The crop suitability maps were developed from a single vector shapefile of land units (polygons defined by the intersection of agroclimate units and soil and physiography units) for Malawi, rather than from individual raster coverages.  In the DropBox folder here – <https://www.dropbox.com/sh/97y2slwila8ghdb/AAC6_YS8EyJk7QuVVquvv6qna?dl=0> – I have placed a Zip file containing that shapefile. If you open the \*.dbf file (the attribute file) of the shapefile, you will find 59 fields with the results of the crop or tree suitability analysis for each of the 7,646 land units across Malawi.  These results are presented as integers 1 to 7 and 9.  The coding is as follows:

|  |  |
| --- | --- |
| 1 | Highly suitable |
| 2 | Intermediate between highly and moderately suitable |
| 3 | Moderately suitable |
| 4 | Intermediate between moderately and marginally suitable |
| 5 | Marginally suitable |
| 6 | Intermediate between marginally and not suitable |
| 7 | Not suitable |
| 9 | Suitability not estimated for land unit |

(For the maps in the document we wrote that you referenced below, we made four legend categories for the maps in that document by combining 1&2, 3&4, 5&6, and 7, and used a mask for those coded as 9.)

To understand what the Land Resources Evaluation Project (LREP) analysts did in their crop suitability assessment and what distinguishes these different levels of suitability, please consult:

Eschweiler, J.A, S. Paris, J.H. Venema, A.J.M. Lorkeers, & R.I. Green. 1991. *Methodology for Land Resources Survey and Land Suitability Appraisal*. Land Resources Evaluation Project – Malawi. Field Document no. 30. Lilongwe, Rome, & New York: Land Husbandry Branch, Ministry of Agriculture, Malawi Government; United Nations Development Programme; & Food and Agriculture Organization of the United Nations.

This document is available online at <https://edepot.wur.nl/484448>, but I also have placed it in the DropBox folder.

However, for your purposes, I don’t think you will need to do a GIS analysis.  I just now opened the shapefile in ArcMap and added a variable to the attribute file that shows the area of each land unit in the shapefile in square meters.  This is the last field in the \*.dbf file.  (I just summed up the values in this field, and it comes to 95,446 km2.  Wikipedia says that the total land area of Malawi without the lakes is 94,080 km². So the shapefile is pretty accurate.)  So, if your interest is to determine the land area of Malawi that falls into each suitability class for each crop (and management system (traditional vs. improved)), you can do a cross tabulation or pivot table in Excel for each crop and suitability classification to come up with the total area for each crop and suitability category just from the attribute file.  I would recommend you try that.

However, you mentioned that you want to do a district-level analysis.  For this, you would need to create a new land unit shapefile by intersecting the national land unit shapefile with a shapefile of district boundaries.  I have placed a Zip file of a district shapefile in the DropBox folder as well. The creation of such a new shapefile based on the intersection of these two existing shapefiles is not a difficult GIS procedure.  However, if you don’t have much GIS experience and would rather not try, let me know, as I can do that GIS operation for you with an hour or so of work.

After intersecting the two shapefiles, you would end up with a new shapefile of land units that will not cross district boundaries, but will have the same information for each land unit that appears in the national land unit shapefile. The number of polygons will increase by quite a bit from the 7,646 In the national shapefile, as each land unit polygon would be split if it crosses a district boundary. But the analysis you would do would be pretty much the same as I described above – doing a cross tabulation or pivot table based on crop and suitability level, but also by district.

I am happy to help you work with this data, Maxwell, so don’t hesitate to ask me to do some more work on the shapefile.  Also let me know if you need me to clarify further anything above.  I hope you can access the three files in the DropBox folder without any problem – they total about 23 MB.