

VCS MODULE VMD0033

ESTIMATION OF EMISSIONS FROM MARKET LEAKAGE

Version 1.0

16 November 2012

Sectoral Scope 14



Document Prepared by: The Earth Partners LLC.

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1 SOURCES

None

2 SUMMARY DESCRIPTION OF THE MODULE

The module provides methods for estimating whether reductions in the production of commodities (such as wood, animals or agricultural products) resulting from the project activity is likely to result in increased emissions from the production of those products elsewhere, and provides methods for determining the volume of such emissions.

3 DEFINITIONS

Project Activity: See *VCS Program Definitions*.

Project Area: The area or areas of land on which the project proponent will undertake the project activities.

4 APPLICABILITY CONDITIONS

None

5 PROCEDURES

Step 1: Identification of commodities and services

Identify all commodities or services whose supply may be reduced on a local, regional, national or international scale due to implementation of the project activity. These commodities and services must include any commodity or service which meets the following criteria:

- Prior to project commencement the commodity or service was produced within the project area, and;
- The commodity or service was not produced solely for the producer's use, but was sold or bartered to others (it was a market commodity or service), and;
- The commodity or service provided more than 5% of the total cash and barter income earned by residents within the project area.

Data for this step may be derived from:

- Existing statistical data,
- Economic studies,
- Market studies, or
- Oral testimony, including Participatory Rural Appraisals

Identify the current markets for the products or services, in terms of the percentage of the product produced within the project area going to local, regional, national and international markets, and the scale of each of those markets, in product units (e.g. kg), and record in the following table:

Table 1: Market and product table

Market	Product 1 – (%)	Product 1 – Market scale (units/yr)
Local (within the community or communities immediately surrounding the project area)		
Regional (within the province/s or other generally recognized region/s containing the project)		
National (within the country, or in some cases, within the group of countries, where close economic integration exists, containing the project)		
International (worldwide)		
Total	100%	

Information on markets will typically be best derived using interviews with producers, combined where necessary with interviews with market intermediaries to determine the final destination of the product or service, where the producer is not sure. This information may be supplemented with information from existing studies or existing statistical databases.

Step 2: Barrier analysis

For each of the markets for each individual products or services, determine the barriers surrounding that market. Barriers may consist of distribution costs, tariff or regulatory barriers, or other circumstances which tend to reduce the introduction of the goods or services from markets at the next scale/s up (for instance introduction of a product from the provincial or national market to the local market), or from neighboring markets of the same scale (for instance from the next town, the next province). Grade these barriers on the following scale:

Table 2: Barrier grades

Grade	Description
Low	Products or services are readily substituted from markets at the next scale/s up, or from neighboring markets at the same scale. For instance, no significant barriers exist to bringing the product or service into the local market from the regional or national market (price differences less than 5% more expensive, no other barriers).
Medium	Barriers do exist, but their effects are limited to price differentials for goods or services from markets at the next scales up or from neighboring markets. Goods brought from neighboring markets or markets at the next scale up are not more than 15% more expensive than those currently available in the market. For instance, fruit from another province can be brought to the local area with a price premium of about 10%.
High	Significant barriers exist. Products or services cannot be brought from markets at the next scale up or neighboring markets, or are significantly more expensive (greater than 15% more) due to transport costs, tariffs, or for other reasons.

Where existing information on market barriers does not exist in statistical databases or previous studies, interviews with market participants, producers, and/or intermediaries may be the best source of this

information. Market participants may have in depth knowledge of the nature and degree of barriers to marketing of specific products.

Step 3: Re-assessment of markets

Recalculate the market percentages, beginning with the local market and working up. For each product or service:

- If the barriers between that market and the next market are low, add that market percentage to the next market up. For example, if the product sells 20% to the local market and 80% to the regional market, but the barriers between the local and regional markets are low, the market for the product should be recalculated as 100% regional.
- If the barriers between that market and the next market are medium, move 50% of the market percentage to the next market up. For example, if the product sells 20% to the local market and 80% to the regional market, but the barriers between the local and regional markets are medium, the markets for the product should be recalculated as 10% local and 90% regional.
- If the barriers between that market and the next market up are high, no recalculation need be undertaken.

