An accurate certified volume is the starting point for observing the impact of better farming practices.

Calculating certified volume:

\[
\text{Certified volume} = \text{Accurate certified production area} \times \text{Yield estimate}
\]

Accurate certified production area:

- Total area of certified crop determined using credible method(s)

Yield estimate:

- Group members’ crop yields estimated using credible methodology: documented & updated yearly
How to read this document

The aim of this document is to:

- Explain the UTZ approach to establishing accurate certified volume estimates;
- Inform members and their trainers about best practices on mapping the certified production area;
- Share methodologies for conducting yield estimates;
- Share what documentation is required.

Guidance on possibilities for improving productivity is given in a separate document.

This document contains a section with general guidance on the subject of certified volume estimates, and annexes where crop-specific guidance is provided. Parts of the control points are included. They are summarized to avoid making the document too lengthy. For the full and official content of the control points, including required procedures and documentation, please refer to the UTZ Code of Conduct documents.

For more information on Rainforest Alliance requirements concerning certified volume estimates, please see Continuous Improvement Criteria 1.7 of the Rainforest Alliance Sustainable Agriculture Standard.

“Group and multi-group certification” refers to the Core Code of Conduct for Group and Multi-Group certification. Control points from this Code start with a G, for example G.A.1.

“Individual and multi-site certification” refers to the Core Code of Conduct for Individual and Multi-Site certification. Control points from this Code start with an I, for example I.A.1.

“Year”: Indicates the first year of compliance in which the control point must be met.

For “Additional” control points the group/producer is free to choose which additional control points to comply with, as long as the required number for certification is met.
UTZ and CERTIFIED VOLUME

Good agricultural practices, professional farm management and transparent group management lead to better crops and better incomes. Having accurate numbers on certified volumes is essential for managing a group and guiding its members towards professional farm management and increased productivity. Additionally, having accurate numbers on certified volumes is essential for the credibility of our certification program and traceability system.

It is important to have accurate volume estimates because it enables producers to:
- Estimate required farm inputs.
- Observe the impact of better farming practices, and identify how to optimize productivity.
- Focus training activities and productivity optimization efforts where they are most needed.
- Estimate their supply of certified product for the coming year.
- Identify opportunities for selling their certified produce.
- Build trust between the producers and their first buyer.
- Better understand the management of household finances for male and female producers.
- Have additional supporting documents for accessing loans and credit from financial institutions.

Estimated volumes for the certification cycle are indicated in the Good Inside Portal following the audit, allowing groups to sell their certified product to certified buyers. During the following certification audit, the total volume harvested by the group (real harvest) is recorded by the auditor and also indicated in the Good Inside Portal.

Whichever the methodology used, it is always essential to:
1) test the methodology,
2) train the users,
3) verify that the estimation reflects what is observed in the field,
4) continuously monitor production,
5) at the end of the certification cycle, compare the estimation with what was really harvested (if there is a difference of more than 15%, the methodology needs to be adjusted) and
6) for each new certification cycle, compare the estimated volume with the previous cycle(s)' harvest.

Certified volume per farmer or group can be estimated with methodologies based on volume calculations per tree or directly per hectare.
## WHAT SHOULD BE IN PLACE?

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Group &amp; multi-group certification</th>
<th>Individual &amp; multi-site certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up-to-date overview map of the production area(s) is available</td>
<td>G.A.1, Year 2 onwards</td>
<td>I.A.1, Year 1 onwards</td>
</tr>
<tr>
<td>Total area of the certified crop is determined</td>
<td>G.A.2, Year 3 onwards</td>
<td>I.A.2, Year 3 onwards</td>
</tr>
<tr>
<td>Registry of group members is kept and updated, incl. production (previous year’s harvest and present year’s estimate)</td>
<td>G.A.8, Year 1 onwards</td>
<td>N/A</td>
</tr>
<tr>
<td>Crop yields of group members are estimated using a credible methodology</td>
<td>G.A.10, Year 1 onwards</td>
<td>I.A.3, Year 1 onwards</td>
</tr>
<tr>
<td>Internal inspection system is in place, incl. group member production (previous year’s harvest and present year’s estimate)</td>
<td>G.A.11, Year 1 onwards</td>
<td>N/A</td>
</tr>
<tr>
<td>Risk assessment is carried out, including risks related to non-accurate volume estimates. The producer is responsible for ensuring compliance of all subcontractors. E.g. collection centers, multi-certification, etc</td>
<td>G.A.16, Year 2 onwards</td>
<td>I.A.11, Year 2 onwards</td>
</tr>
</tbody>
</table>
ESTIMATED CERTIFIED VOLUMES

The total estimated certified volume per farmer can be calculated by multiplying the farmer’s certified area with the average yield estimate of the farmer’s plots. The certificate holder can then add up all certified volumes to come to an estimated certified volume for the whole producer group.

