RSPO | Roundtable on Sustainable Palm Oil

GUIDANCE ON MAP SUBMISSION FOR LAND USE CHANGE ANALYSIS (LUCA) FOR INDEPENDENT SMALLHOLDERS

Version 1, December 2017

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DISCLAIMER STATEMENT

To ensure consistency with the New Planting Procedure (NPP) for Smallholders document and/or any other related documents, the term '**planting**' in this document, may be used interchangeably with the term '**development**'.

New oil palm planting or new oil palm development is defined as planned or proposed planting (e.g. land clearing and preparation, including any associated development) on land not previously cultivated with oil palm.

For reference, users are encouraged to refer to the NPP 2015 document glossary for the correct interpretation of terms used in this document.

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BACKGROUND

According to **Criterion 7.3.2 (M)** of the Roundtable on Sustainable Palm Oil (RSPO) Management System Requirements and Guidance for Group Certification of Fresh Fruit Bunch (FFB) production, independent smallholders are required to have:

1. A comprehensive High Conservation Value (HCV) assessment, which includes stakeholder consultation prior to the new planting and

2. Land Use Change Analysis (LUCA) to determine changes to the vegetation since November 2005. The analysis shall be used with proxies, to indicate changes to HCV status.

In the New Planting Procedure (NPP) 2015, independent smallholders are required to carry out all assessments, including the LUCA, through the Group Manager.

Based on Table 2: Guidance for assessments in the NPP 2015, independent smallholders who wish to conduct new planting shall engage independent assessors to conduct the LUCA. The LUCA must be current at the time of the NPP submission, i.e., less than one year old.

As part of the resolution 6f (2016) the RSPO produced this simplified LUCA guidance to help independent smallholders with the assessments required in the NPP. This simplified LUCA guidance is only applicable to independent smallholders. Companies are responsible to conduct the LUCA for its scheme and associated smallholders, as well as out-growers as stated in the NPP 2015.

LAND USE CHANGE ANALYSIS (LUCA) FOR INDEPENDENT SMALLHOLDERS

The RSPO acknowledged that independent smallholders have limited capacity to conduct the LUCA for the NPP. The LUCA will require expertise in interpreting land covers from satellite images, therefore, it is not recommended for the Group Managers to conduct the LUCA. Furthermore, it involves high costs which is often not favourable to the independent smallholders.

Despite the challenges, the LUCA requirement for the NPP simply cannot be compromised, even for independent smallholders. Simplifying the LUCA methodology is not recommended as it will be difficult and potentially innacurate. Therefore, the RSPO has taken steps to support the independent smallholders in conducting the LUCA. The LUCA will be conducted according to the Land Use Change Analysis Guidance 2017.

In order to conduct the LUCA, the independent smallholders need to submit the maps depicting the proposed new planting boundaries. The RSPO maps its members' oil palm plantations by using polygon shapefiles. Therefore, independent smallholders who wish to expand their farms will have to submit polygon shapefiles for the LUCA.

Map Requirements

A shapefile is an Esri vector data that stores the information on location, shape, and attributes of geographic features. It consists of a collection of files with a common filename prefix, stored in the same directory. An ideal shapefile consists of file extensions as shown in Table 1 below.

File Extension	Description
.shp	Shape format
.shx	Shape index format
.dbf	Attribute format
.prj	Projection format

Table 1: The file extension of an ideal shapefile submission

A shapefile has three types of vector data, namely the discrete points, polylines, and polygons. Figure 1 below shows the three vector data.

DISCRETE POINTS

A point feature is described by its X and Y coordinates. It represents discrete locations on the ground – e.g.: Farm A, Farm B and Farm C.

Discrete points are mainly used to locate an area. It is not suitable for the LUCA.

POLYLINES

A polyline represents linear features such as rivers and roads.

Polylines do not contain information on the size of an area. They only present information on the length and distance from point A to point B. Therefore, using polylines is not suitable for the LUCA.

POLYGONS

A polygon is a closed shape defined by a connected sequence of X and Y coordinates, where the first and last coordinates are the same.

Polygons present information on location, length and size of the area of interest. Hence, it is suitable to be used for the LUCA.

