the number of people and households, and their estimated pre-shock food insecurity or poverty levels by area;
- Describe for each area, the principal livelihood groups, and estimate their importance, insert their pre-shock food security level and copy them on a map of the affected areas (EFSA) or a country-wide map (CFSVA);
- List the normal key livelihood activities of the livelihood groups, if available;
- List the essential food items they normally purchase and the key products they sell on markets.

On this basis, the assessment team can select the food crops that are most important in terms of market sales and purchases for the livelihood groups that are involved in food production across the affected regions.

Table 1	Population (number of people)	Population (number of households)	Pre-crisis food insecurity / poverty (%)
Area/District 1			
Area/District 2			
....			

Table 2	Proportion of population (%)	Wealth grouping (% poor, % average, % rich)	Key livelihood activities (list top 3)
Livelihood group 1			
Livelihood group 2			
....			

Table 3	Essential staple food items purchased (list top 3)	Key staple foods for sale (list top 3)	Key products produced on- farm (staple food)
Livelihood group 1			
Livelihood group 2			
....			

### Sub-step 1b: Market and availability characteristics

On the basis of existing secondary information and local knowledge (i.e. expert judgement or key informants' perceptions),

- List the normal production deficit/surplus zones for the essential food items and key sale products as identified in table 3. The Ministry of Agriculture or FAO can be of help on this:

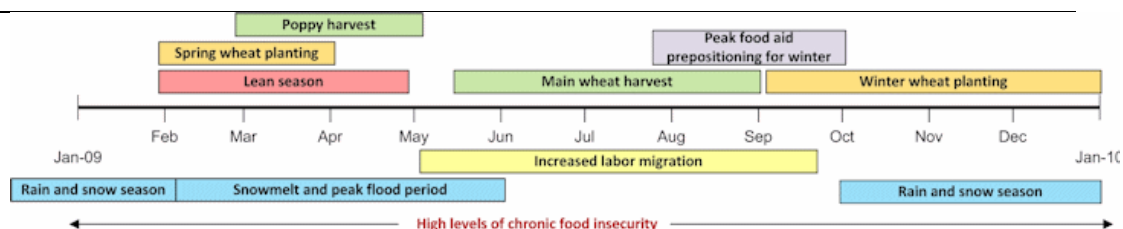
Table 4	Food item 1	Food item 2
Area/District 1	Deficit/excess (in metric tons if possible)	
Area/District 2		
....		
National		

- Draw the cropping and marketing seasons for the essential food items and key sale products as identified in Table 3. The example below illustrates the difference between the marketing calendar (e.g. Niger) and cropping calendar (e.g. Afghanistan);

Good harvest		Important	Fairly important	Low								
Average harvest		Important	Fairly important	Low								
Bad harvest		Important	Low	Nil								
	Sep	Okt	Nov	Dec	Jan	Feb	Mrt	Apr	Mei	Jun	Jul	Aug

Marketing seasons (sales) for key cereals in Niger (WFP, 2005)





**Seasonal crop calendar in Afghanistan (FEWS NET, 2009)**

These will help to formulate some expectations, along with the information ascertained from the population characteristics, as to where the majority of net-selling, net-buying or self-sufficient households may be located. It is more likely for net-selling households to be involved in food crop production in surplus areas of a particular country, rather than the deficit producing areas of a country, for example. The cropping and marketing calendars are also very important in formulating expectations as to the seasonality that might be observed, in the absence of shocks, in households' net-seller and net-buyer status across the year.

**Sub-step 1c: Scenarios on impacts of potential shocks**

Given the previous information collected, certain expectations might be formed about the way a particular shock may impact a net-selling household who lives in a deficit area of the country at a particular point in time. Thinking about these in advance will help to develop the survey plan:

- Describe the type and magnitude of the actual or anticipated shock;
- Describe how the (potential) shock affected (is expected to impact) the purchasing/selling activities of the households to the shock (see Table 5)

Table 5	Food Crop 1		Food Crop 2		Food Crop 3	
	Purchases	Sales	Purchases	Sales	Purchases	Sales
Livelihood group 1						
Livelihood group 2						
....						

**Sub-step 1d: Anticipated response options**

The profiling of households according to their net-seller/net-buyer status should be one of various analytical inputs that need to be considered when weighing the pros and cons of various response options. The existing guidance on response analysis is very clear, and as such, the impact that the net-seller/net-buyer status of households might have on the appropriateness of various interventions need to be appropriately considered.