Step 4: Percentage of the market supplied

Multiply the revised market percentages by the total amount of that product or service provided from the project area prior to the project start date. For each market which the project supplies, calculate the percentage of the total market which the project supplies.

Example: The project area produces 10,000 kilograms of oranges per year. These oranges are sold 10% to the local market, and 90% to the regional market. The barriers between the local, and regional and national markets are low, but there are high barriers between the national and international markets. The revised market percentage for the oranges is thus 100% to the national market. The total national market for oranges is 500,000 kilograms. Thus the project area supplies 2% of the national market.

Data on total markets for a given product are typically best found in government or institutional databases. Some information may also be found in existing studies, and market participants, particularly larger scale intermediaries, may also have significant knowledge on this. At times local or regional scale data may have to be inferred from national data, using appropriate methods, such as weighting by population.

Step 5: Market significance

If for a given product the project supplies less than 3% of the total market in each market that it supplies, go to Step 10. If the project supplies more than 3% of any given market, proceed to Step 6.

Step 6: Replacement paths

For each product market, for which the project area supplies more than 3% of the total market volume of that product, determine the least cost replacement path. Paths to be examined include:

- Replacement by production from higher scale markets, with additional costs resulting from the barriers between markets.
- Replacement by existing alternate items within the market area.
- Increased production within the market area.

Assess the cost increase resulting from each of these replacement paths.

Typically market participants, particularly medium and large scale intermediaries, will have an excellent idea of the most likely replacement paths. Local producers are likely to have a good idea of the cost barriers to increased production within the local market area.

Select the replacement path which gives the lowest cost increase.

- If this path is replacement by existing alternate items, calculate the percentage of the market for the alternate items represented by the substitution, and return to Step 4.
- If the path is replacement by production in a higher scale market, recalculate the percentage of the product going to the higher level market as the sum of the percentage going to the current market and the percentage going to the higher level market, and return to Step 4.
- If the path is increased production within the market area, proceed to Step 7.

Step 7: Market impact

Assess the market impact of the replacement path.

- Estimate the expected price of the commodity or service required to allow increased production within the market area. This estimation must be based on an analysis of the least cost route to increased production. For instance, increased production of cattle might be achieved through production intensification, using more grain feeding to increase the number of cattle per unit area, or it might be achieved by increasing the amount of area used for cattle. Each of these options will have a cost associated with it – either the cost of increased feed purchases, or the cost of adding pasture. This method assumes that the cattle rancher will increase the production of cattle using whichever method adds the least costs per animal produced.

Once the least cost route to increased production is determined, the expected price of the commodity or service required to allow this production will be the new cost of production, plus the typical overhead coverage and profit margin for this commodity or service, which is usually best determined through interviews with local producers of the commodity.

- If this price is less than 5% greater than the current market price, increase of production of this commodity or service from other providers within the market area is expected to be equal to 100% of the reduction caused by the project. Proceed to Step 8.
 - If this price is more than 5% greater than the current market price, quantify the expected impact of the increased price on consumption of the commodity or service. Analysis must include the impacts of product substitution, reductions in use, and changes in the use of discretionary income.
- Based on this analysis, quantify the expected actual increase in production of the commodity or service in the market area from sources outside of the project area.

Example 1:

The project area currently produces 10,000 kilos of oranges a year, all going to the local market. High transportation costs mean that there are significant barriers between the local and regional markets. Farmers in the local area would readily produce more oranges if they could find a market, by increasing fertilization rates in the orange orchards, even at the same price. Therefore, when orange production is stopped in the project area, other farmers in the local market area are expected to readily increase their production by 10,000 kilos of oranges a year to replace the lost production.

Example 2:

As above, the project area produces 10,000 kilos of oranges a year, all going to the local market, and high transportation costs mean that there are significant barriers between the local and regional markets. However, the current price for oranges in the local market is resulting in farmers getting out of orange production. The price would have to be 20% higher to incentivize farmers to grow more oranges. A price increase of this magnitude would result in many people no longer buying oranges, or buying fewer. The result would be that an estimated 7,000 kilos less oranges would be consumed per year. Thus, the most likely increase in orange production as a result of the project activity is 3,000 kilos.