Figure 1: Discrete points, polylines, and polygons

Based on Figure 1, polygon shapefiles are required to conduct the LUCA. Therefore, independent smallholders are required to produce and submit polygon shapefiles depicting the area for expansion.

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MAPPING PROCEDURES

Acknowledging that producing and submitting shapefiles may be beyond independent smallholders' capacity, this section explains how independent smallholders can produce polygon shapefiles required for the LUCA.

The mapping procedures will involve both fieldwork and desktop study as highlighted in Figure 2.

Equipment and Software Required

The mapping procedures will involve the use of a Global Positioning System (GPS), Google Earth and Quantum Geographic Information System (QGIS). Both Google Earth and QGIS are downloadable for free.

Google Earth
https://www.google.com/earth/download/ge/agree.html

QGIS
http://www.qgis.org/en/site/forusers/download.html

Step 1: Collecting GPS Coordinates

The first step required to produce the shapefile is to collect GPS coordinates of the expansion area. A GPS is required to complete this step.

There are two options available to collect the GPS coordinates. The options are highlighted in Table 2.

Independent smallholders may choose either of the two options depending on their capacity. Once the output is ready, proceed to Step 2: Creating .kmz/.kml files.

	Tracking Method	Waypoint Method
Methodology	The tracking method requires the farmers to walk around the expansion area	The waypoint method requires the farmers to collect a single GPS coordinate, preferably from the centre of the expansion area
Output	A .gpx format file showing the shape of the expansion area	A single GPS coordinate in .gpx format
Effort	High as it involves field visits	Low as only a single GPS coordinate is required
Duration	Time consuming as it requires farmers to walk around the boundary	Relatively faster, as only a single GPS coordinate is required
Accuracy	High, provided that the farmers walk around the correct legal boundary[2]	N/A
Others	Do not require additional steps	Require additional steps which is creating polygons on Google Earth based on the legal map. This additional step is time consuming

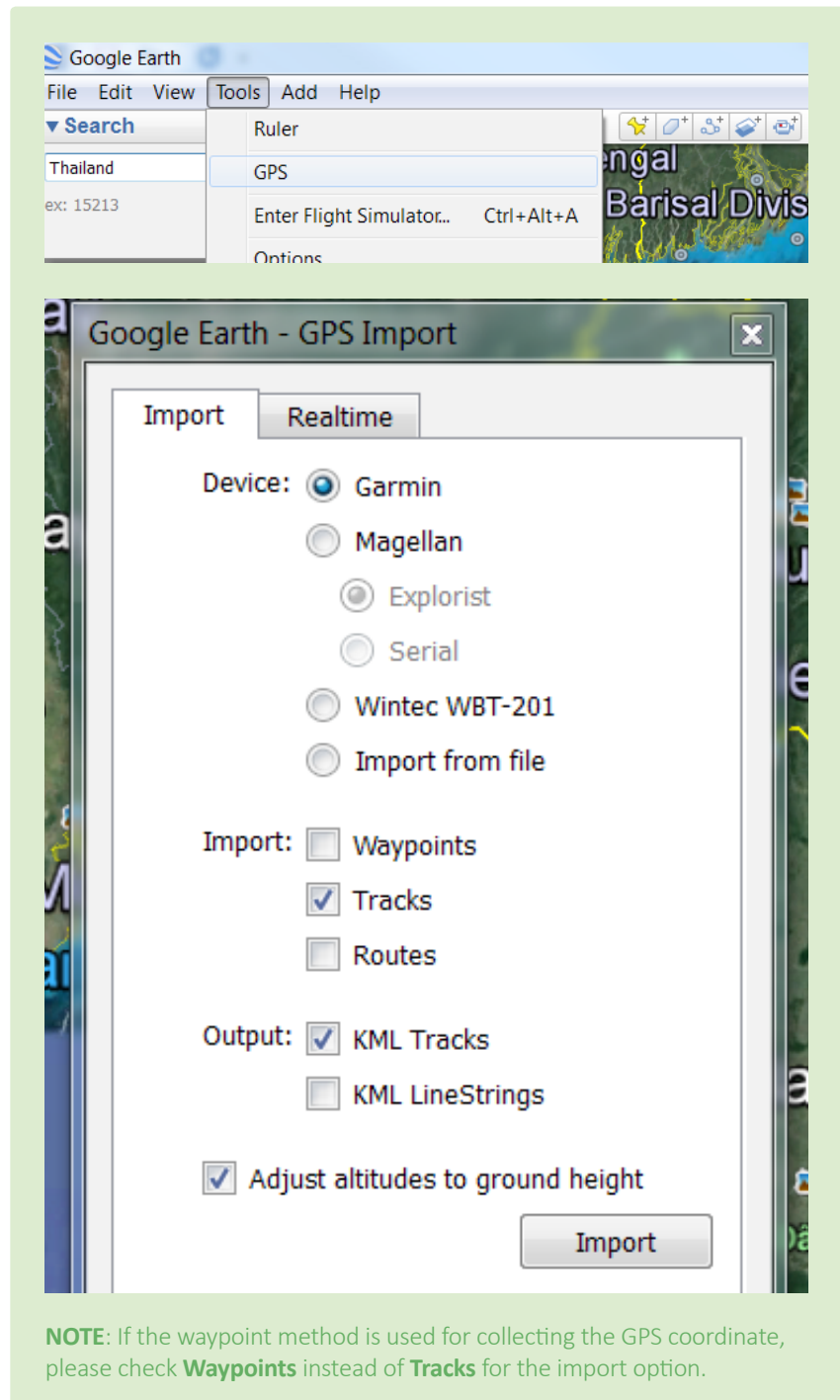**Table 2:** Comparison between the tracking and waypoint methods