This is especially true for those countries involved in the early stages of planning for P4P interventions, or for those considering the implementation of cash & voucher programming.

For more detailed information please refer to the EFSA Handbook (WFP,2009d).

**5. Step 2: Organization of field work**

The data and assumptions from Step 1 will help to formulate the survey plan and will ensure that the required information is being collected in the questionnaires.

**Sub-step 2a: Timing**

The module for the net-seller/net-buyer status should be integrated into the existing household questionnaire for a particular food security analysis. As such, the timing of the collection of data will most often coincide with the timing of the EFSA, CFSVA or P4P baseline that is being undertaken.

When considering the baseline formulation of the net-seller/net-buyer status of households, it might be most useful to **include the module in an existing Food Security Monitoring System** that collects household-level data on a quarterly basis for one year. This might be preferable in order to **overcome some of the recall problems** that might be associated with asking households at one point in time detailed questions of their monthly buying and selling behaviour, even if on a qualitative level. This might improve the accuracy and overall usefulness of the profile as a result.

### **Sub-step 2b: Selection of food crops**

It is essential to define ex-ante the staple food crops that are going to be included in the module, as it will guide the analysis and the extent to which the net-seller/net-buyer status of households can be interpreted to impact their food security, as the entire food basket will seldom be considered in this formulation.

In this guidance, the **focus is on staple food crops** that are produced on-farm and then bought and sold on the market. The exercise of identifying essential food items that are purchased and sold on the market, and those food staples that are produced on-farm in Step 1 should be used to identify the food staple or staples to be included in the module. The food crop(s) that are chosen should be crops that are (i) typically marketed and produced; (ii) relevant for expected food security and (iii) relevant for the expected food insecure livelihood groups.

### **Sub-step 2c: Selection of Households**

Though the net-seller/net-buyer module is to be mainstreamed into the household questionnaire, the module does not have to be administered to each household. The focus of this guidance sheet is on the net-seller/net-buyer status of **households who engage mainly in agricultural production of staple food crops**.

This is likely to include households that are mainly in rural areas, and even possibly in peri-urban areas where some households do engage in own-food production. Ultimately, however, when conducting the final analysis it is important to take care that the comparisons that are being made across different sampling strata does not take away from the power of comparison. This may be particularly true if comparing peri-urban and rural households, as the sample size of relevant households in rural areas are likely to be much more than those in peri-urban areas.

## **6. Step 3: Development of the questionnaire**

The inclusion of the module for the net-seller/net-buyer status must be considered in the survey planning stage for any number of analyses including CFSVAs, EFSAAs, P4P baselines and, if considered appropriate, in FSMS and the Monitoring and Evaluation for P4P. The interpretative power of the net-seller/net-buyer status depends on other complementary household-level, community-level and market-level information. As such, it is important that this module not be considered a stand-alone but be incorporated into the household questionnaire and filled out once the household is identified as being dependent on food crop production for a significant part of their livelihood.

There are two types of generic modules that can be included in the household questionnaires, one which looks at specific marketed quantities and value of foods bought and sold, and the second which relies on household perceptions of buying or selling more in a particular month. The first 2 sections of the module deal with a more qualitative formulation of the net-seller/net-buyer status and can be used to cross-check the results from the section that deals directly with the buying and selling behaviour of households. This generic questionnaire can be adapted in the following ways:

- Time covered: the questionnaires are currently based on profiling the net-seller/net-buyer status of households on a month-by-month basis. This can be modified to profile households on a seasonal basis, or on a year-to-year basis;
- In a sudden emergency, the questions could also compare the situation before and after the shock; in a slow-onset emergency or a baseline survey, the questions should compare the current situation with the situation during the same period/season one

year ago (slow-onset) or with the usual situation during the same period/season (baseline surveys)

- If there is a good Market Information System in the country of interest, it may not be necessary to collect purchase and sale price information at the household level. This might lighten the load of the module and increase the accuracy of the data that is collected from the quantitative questionnaires.
- The questionnaire should reflect the local products being traded.

### **Section 1: Buying and Selling Behaviour**

The first section of the qualitative module does not deal directly with the question of whether households buy or sell more food in a particular month. It is important to ensure that the food crops that are included in the module, if more than one is chosen, are those that have been identified in Step 2b. The entire module should only refer to those food crops.