Step 8: Land impact

Identify the area of land required to produce the amount of product or service identified in Step 7, and the most probable land base on which this production will take place. For this land base, identify the probable management regime required to commence and continue production (eg, clearing tropical forests and planting of orange orchards).

Step 9: Carbon impact

Using sampling, modeling and widely accepted values, quantify the total carbon stocks on the identified land base under the management regime present in the baseline scenario (ie, the management regime that existed before market leakage effects occurred), and model the projected carbon stocks on the land base under the management regime required to produce the product or service in the project scenario (ie, the management regime in the project scenario caused by the market leakage). Carbon impact of market leakage will be calculated using the following equation:

$$E_m = C_c - C_m \quad (17.1)$$

Where:

- E_m = Market leakage, t CO₂e
- C_c = Carbon stocks of the identified land base under the management regime present in the baseline scenario, tCO₂e
- C_m = Carbon stocks of the identified land base under the management regime expected to result from the market leakage in the project scenario, tCO₂e

The methods and models used to complete this stage must be those defined in the modules associated with VCS methodology *VM0021 Soil Carbon Quantification Methodology*, for the relevant carbon pools. The change in onsite carbon stocks through time between the management regime before and after market leakage occurred, on the affected land, is the leakage attributable to the project. Changes in offsite GHG emissions not arising from changes in carbon pools on the land base, (for example emissions from fossil fuel use and fertilization), are not accounted, as these emissions are expected to be similar to those that occurred within the project area prior to the commencement of the project.

Step 10: Market flexibility

Where the project causes a less than 3% change in the supply of a given product or service to any market, as determined in Step 5, market changes caused by the project may reasonably be assumed to be indistinguishable from normal market “noise”, and it is unlikely that any pricing change attributable to the project will incentivize a change in behavior on the part of suppliers to the market. However, project proponents must examine the market conditions to determine if flexibility mechanisms exist within the market which will mask or compensate for the effects of the project.

Such mechanisms may include:

- Surplus - The market for the good is typically in a surplus situation, with some wastage or low value use consuming the surplus.
- Substitution - Substitution of another existing good is likely to occur if any temporary shortfall occurs, and the substitute is in surplus.
- Under-utilized capacity - Existing lands suitable for production of the good without further clearance or other carbon impacts are under-utilized, and any shortfall could be made up from these lands.
- Intensification capacity - Intensification of production on existing lands producing the good represents the lowest cost path to replacement of the losses attributable to the project.

The best source for this data is likely to be local producers and intermediaries with a clear knowledge of the market dynamics and production limitations for the commodity or service.

If any of these mechanisms, or similar mechanisms which would tend to mask market signals, demonstrably exists, no leakage is assumed to occur for this product or service in this market. Otherwise, return to Step 6.

6 PARAMETERS

Data Unit / Parameter:	E_m
Data unit:	tCO ₂ e
Description:	Market leakage CO ₂ for year y
Source of data:	Calculated
Justification of choice of data or description of measurement methods and procedures applied:	The market leakage estimated for a given year
Any comment:	

Data Unit / Parameter:	C_c
Data unit:	tCO ₂ e
Description:	Carbon stocks of the identified land base under the management regime present in the baseline scenario
Source of data:	Calculated using appropriate modules
Justification of choice of data or description of measurement methods and procedures applied:	Tonnes of CO ₂ e on the identified land based under the management regime that was present in the baseline scenario
Any comment:	

Data Unit / Parameter:	C_m
Data unit:	tCO ₂ e
Description:	Carbon stocks of the identified land base under the management regime expected to result from the market leakage in the project scenario
Source of data:	Calculated using appropriate modules
Justification of choice of data or description of measurement methods and procedures applied:	Carbon stocks of the identified land under the management regime expected to result from the market leakage in the project scenario
Any comment:	

7 REFERENCES AND OTHER INFORMATION

None

DOCUMENT HISTORY

Version	Date	Comment
v1.0	16 Nov 2012	Initial version released