[2] Accuracy can be further improved by comparing the output (.gpx data) with the legal map.
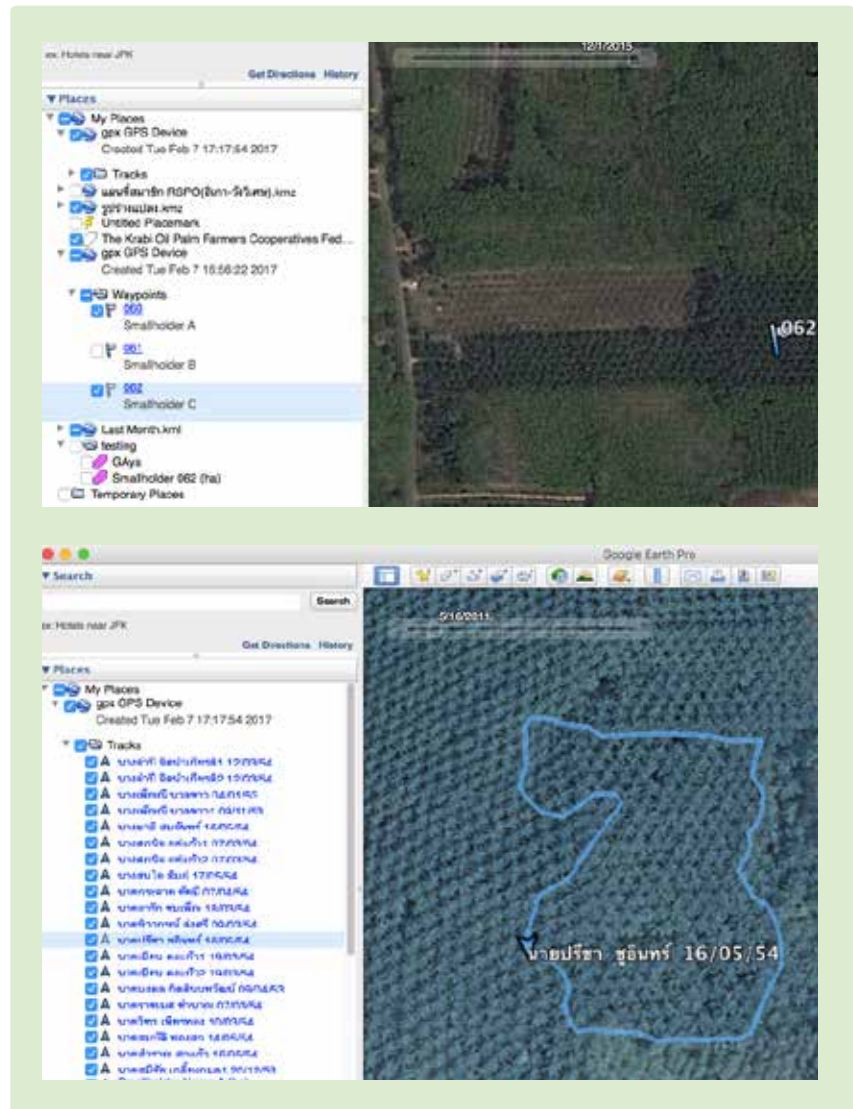
Step 2: Creating .kmz/.kml Files

The next step is to import the output (.gpx format files) into Google Earth. Depending on the method chosen in Step 1, the second step may vary.