These questions deal with qualitative information that will likely help to interpret the results on the net-seller/net-buyer status of households. In particular these questions deal with the consumption needs, own-consumption, and purchases of food on the market for the particular food crops in question (Questions 1a – 1d). With these questions it might be possible to ascertain whether households harvest more or less than they buy or sell on the market with cross-tabulation in the absence of usable data from the 3<sup>rd</sup> section, which deals directly with the transaction quantities and prices. This will likely help understand whether households sell on a distress basis, or whether the household has a marketable surplus after they meet their own consumption needs. Furthermore, it is important to ascertain whether the household actually sells any of the food that it produces (Question 1f). If the household in question does not sell any of its production in a typical year, then the interview should not be continued.

### **Section 2: Seasonal Pattern of Buying and Selling**

This section continues with the qualitative information required to help with further interpretation of the net-seller/net-buyer profile. In particular, this section attempts to identify the seasonality of when purchases are more important than sales and vice versa (Question 2a). Also, this section asks questions that attempt to ascertain the motivation behind the buying and selling behavior of households (Questions 2b-2c). In other words, this section can help to identify whether households actually produce a marketable surplus, or whether they are selling on the market due to cash constraints and debt repayments, which may identify stress sales rather than profit sales.

### **Section 3: Details of Sales and Purchases across Seasons**

This section deals directly with household buying and selling behavior on a monthly basis. There are two options offered here: Option 3.2A looks at the quantities and average prices of sales and purchases for each appropriate commodity across the seasons. Option 3.2B based purely on household recall, will help to identify the seasonal pattern of households' buying and selling behavior on a monthly basis.

However, before delving into the actual marketed and purchases quantities, Section 3.1 establishes the parameters for the units of measurements to be used throughout Section 3.2A, such that each quantity and price should be expressed as the Local Measurement Unit that is typically used for purchases and sales; and the standard conversions which apply to each of them for the various commodities. These will be crucial in later stages of the analysis involving data cleaning and data analysis. The conversions to standard units should not be done directly by enumerators in the questionnaires themselves, as often this can lead to wide standard deviations in the data and lead to erroneous analysis.

### **Limitations and Caveats**

In interpreting this indicator several factors should be borne in mind. The **long recall basis (annual) could lead to inaccurate reporting by households**. The questionnaires are currently structured on a monthly basis, and it might be best for accuracy purposes to mainstream such a module into a Food Security Monitoring System so that the monthly information is accurately reported every 3-4 months based on a 3-month recall period. If, however, this is not possible then the module may be adjusted to **reflect the seasonal selling and buying behaviour of households**.

If prices are being collected from an existing Market Information System then it is imperative that the **correct prices are used to reflect the purchases and sales of households**. The prices by which the sales of food are valued are the producer prices, while purchased foods

are valued at the much higher consumer price. If consumer prices in the lean season just before the next harvest are double or triple the producer prices received just after the harvest, households could sell and then buy back the same amount of the same food and find themselves in the net buyer category. In fact, the use of other indicators, as provided by Section 1 in the questionnaires, is suggested to provide greater insight into the dynamics of the net-seller/net-buyer status of households.

Another important consideration in the calculation and the interpretation of this indicator are household stocks. Households may retain stocks for own consumption or they may retain stocks to sell later during the season when selling prices are more profitable. The question of **what households do with their stocks is the key in this situation**. Often times, household surveys are able to pinpoint to a certain degree how long food stocks will last for a particular household, though how much of it goes towards own-consumption and how much might be sold at a later date on the market will have an important impact on the net-seller/net-buyer status of the household. These assumptions must be carefully formulated and adequately justified.

The **units of measurement** that are considered for the quantitative formulation of the net-seller/net-buyer status are of particular importance. The use of local units of measurement can be quite cumbersome, especially if weights change according to the food crop and according to the season. Therefore, it is best to use maximum 2-3 units of local measurement.

## 7. Step 4: Analysis and reporting

Once the collection or collation of primary or secondary data is completed the calculation of the net-seller/net-buyer status must be completed according to the formulae presented below. The qualitative data that is collected might differ according to the specific situation, as discussed in Step 3, however the basic calculation of the indicator should be fairly standard if the quantitative formulation of the net-seller/net-buyer status has been identified for use in the analysis.