To achieve accurate certified volumes, the certified production area and yield estimates per, for example, hectare (ha) need to be determined. The calculation is visualized as follows:

Accurate certified area (in ha)  +  Yield estimate (in kg/ha)  =  Estimated certified volume (in kg)
ACCURATE CERTIFIED PRODUCTION AREA

The *certified production area* is the area used for the production of the certified crop.\(^1\) The UTZ Code of Conduct version 1.1 requires that certificate holders determine certified production area based on reliable methods (see box 1).\(^2\)

GPS mapping is widely used and considered a reliable method when executed well (see Annex 3 for instructions on how to conduct GPS mapping). It allows for more accurate and consistent data collection than estimating locations or area using paper maps, or a compass and distance measurement.

In several countries, governmental bodies issue official land titles indicating the size of the farm. These officially recognized documents are also considered a reliable method to prove the size of the certified area per group member. The IMS should nevertheless verify from time to time that the farm has not been split or sold since the issuance of the official land title.

Please see Annex 3 for best practices to measure the certified production area.

---

**Box 1: What does the Code 1.1 say?**

**G.A.1 and I.A.1:**
Up-to-date overview map of the production area(s) is available

**G.A.2 and I.A.2:**
The total area of the certified crop is determined. The area is determined using a credible method(s) based on e.g.:
- GPS mapping
- Land titles
- Tree counting and density

---

\(^1\) Parallel production is not allowed in the case of (multi-)group certification. In other words, group members cannot have some plots that are UTZ certified, and others that are excluded from UTZ certification. For individual and multi-site certification, this is allowed but only if an identification and segregation system is in place that guarantees the integrity of the UTZ product.

\(^2\) For the Rainforest Alliance criteria on area, see Critical criterion 1.1 and Critical criterion 1.13 in the Sustainable Agriculture Standard.
ACCURATE YIELD ESTIMATION

To arrive at accurate certified volume estimates, the yield of the certified crop also needs to be determined. An accurate yield estimate is determined by many factors. Therefore, UTZ provides guidance on some basic steps that can help in estimating yields for group members producing cocoa (Annex 1) and/or coffee (Annex 2). We describe some basic principles to arrive at more accurate yield estimates, while acknowledging that different and more detailed approaches (methodologies) are possible and currently being practiced. Therefore, it is highly recommended that farmer groups write down clearly the methodology they use.

Box 2: What does the Code 1.1 say?
G.A. 10:

Crop yields of group members are estimated using a credible methodology. They are documented and updated every year. A credible methodology considers e.g.:
- Previous year harvest(s)
- Density/tree count
- Age
- Input use
- Pests and diseases
- Plant variety
- Soil quality
- Geographic location
- Climate

Minimum requirement for credible yield estimation

For members in their first year of compliance, yield estimates can be more difficult to determine.

Nonetheless, yields and volumes can be estimated based on the previous year(s)’ harvested volumes (of each member in case of groups). This information can then be adjusted based on:
- If available, local average or potential yield of the area, for comparison purposes.
- Integrated Pest Management practices implemented.
- Input use (fertilizers and pesticides).
- Sanitary status of the crop (pest and disease pressure).
- Cropping system (intercropping or monocropping – the density of the certified crop will affect the yields).
- Crop maintenance (level of pruning, presence of weeds, irrigation).
- Age of plantation.
- Precipitation (rainfall) pattern.

In the case of producer groups, this information can be collected through interviews with the producers and observations of the fields.

To increase the accuracy of the estimates, inspectors are encouraged during the internal inspections to:
- Obtain information about the agricultural practices and characteristics of the plantation.
  For example, the internal inspector can ask:
  “How old is the plantation, and which variety is used?”
  “Are there any serious pest or disease problems?”
  “What inputs have been used over the last year and in what quantity/frequency?”
• Ask producers for the invoices or records of volumes sold elsewhere in the previous year, or ask for an estimate of what is sold to other buyers. These volumes should be included in the estimate.

Additional elements to improve the credibility of yield estimation

From year two onwards, groups/producers should work on increasing the credibility of their yield estimation to reduce the gap between the volume estimated and the volume produced.