Importing Data into Google Earth

1. Open Google Earth
2. Go to **Tools** and select GPS
3. Select **Import**
4. Check **Garmin** for device
5. If the method used in Step 1 is tracking, then check **Tracks** for Import. Otherwise, check **Waypoints** for Import.
6. Check **KML Tracks** for Output
7. Check **Adjust altitudes to ground height**
8. Click **Import**

NOTE: If the waypoint method is used for collecting the GPS coordinate, please check **Waypoints** instead of **Tracks** for the import option.
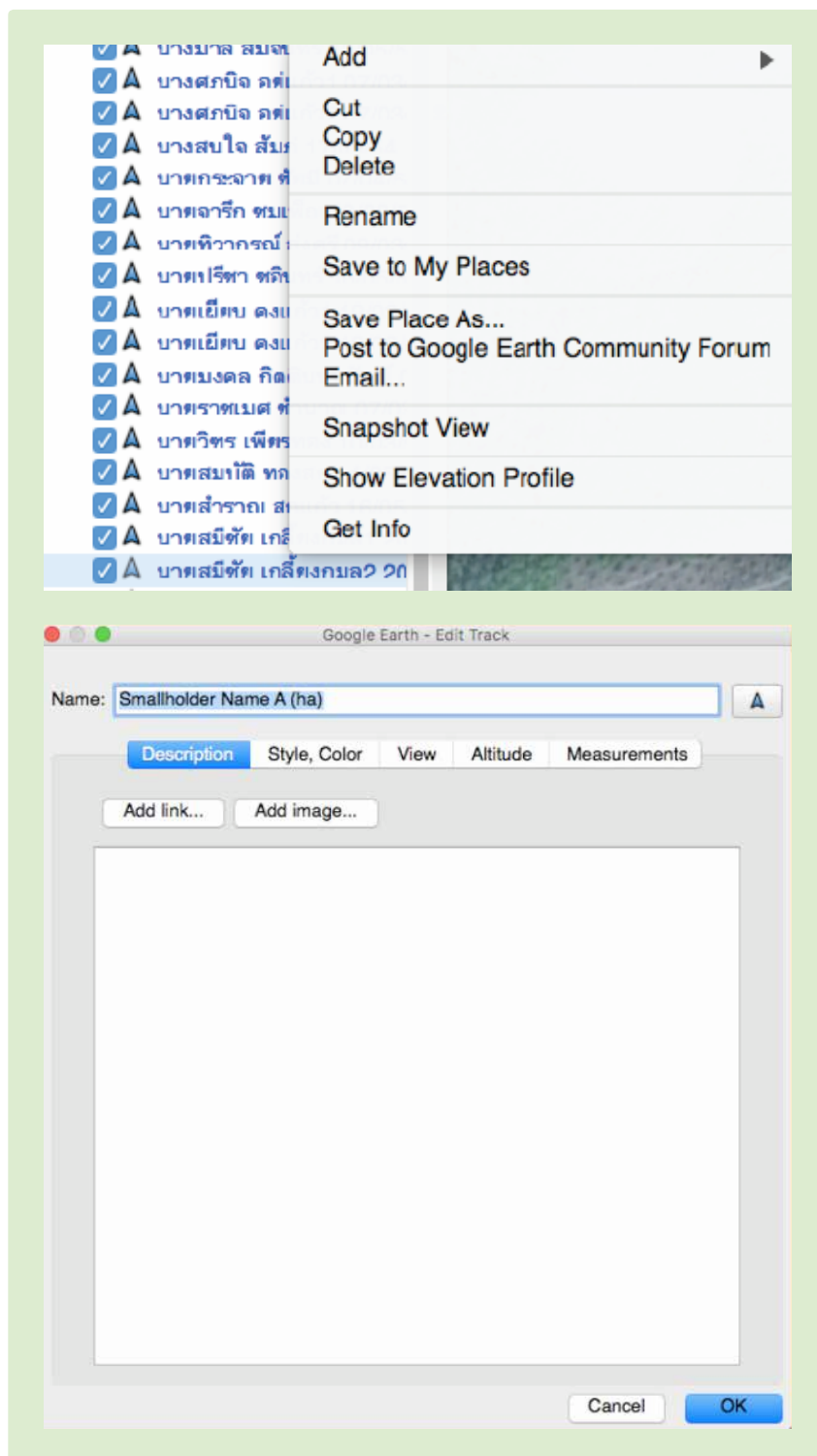
9. The walked track/waypoint will be shown on the right. The list of imported tracks will be on the left.