In order to take into account price seasonality, and also the fact that the price at which food is bought as a consumer and the price at which food is sold as a producer vary (for more information related to this please refer to the forthcoming guidance on Marketing Margins), the formulation that is used is called the **value definition**. The basis of this formulation is on **the real marketed declared quantities bought and sold** during the survey period and not on produced and consumed quantities.

$$B_h < S_h \Leftrightarrow hh \text{ is a net - seller}$$

$$B_h > S_h \Leftrightarrow hh \text{ is a net - buyer}$$

$$B_h = S_h \Leftrightarrow hh \text{ is self - sufficient}$$

In this formulation, the fundamental concept is that monetary values of market quantities are more important than produced and consumed quantities to classify a net-seller.  $B_h$  is the total value of purchases of food crop  $i$  and  $S_h$  the total value of sales of food crop  $i$ , by household  $h$ . In other words, at each month for which a household buys and sells a particular food crop, it sells a particular quantity  $Q_s$  at a producer price  $P_p$ ; and it buys a particular quantity  $Q_b$  at a consumer price  $P_c$ . The calculations required in defining a net-seller or net-buyer are as follows:

$$(P_p \times Q_s) > (P_c \times Q_b) \Leftrightarrow hh \text{ is a net - seller}$$

$$(P_p \times Q_s) < (P_c \times Q_b) \Leftrightarrow hh \text{ is a net - buyer}$$

$$(P_p \times Q_s) = (P_c \times Q_b) \Leftrightarrow hh \text{ is self - sufficient}$$

For example, if a household produces 2 tonnes of maize per year, and it sells 1.5 tonnes at the market price of 100\$ per tonne, it would obtain \$150 for their production. If, however, at a later stage the household has to buy 1 tonne of maize to cover its consumption needs for

the rest of the year. At this point in time, it buys at the market price of \$250. Therefore, it spends \$250 in purchases of maize. Because the value of what it buys (\$250) is greater than what it sells (\$150), this household is a net-buyer of maize. This is true even though it has actually sold more maize in weight than it has bought (1.5 tonnes > 1 tonne)

However, it is very likely that such a household will not be able to purchase 1 tonne of maize in one transaction as perhaps it has a credit constraint. This calculation would have to be done at each transaction, so at most on a monthly basis if the data allows. As such,  $B_h$  and  $S_h$  are defined differently by allowing every market transaction  $t$  of household  $h$  to be described (traded volumes and related market prices). As a result, this takes into account price seasonality:

$$B = \sum_t P_b(t) \times Q_b(t)$$

$$S = \sum_t P_s(t) \times Q_s(t)$$

For example, if this household were to buy this tonne of maize in 5 purchases of 200 kg each time during the post harvest period while prices are going up. For each purchase the consumer market prices are \$130, \$160, \$200, \$230 and \$250 per tonne. So the calculation would be made as follows:

$$S = \$100 \times 1.5 \text{ tonnes} = \$150$$

$$B = (\$130 \times 0.2) + (\$160 \times 0.2) + (\$200 \times 0.2) + (\$230 \times 0.2) + (\$250 \times 0.2) = \$194$$

According to this calculation the value of the bought quantities (\$194) is greater than the value of the sold quantities (\$150), and therefore the household is classified a net-buyer of maize.

As such, the calculation of the NBR using this formulation of the net-seller/net-buyer status of households  $h$  for good  $l$ , with total expenditure  $E$  would be as follows:

$$NBR_i = \frac{1}{E_h} \left[ \sum_t P_s(t) Q_s(t) - \sum_t P_b(t) Q_b(t) \right]$$

Continuing with the example of our maize producing household, we can simulate the impact of a price shock on its revenue if we know its total expenditure over a year, or the particular reference period in question. If the household has an annual expenditure of \$400 per annum then the NBR of the household with the previous selling and buying behaviour, and the previous prices:

$$NBR = (\$150 - \$194) / \$400 = -0.11$$

The NBR is negative because the household is a net-buyer of maize. If the household were a net-seller then the NBR would have been a positive expression.