If there is an important difference (more than 15%), the groups/individual producers must:

1) Look for explanations at producer level for the difference. The difference between the volume estimated and harvested can be due to a combination of controllable and non-controllable factors, such as extreme climatic events. The group should ensure that all available factors that affect yield estimates are considered.

It is strongly encouraged that production (per producer in case of a group) is continuously checked throughout the year to detect early any large discrepancies between estimated and produced volumes.

2) Improve their yield estimation methodology so as to increase the accuracy of the estimates.

From year two onwards, additional factors or other methods can be included to increase the credibility of the methodology and the accuracy of the volumes.

For example for cocoa or coffee:

✔ Productive tree density estimation (and gradually increasing sampling to increase accuracy)
✔ Pod or cherry counting (and gradually increasing sampling to increase accuracy)

In parallel to this, individual producers/IMS staff should also:

• Test the methodology before full-scale implementation.
• Train implementers and users of the methodology on how the methodology works and how it should be carried out.
• Set up a system to monitor production3 (this can be on a representative sample only).
• Compare what was estimated with what was produced (per producer in case of groups), to see if there is an important difference.

---

3 For producer groups, it is important for the IMS to acknowledge that production is not always equal to the deliveries made to the group, and that side-selling may occur. A system to keep track of the harvested volumes allows for a better assessment of real production.
HOW TO IMPROVE YOUR CERTIFIED VOLUME ESTIMATES?

1. Establish a credible methodology to calculate the certified area and yield of each producer.

2. Perform the methodology:
   - Test the methodology.
   - Train the person responsible within the IMS for estimating the volume.
   - Calculate the volume for each farmer.

3. Compare data:
   Cross-check the certified volume of each group member with previous year(s)’ harvest, total sales of the member, and internal inspection report (G.A.11). Take into account risks that might influence volume estimates.*

4. Keep track of real production:
   Set up a system to verify real production. This can be done for example by regular checks with a representative number of producers to gather information on the status of the crop and the quantities produced.

5. Analyze data:
   After the harvest season, real production needs to be compared to estimated production. If discrepancies between the two are found:
   - Identify the cause of the discrepancies and, depending on the reason, improve your methodology (step 1) and train your internal inspector (step 1).
   - Modify the estimated certified volume on your list of group members (G.A.8) for the new certification cycle.

---

* This is facilitated by having a clear picture of your supply chain. Risks that influence the accuracy of your data could be the presence of collection centers in your supply chain or multi-certification of your group members.
ANNEX 1: EXAMPLE OF ACCURATE VOLUME ESTIMATES IN COCOA

After having mapped the area with GPS or recognized official documents, the certificate holder can make yield and volumes estimates by adopting the following methodology:

**Step 1: productive tree density on sampled farms**

This first step of determining productive tree density (number of productive trees per hectare), can be done on each group member’s farm, but also on a representative sample of farms (for example, on the square root number of all group members). The average number of productive trees per hectare for these sampled farms is then calculated and applied to all group members. The explanations below are based on a sampled number of farmers:

Productive tree density can be determined based on sample area(s). For this, one or more area of 10 meters by 10 meters (100m²) is defined on a representative part of each sampled farm.

If the farm is not homogeneous, as a general guide, the sample area should not be in:
- a. Newly planted fields (no production).
- b. Abandoned fields (no production).
- c. Fields with old trees (declining production).

In each of the sample areas, the number of productive trees is then counted. If more than one sample area is defined, the average number of productive trees per sample area is calculated.

This counting will result in the number of productive trees per 100m²; this figure then needs to be multiplied by 100 to obtain the density of productive trees per hectare.¹

![Formula](number of productive trees per sample area (100m²) × 100 = average number of productive trees per hectare)

**Step 2: productive tree density for the whole group**

Once the average number of productive trees per hectare is determined for each sampled farm, the average of all these sampled farms can be calculated to obtain the average productive tree density for the whole group.

![Formula](sum of number of productive trees per hectare of all sampled farmers ÷ number of sampled farmers = average number of productive trees per hectare for the whole group)

¹ Other than estimating yield, tree density is useful for producers as it tells them if and how many more trees need to be planted for rehabilitation.
Steps 3 and 4: pod counting on productive trees for each group member

Once the tree density has been determined and applied to all group members, pods on productive trees need to be counted to then determine the estimated yield and volume.