Data Editing (Tracking Method)

1. Right click on the tracks. Select **Get Info**.

2. **Edit Track** box will appear.

3. Insert the following information[3] in the **Name** box:

   a. Group's name
   b. Farmer's name
   c. Size of the area
   d. Planting year
   e. Average FFB/year
   f. Partner Mills

4. Click **OK** to save. Edit more tracks if required.

5. Store all edited tracks into one folder.

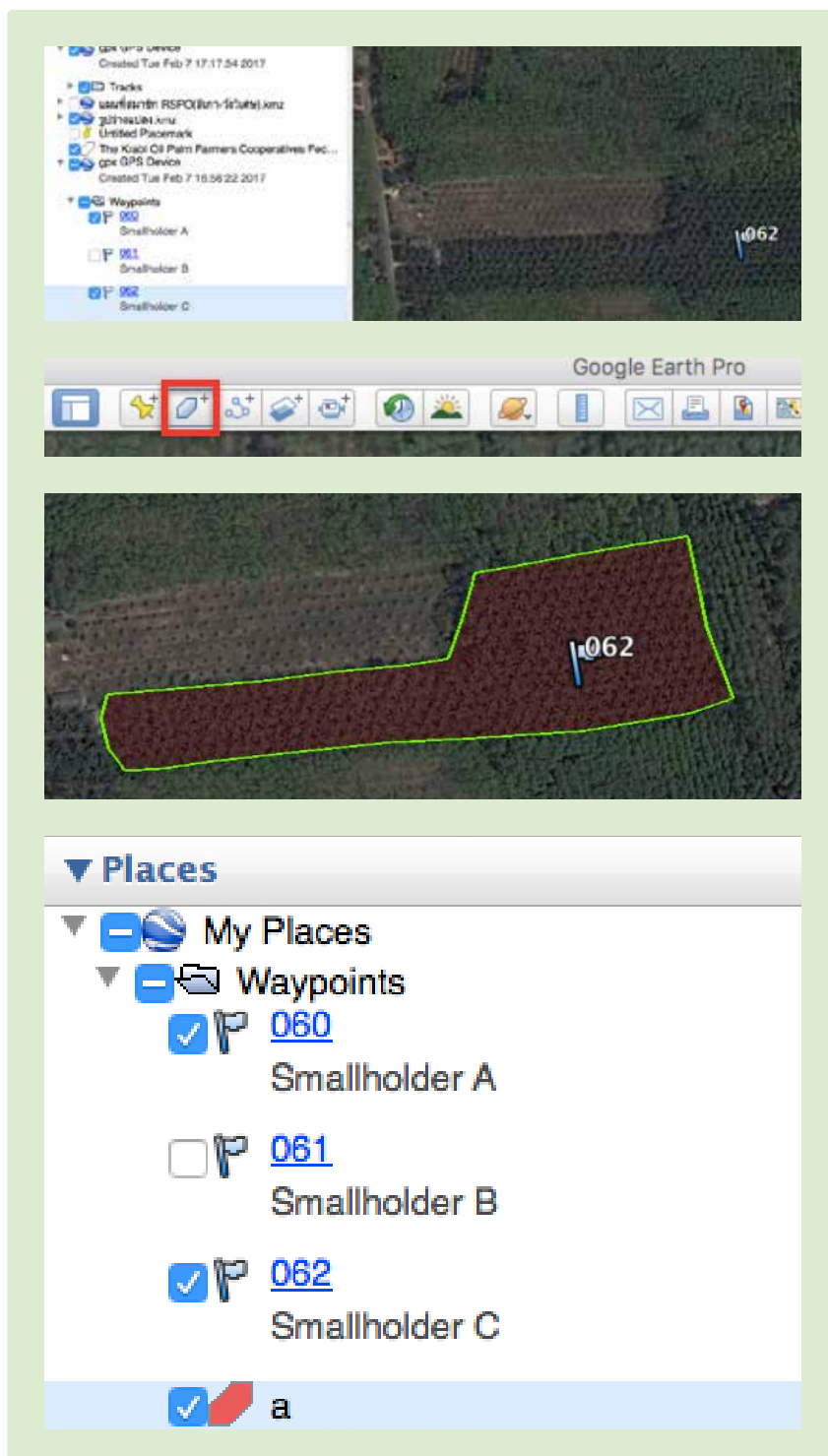6. Save folder as .kml/.kmz.