If we imagine a 10% increase in prices across the board, then we can see how this particular household will be impacted:

$$S = \$110 \times 1.5 \text{ tonnes} = \$165$$

$$B = (\$143 \times 0.2) + (\$176 \times 0.2) + (\$220 \times 0.2) + (\$253 \times 0.2) + (\$275 \times 0.2) = \$213.40$$

$$NBR = (\$165 - \$213.4) / \$400 = -0.121$$

If we look at the difference in the NBR between the original scenario and the simulated scenario of an across-the-board increase 10% increases in prices would lead to a 10% decrease in the welfare level of this particular household.

$$\text{Relative change in NBR} = (-0.11 - -0.121) / -0.11 = -0.1 \times 100 = -10\%$$

The calculation of these formulae could also be envisaged for a combination of various staples rather than just one food item. The various formulations of the net-seller/net-buyer status of households can be easily adapted to take this into consideration by looking at the sum of the value of sold quantities of the foods under study minus the sum of the bought quantities of the foods under study.

The data requirements for the value definition are the following:

- Quantity bought on the market by month, season or by year for the food crop under study
- Quantity sold on the market by month, season or by year for the food crop under study
- Producer price by month, season, or by year
- Consumer price by month, season or by year

And for the NBR the total household expenditure over a year is also required.

If the resources and time available for the survey in general are not sufficient and the quantitative information collected is not on a monthly basis, then the quantitative calculations can be made on the average over a trimester, taking into proper consideration the seasonal factors. Furthermore, it is important to understand that the interpretation of the net-seller/net-buyer status of households can be usefully cross-tabbed with other information from the household questionnaire, as well as from the trader and market survey (please refer to Market Analysis Technical Guidance Sheet on How to Conduct a Trader Survey (WFP, 2009g) for more information).

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## Annex I – Alternative Formulations of the Net-Seller/Net-buyer status and NBR

The most common way to define a household as a net-seller or a net-buyer has been to compare the produced and consumed quantities of a specified crop/food over the survey period. This can be termed the **quantity definition** of a net-seller/net-buyer.

Let's consider an agricultural household  $h$ , producing a food crop  $i$ , among others. During one year, we note  $P$  its production and  $C$  its consumption of crop  $i$ . The most common definition of net-seller (net-buyer; self-sufficient) agricultural household regarding crop  $i$ , is this one:

$$\begin{aligned}
 P_h < C_h &\Leftrightarrow h \text{ is a net-buyer} \\
 P_h > C_h &\Leftrightarrow h \text{ is a net-seller} \\
 P_h = C_h &\Leftrightarrow h \text{ is self-sufficient}
 \end{aligned}$$

Let's consider an agricultural household  $h$ , producing a food crop  $i$ , among others. During one year, we note  $P$  its production and  $C$  its consumption of crop  $i$ . The most common definition of net-seller (net-buyer; self-sufficient) agricultural household regarding crop  $i$ , is this one:

$$\begin{aligned}
 P_h < C_h &\Leftrightarrow h \text{ is a net-buyer} \\
 P_h > C_h &\Leftrightarrow h \text{ is a net-seller} \\
 P_h = C_h &\Leftrightarrow h \text{ is self-sufficient}
 \end{aligned}$$

This definition is **based on the produced and consumed quantities** of the households over a given period of time. This definition does not in fact give us the net-seller or the net-buyer status of households as it supposes no link with the markets. As such, this formulation would allow a profiling of households as net-producers or net-consumers, but not as net-sellers or net-buyers.

As such, to consider a household a net-seller/net-buyer it is important to take into consideration the **real marketed quantities** of a particular staple food or a range of staple foods. Therefore, another formulation could look at the difference between the bought quantity ( $Q_b$ ) and the sold quantity ( $Q_s$ ) of food on the market:  $P - C$ :

$$\begin{aligned}
 P \geq Q_b \geq C - P \text{ and } Q_b > Q_s \geq 0 &\Leftrightarrow h \text{ is a net - buyer} \\
 0 \leq Q_b \leq P \text{ and } 0 \leq Q_b < Q_s \leq Q &\Leftrightarrow h \text{ is a net - seller} \\
 Q \geq Q_b = Q_s \geq 0 &\Leftrightarrow h \text{ is self - sufficient}
 \end{aligned}$$

In this formulation,  $Q_b$  is the total bought quantity of  $i$ ,  $Q_s$  the total sold quantity of  $i$ . As such, the underlying assumption is that the prices of bought and sold quantities are a single price and what makes the difference between a net-seller and net-buyer is determined by the difference in the quantities of food crop  $i$  bought and sold.