The pod count is done on the farm of each group member, on a representative number of adjacent productive trees. The number of trees on which to count the pods is based on the productive tree density for the whole group divided by 100 (the result represents the number of productive trees that would be found on a 10 meter by 10 meter sample area).

The pods on this number of sampled productive trees are then counted on the farm of each group member:

Average number of productive trees per hectare for the whole group: \[
\frac{100}{\text{Number of productive trees on which to do the pod count on each farm.}}
\]

<table>
<thead>
<tr>
<th>Tree</th>
<th>Number of pods per productive tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree 1</td>
<td></td>
</tr>
<tr>
<td>Tree 2</td>
<td></td>
</tr>
<tr>
<td>Tree 3</td>
<td></td>
</tr>
<tr>
<td>Tree 4</td>
<td></td>
</tr>
<tr>
<td>Tree 5</td>
<td></td>
</tr>
<tr>
<td>Tree 6</td>
<td></td>
</tr>
<tr>
<td>Tree 7</td>
<td></td>
</tr>
<tr>
<td>Tree 8</td>
<td></td>
</tr>
<tr>
<td>Tree 9</td>
<td></td>
</tr>
<tr>
<td>Tree 10</td>
<td></td>
</tr>
<tr>
<td>Tree 11</td>
<td></td>
</tr>
<tr>
<td>Tree 12</td>
<td></td>
</tr>
<tr>
<td>Tree 13</td>
<td></td>
</tr>
<tr>
<td>Tree ...</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL NUMBER OF PODS ON SAMPLED PRODUCTIVE TREES:**
Steps 5 and 6: calculating the estimated cocoa yield

Once the pods on the sampled productive trees have been counted, the cocoa yield can be estimated.

The number of pods per tree is first determined based on the sum of the number of pods counted on the sampled productive trees:

\[
\text{Total number of pods on sampled productive trees} \div \text{Number of sampled productive trees} = \text{Average number of pods per productive tree}
\]

The average number of pods per tree is then used to calculate the average cocoa bean production per tree, knowing that on average one pod is equivalent to 0.04kg of cocoa beans:

\[
\text{Average number of pods per productive tree} \times 0.04 = \text{Average cocoa production per tree (kg/tree)}
\]

Finally, the cocoa bean production per tree is multiplied by the tree density per hectare to obtain the yield:

\[
\text{Average cocoa production per tree (kg/tree)} \times \text{Average number of productive trees per hectare} = \text{Estimated yield (kg/ha)}
\]

---

\(^5\) 1 pod = 450g = 40g of dried cocoa. These quantities are based on interviews with actors of the cocoa sector and may vary from one variety to another (according to ‘Catalogo de Cultivares de Cacao del Peru’, the weight of a pod is 45.5g for variety IC-95 and 61.6g for variety CCN-51).
Step 8: calculating the estimated volume and adjusting for local conditions

As a last step, the yield per hectare is multiplied by the total certified area to obtain the estimated volume, and then adjusted based on the factors mentioned on page eight of this document.

For example, with no pest and disease control (such as little to no pruning and/or weeding, or removal of infested pods), it can be expected that part of the pods will be lost, and hence, need to be deducted from the overall annual estimated volume.
For example:
Cocoa producer Marie Kouamé is a member of a certified group of 900 farmers, and has a certified cocoa farm of 1.5 hectares.

Based on a sample of 30 farmers from her group, the internal inspectors determined that the average productive tree density is 1,000 trees per hectare. The inspectors thus calculated that they will need to count the pods on 10 adjacent productive trees in each group member’s farm to estimate the volume.

On Marie Kouamé’s farm, the internal inspector selected 10 adjacent productive trees, and counted in total 106 pods on all 10 productive trees. The inspector then knows that on average, a productive tree on Marie Kouamé’s farm produces 10.6 pods, which is equivalent to 0.424kg of cocoa beans per tree:

<table>
<thead>
<tr>
<th>Total number of pods on productive trees:</th>
<th>Number of sampled productive trees:</th>
<th>Average number of pods per productive tree:</th>
</tr>
</thead>
<tbody>
<tr>
<td>106</td>
<td>10</td>
<td>10.6</td>
</tr>
</tbody>
</table>

This figure is multiplied by the tree density, resulting in a yield of 424kg/ha.