7. Submit the output to RSPO.

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[3] For the NPP, only the information for (a), (b), & (c) are required. Full information is required for ACOP and RaCP.

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Data Editing (Waypoint Method)

As highlighted in Table 2, for the waypoint method, an additional step of creating a polygon is required.

1. On the left of the Google Earth screen, click on the waypoint to create the polygon. The clicked polygon will be highlighted.

2. Go to the tools bar and click **add polygon**.

3. Draw the polygon by using the land title as reference.

4. Once plotted, you will get a new polygon file which can be seen on the left.

5. Right click on the new polygon. Select **Get Info**.

6. Insert the following information[4] in the **Name** box:

   a. Group's name
   b. Farmer's name
   c. Size of the area
   d. Planting year
   e. Average FFB/year
   f. Partner mills

7. Click **OK** to save polygon. Draw and edit more polygons.

8. Store all polygons into one folder.

9. Save folder as .kml/.kmz.

10. Submit the output to RSPO.

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[4] For the NPP, only the information for (a), (b), & (c) are required. Full information is required for ACOP and RaCP.

Step 3: Conversion of .kmz/.kml Files to Shapefiles

The RSPO will be converting the .kmz/.kml files to shapefiles and proceed with conducting the LUCA.

The RSPO is in the process of developing an app for the independent smallholder's HCV 7.3 requirement. There is a possibility that the app can generate maps automatically, hence, further simplifying the mapping procedures for smallholders.
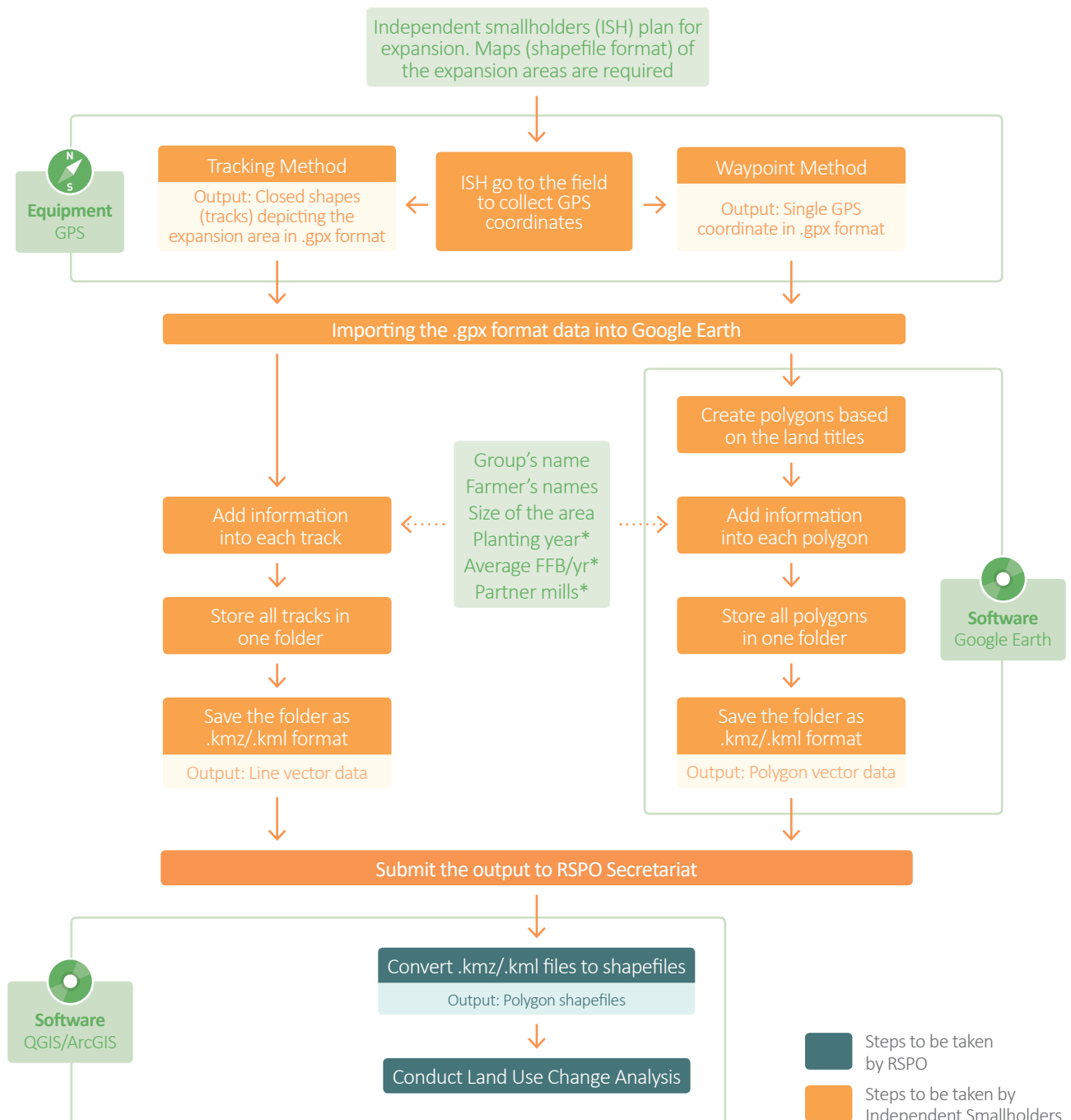
Flow diagram for the creation of shapefiles

Independent smallholders (ISH) plan for expansion. Maps (shapefile format) of the expansion areas are required

Equipment GPS

Tracking Method
Output: Closed shapes (tracks) depicting the expansion area in .gpx format