However, this definition still uses production and consumption figures to impute marketed quantities and furthermore uses only one price to account for the value of bought and sold quantities. This means that price seasonality and market failures are not taken into account.

Furthermore, the effectiveness and accuracy of the NBR is dependent upon the way in which the net-seller/net-buyer status of households was formulated. In the above quantity definitions, the calculation of the NBR would be as follows:



$$NBR_{ih} = p_i \frac{Q_{ih} - C_{ih}}{E_h}$$

where  $E_h$  is the total expenditure of household  $h$ , and  $p_i$  is the price of crop  $i$ . The manner in which this ratio varies across the income distribution (so related to the distribution of  $E_h$ ) illuminates how a price change (a change in  $p_i$ ) affects income across the income distribution.

## Annex II – Generic Questionnaire Modules

### Section 1: Buying and selling behaviour

1	Commodity	1a. About how much of this commodity did your household need for consumption during the last year? 0 = do not consume		1b. During the last year for how many months did you largely have to depend on market purchases for your household consumption of the following staple commodities?	1c. During the last year for how many months did you largely depend on your own production for your household consumption of the following staple commodities?	1d. During the last year for how many months did you have none of the following staple commodities for household consumption?	1f. In the last year, have you sold some, part or all of your harvest on the market? 0 = no 1 = yes  If "0" then stop interview
		Units (please indicate relevant LMU)	quantity				
1	Wheat						
2	Sorghum						
3	Rice						

### Section 2: Seasonal Pattern of Selling and Buying

2a. In general in which period are your purchases/sales most important in a normal year?		2b. Why is that particular time of the year the most important for your purchases?	2c. Why is that particular time of the year the most important for your sales?
	1 = Pre-harvest 2 = Harvest 3 = Post-harvest 4 = Lean season 5 = all the time	1 = Running out of own stocks 2 = ceremonies/festivals 3 = low prices 4 = Other, specify ____ 99 = no response	1 = Re-paying debts 2 = Purchasing agricultural inputs 3 = spending on ceremonies/festivals 4 = migration of family member/travel 5 = school fees/taxes 6 = medical expenses 7 = purchase of non-agricultural/household supplies

						<p>8 = purchase of livestock                  9 = anticipate low/high prices                  10 = lack of storage                  11 = Other, specify _____                  99 = no response</p>
		Purchases	Sales		See codes	See codes
1	Wheat	__ __ __	__ __ __		__ __ __	__ __ __
2	Sorghum	__ __ __	__ __ __		__ __ __	__ __ __
3	Rice	__ __ __	__ __ __		__ __ __	__ __ __

**The following section needs to be adapted according to the seasonal calendar of the crop and country in question. 3.2A represents a more complex formulation of the net-seller/net-buyer status and 3.2B is a more simplified module**

**3. Details of Purchases and Sales Across Seasons/Months**

3.1 Please indicate the purchase and sale units	2.1.P. What is the local measurement unit for buying this product and what is its purchase price in local currency ?		2.1.S - What is the local measurement unit for selling this product and what is its purchase price in local currency ?	
	Purchase unit in LMU	standard conversion in kgs	Purchase unit in LMU	standard conversion in kgs
Rice				
Sorghum				
Wheat				

3.2A Please indicate the quantity and price for each food crop bought and sold for each season, using the units indicated in 2.1 for quantity, and the average price for transactions made in a particular season													
Food Crop (please specify)	2.1 Pre-Harvest (Indicate month ____ year ____ to month ____ year ____)			2.2 Harvest (Indicate month: ____ year ____ to month ____ year ____)			2.3 Post-Harvest (Indicate month ____ year ____ to month ____ year ____)			2.4 Lean Season (Indicate month ____ year ____ to month ____ year ____)			
	2.1.B Bought		2.1.S Sold	2.2 B Bought		2.2S Sold	Bought		Price	Sold		Price	Sold
	Quantity (In LMU indicated in 2.1.P)	Price	Quantity (in LMU indicated in 2.1.S)	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price
Rice													
Sorghum													
Wheat													
3.2B Please indicate whether you bought more or sold more of each commodity for each month (0 = bought more; 1 = sold more)													
Food Crop (please specify)	A. January	B. February	C. March	D. April	E. May	F. June	G. July	H. August	I. September	J. October	K. November	L. December	
rice													
Sorghum													
Wheat													