<table>
<thead>
<tr>
<th>Average production per tree (kg/tree)</th>
<th>Productive tree density:</th>
<th>Yield of Marie Kouamé’s farm (kg/ha):</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.424</td>
<td>1,000</td>
<td>424</td>
</tr>
</tbody>
</table>

To calculate the volume for the whole farm, the internal inspector then multiplied the yield by the total certified area of Marie Kouamé’s farm:

<table>
<thead>
<tr>
<th>Yield of Marie Kouamé’s farm (kg/ha):</th>
<th>Certified area of Marie Kouamé’s farm (ha):</th>
<th>Estimated volume of Marie Kouamé’s farm (kg):</th>
</tr>
</thead>
<tbody>
<tr>
<td>424</td>
<td>1.5</td>
<td>636</td>
</tr>
</tbody>
</table>

The internal inspector compared this yield and volume with what he observed on the farm and the agricultural practices implemented by Marie Kouamé, to make sure this estimate is realistic. In Marie Kouamé’s case, she does not undertake any pest or disease control, hence the internal inspector decreased her estimated yield and volume by 20%. Her final estimated yield is thus 339kg/ha, and her estimated volume is thus 509kg of cocoa beans.

<table>
<thead>
<tr>
<th>Adjusted yield of Marie Kouamé’s farm (kg/ha):</th>
<th>Certified area of Marie Kouamé’s farm (ha):</th>
<th>Final estimated volume of Marie Kouamé’s farm (kg):</th>
</tr>
</thead>
<tbody>
<tr>
<td>(424x 0.8) 339</td>
<td>1.5</td>
<td>509</td>
</tr>
</tbody>
</table>
ANNEX 2: EXAMPLE OF ACCURATE VOLUME ESTIMATES IN COFFEE

After having mapped the area, certificate holders can make yield estimates by taking the following steps per group member. This methodology can be used when cherries are present in the field.

**Step 1: tree counting**
Count the trees that you have in one hectare. See Annex 1 for an example of the methodology. In this example there are 1500 trees/hectare.

**Step 2: make sample**
In one plot, draw a transect/imaginary line. This transect has to go through representative areas of the farm in terms of variety and age of trees and soil quality. On this line, identify three points where there is a good diversity of yields. At each point, choose five representative trees in terms of yield and go through the next steps.

**Step 3: count the branches**
Counting should take place during harvest time. For each tree, count the number of branches and write it down. Afterwards, choose four (4) average size branches in four directions, count all cherries on the branches and calculate the average. Once you have the number of cherries per branch and the number of branches per tree, you can calculate the number of cherries per tree. Complete the following table:

<table>
<thead>
<tr>
<th>Tree number</th>
<th>Number of branches</th>
<th>Number of cherries on one branch</th>
<th>Number of cherries per tree = number of cherries per branch * number of branches per tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30</td>
<td>20</td>
<td>30 * 20 = 600</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>60</td>
<td>50 * 60 = 3 000</td>
</tr>
<tr>
<td>3</td>
<td>45</td>
<td>45</td>
<td>45 * 45 = 2 000</td>
</tr>
<tr>
<td>4</td>
<td>45</td>
<td>40</td>
<td>45 * 40 = 1 800</td>
</tr>
<tr>
<td>5</td>
<td>32</td>
<td>25</td>
<td>32 * 25 = 800</td>
</tr>
<tr>
<td>6</td>
<td>55</td>
<td>65</td>
<td>55 * 65 = 3 600</td>
</tr>
<tr>
<td>7</td>
<td>40</td>
<td>10</td>
<td>40 * 10 = 400</td>
</tr>
<tr>
<td>8</td>
<td>50</td>
<td>50</td>
<td>50 * 50 = 2 500</td>
</tr>
<tr>
<td>9</td>
<td>37</td>
<td>40</td>
<td>37 * 40 = 1 500</td>
</tr>
<tr>
<td>10</td>
<td>46</td>
<td>50</td>
<td>46 * 50 = 2 300</td>
</tr>
<tr>
<td>11</td>
<td>30</td>
<td>33</td>
<td>30 * 33 = 1 000</td>
</tr>
<tr>
<td>12</td>
<td>75</td>
<td>60</td>
<td>75 * 60 = 4 500</td>
</tr>
<tr>
<td>13</td>
<td>50</td>
<td>60</td>
<td>50 * 60 = 3 000</td>
</tr>
<tr>
<td>14</td>
<td>45</td>
<td>45</td>
<td>45 * 45 = 2 000</td>
</tr>
<tr>
<td>15</td>
<td>50</td>
<td>28</td>
<td>50 * 28 = 1 400</td>
</tr>
</tbody>
</table>

Average number of cherries per tree = **2030** cherries/tree
Step 4: yield estimate
To determine the weight of green coffee per tree, do the following calculation.