ISH go to the field to collect GPS coordinates

Waypoint Method
Output: Single GPS coordinate in .gpx format

Importing the .gpx format data into Google Earth

Create polygons based on the land titles

Group's name
Farmer's names
Size of the area
Planting year*
Average FFB/yr*
Partner mills*

Add information into each track

Add information into each polygon

Store all tracks in one folder

Store all polygons in one folder

Software Google Earth

Save the folder as .kmz/.kml format
Output: Line vector data

Save the folder as .kmz/.kml format
Output: Polygon vector data

Submit the output to RSPO Secretariat

Software QGIS/ArcGIS

Convert .kmz/.kml files to shapefiles
Output: Polygon shapefiles

Conduct Land Use Change Analysis

Steps to be taken by RSPO

Steps to be taken by Independent Smallholders

Figure 2: The flow diagram for the creation of shapefiles

*For NPP, this is not required

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LAND USE CHANGE ANALYSIS (LUCA)

The RSPO will only conduct the LUCA for independent smallholders who have submitted complete .kml/.kmz files with sufficient information as highlighted in Figure 2.

Depending on the size of the expansion, the LUCA report will be delivered to the independent smallholders one month from the submission of the completed .kml/.kmz files. During the analysis period, independent smallholders may be contacted for more information.

The LUCA report will be used to support the HCV assessments as well as the green house gas (GHG) calculation.

The RSPO is an international non-profit organisation formed in 2004 with the objective to promote the growth and use of sustainable oil palm products through credible global standards and engagement of stakeholders.

www.rspo.org

ROUNDTABLE ON SUSTAINABLE PALM OIL

Unit A-37-1, Level 37, Tower A,
Menara UOA Bangsar
No. 5 Jalan Bangsar Utama 1,
59000 Kuala Lumpur

T +603 2302 1500
E rspo@rspo.org
F +603 2302 1543

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