The first step is to calculate the average weight of cherries per tree. We have taken 1/600kg as the weight of one cherry.\(^6\)

\[
\text{Average of cherries per tree} \times \frac{1}{600} \text{ kg} = \text{Average weight of cherries per tree}
\]

\[
2030 \times \frac{1}{600} = 3.4 \text{ kg}
\]

The second step is to calculate the weight of green coffee per tree by using a conversion rate of 1 to 7.\(^7\)

For this example: kg of green coffee per tree = \(\frac{3.4}{7} = 0.486\) kg of green coffee per tree.

\[
\frac{\text{Average weight of cherries per tree}}{7} = \text{Weight of green coffee per tree}
\]

\[
\frac{3.4}{7} = 0.486 \text{ kg}
\]

To have the yield estimate per hectare, you have to multiply by the number of trees identified in step 1:

\[
\text{Weight of green coffee per tree} \times \text{Number of trees per hectare} = \text{Yield estimate per hectare}
\]

\[
0.486 \text{ kg} \times 1500 = 729 \text{ kg/ha}
\]

Step 5: volume estimation
The last step is to multiply the yield estimate and the size of the certified area to get the estimated volume.

\(^6\) Based on methodology developed by ICAFE, Instituto del Café de Costa Rica.
\(^7\) Based on methodology developed by ICAFE, Instituto del Café de Costa Rica.
ANNEX 3: BEST PRACTICES TO MEASURE THE CERTIFIED AREA

GPS device
1. Turn the device on with the power button.
2. You will get a message, “Wait…tracking satellites” (A good signal needs at least four satellites and can take up to five minutes to get a connection).
3. If you are under a dense canopy, it helps to track satellites in a nearby open area first, then bring the device (with the power still on) back to the farm.
4. Mark your location and note down:
   - Elevation: (e.g. 605 meters)
   - Latitude: (e.g. N 38°57.711’)
   - Longitude: (e.g. W 094°47.935’)
5. Make sure to also note down the units of measurement you use (e.g. ft/m/N/W)

Smartphone
1. Download a free suitable application for tracking coordinates with your smartphone:
   - For iOS, e.g. https://itunes.apple.com/be/app/gps-coordinates/id449505834?mt=8
2. Either mark your location while you are on the spot, or search for the location of the producer organization or estate on the map and mark a point.
3. Note down:
   - Latitude: (e.g. N 38°57.711’)
   - Longitude: (e.g. W 094°47.935’)
4. Make sure to also note down the units of measurement you use (e.g. N/W)
5. Note that elevation cannot be determined with a smartphone
Google Maps

1. Open Google maps: https://maps.google.com/
2. Right-click on the map on the location of the producer organization or the estate
3. Select “What’s here?”

4. The coordinates will appear in the search box at the top of the page. You can also see the coordinates if you hover over the arrow at the marked spot or click on the arrow
5. Note down:
   - Latitude: (e.g. 6.716778)
   - Longitude: (e.g. 39.389076)

6. Make sure to also note down the units of measurement you use (e.g. N/W)
7. Note that elevation cannot be determined with Google maps
ANNEX 4: METRIC CONVERSION

Surface

The basic metric unit of land area measurement is a square with each side 100 meters long, covering an area of 10,000 square meters. This unit of land is called the hectare (ha) and is equal to approximately 2.5 acres.

1 hectare (ha) = 10,000 square meters (m²)
1 hectare (ha) = 2.471 (2.5) acres
1 acre (a) = 4,046.86 square meters
1 acre = .4047 (.4) hectares

Weight

Weight is measured in kilograms (kg)

1 quintal = 100 kilograms
1 metric ton = 1,000 kilograms
1 metric ton = 10 quintals

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Central America</th>
<th>Ecuador</th>
<th>Peru</th>
<th>Colombia</th>
<th>Costa Rica</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit used and equivalence in kg</td>
<td>1 fanega = 46kg</td>
<td>22,046 quintal = 1 Metric Ton</td>
<td>1 quintal of green coffee = 46kg</td>
<td>1 arroba = 12.5kg</td>
<td>1 cajuela = 12.5kg</td>
</tr>
<tr>
<td></td>
<td>1 debe cherry = 14kg</td>
<td>1 quintal of cocoa beans (at field) = 45kg</td>
<td></td>
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<tr>
<td></td>
<td>500 debes cherry = 1 ton clean coffee</td>
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</tbody>
</table>