



ADAPTATION FUND



Volta Flood and Drought Management

SURVEYS AT COMMUNITY LEVEL ANALYSIS ON GIS DATA and PUBLICATION ON DEWETRA **REPORT**

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Introduction

Training activities addressed to local experts by CIMA and CERFE during September/October 2020 have been deployed to augment comprehension of aims and to develop technical skills.

In the subsequent months, experts have been on the field to meet 60 selected Communities distributed within Volta basin and belonging alternatively to one of the six different Countries addressed with this project: Benin, Burkina Faso, Cote d'Ivoire, Ghana, Mali, Togo. Countries have been coded with their own ISO3 names.

Among the outputs of each survey, local experts have built local maps in Google My Maps containing information from memories of each specific community and representing a geographical footprint of historical events: most of them are floods, but some areas affected by historical droughts have been identified, too.

Google My Map maps have been shared with GIS experts at CIMA and with CERFE, in order to trigger the subsequent activities of analysis, editing and visualization for the aims of the project.

Ghana, Burkina Faso and Benin completed surveys within the very end of 2021, while Cote d'Ivoire, Mali, Togo deployed data during January and February 2021.

The list of Communities where local surveys took place is reported in the following table.

SURVEYS ON THE FIELD- LIST OF COMMUNITIES	
BENIN	GHANA
Datori (Cobly)	Akwamufie
Kountori (Cobly)	Brifor Chaa
Tabota (Boukoubé)	Jambusie
Tatouta (Boukoubé)	Chache
Coukogou (Boukoubé)	Buipe
Sépounga (Tanguiéta)	Azumsapelliga
Doga (Matéri)	Tampizua
Porga (Matéri)	Djemtoga 1e2
BURKINA FASO	Yarigungu
Kongoussi, Secteur 6, Village de Pouni (Province du Bam)	Kunkua
Kongoussi Secteur 4, (Province du Bam)	Nasia
Dem, Kaya (Province du Sanmatenga)	Kokobilla
Ouonon (Province du Passoré)	Kpalba
Tougo (Province du Zondoma)	Wapuli
Kalsaka (Province du Yatenga)	Sanguli
Non loti de Toukin - - Arrondissement 2 Ouagadougou (Province du Kadiogo)	MALI
Tampouy - Arrondissement 2 Ouagadougou (Province du Kadiogo)	Oula (Bankass)
Dapoya et Nemnin - Arrondissement 2 Ouagadougou (Province du Kadiogo)	Ouro (Bankass)
Dirlakou (Province du Boulgou)	Para (Bankass)
Zékézé (Province du Boulgou)	Kandé (Bankass)
Belayerla (Province du Boulgou)	Séché (Bankass)
Bama (Province du Houet)	Toroli (Koro)
Samandéni (Province du Houet)	Tori (Bankass)
Badara (Province du Houet)	TOGO
COTE D'IVOIRE	Bourgou (PREFECTURE DE KPENDJAL OUEST)
Sangabili (Bondoukou)	Daoudé (PREFECTURE D'ASSOLI)
Kamala (Bondoukou)	Koumongou (PREFECTURE OTI SUD)
Pougoube (Bondoukou)	Mango (PREFECTURE DE L'OTI)
Kohodio Bkou (Bondoukou)	Katchamba (PREFECTURE DE DANKPEN)
Vonkoro (Bouna)	Mandouri (PREFECTURE DE KPENDJAL OUEST)
Poliedou 2 (Bouna)	Pancheri/Pansieri (PREFECTURE DE KPENDJAL)
Gbordouo (Bouna)	
Kokpingue (Bouna)	

Surveys on the field: Google My Maps Data Analysis

CIMA experts have received the various Google My Map invitations and accessed the single maps.

It must be highlighted that, nevertheless the training issued during autumn 2020, contents and design of maps varies widely among different countries, because each local experts has given to data his own imprinting. Moreover, local experts have often changed their own method of work all along the period of survey, as a result of a growing awareness on data and technical expertise.

It derives that the classification of data for further usage in the project, and specifically for the publication of them on DEWETRA platform, it is a long process that first of all needs to analyze each map. Then, it is advisable to adopt specific criteria for data management and classification. Choices must be agreed in order to build a satisfactory and coherent accessibility to data from the side of general users of DEWETRA platform.

It has to be taken into account that the import of Google My Map maps export kmz format into a desktop GIS environment, consists in maximum three different layers: areas, lines, points.

At the same time, it is also advisable to select a maximum number of layers for each Community to be published on the DEWETRA platform, so as not to exceed with scattered and inconsistent data, and to get lost among the geospatial themes.

CHOICES ON DATA MANIPULATION

- CHOICE 1 : It consists in checking and optimizing the original three layers composing a specific Community map, and then to publish them on the DEWETRA platform. This method doesn't change the inner content of data produced by each local expert and represents exactly the survey has it has been built, except photos (photos hyperlinks are erased for the publication on DEWETRA). Areas, lines and points are represented with thematic maps classified according codes given by each surveyor; codes vary because of different local condition from Community to Community, different choices adopted by the same surveyor on different occasions, alternative methods adopted by different surveyors.
- CHOICE 2: It consists in modifying the number of elements composing a map, usually points. It implies an even more in-depth analysis of choice 1 and implies to analyze each attribute of each layer of each map, then to manipulate layers with the aim of erasing data not essential for the publication on DEWETRA. It might produce a simpler accessibility to Community maps and to obtain a more immediate understanding; it implies a heavy work on the side of GIS preparation of data. It requests to agree about criteria to adopt from case to case, so it requests also an effort in validating procedures. It doesn't grant homogeneous views in DEWETRA, since points may represent many different things and may be treated in many different ways.

A subset of points always contains MFPs, Most frequent Flood Points, and WFPs, Worst case Flood Points: they are collected from memories in each specific community and represent the geographical base to estimate flooded areas by interpolation of historical data.

If MFPs and WFPS have empty descriptions, it could be decided to erase them. **It should be noted that doing this action loses memory on original data: field detection of a different, for example denser, hotspot dataset may have produced a different historical flood footprint; the action of deleting the original field survey points introduces a semantic bias on data, or rather on the memory of why each historical flood area is shaped in a certain way.**

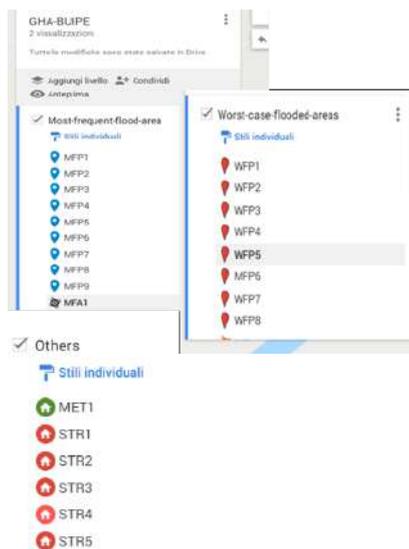
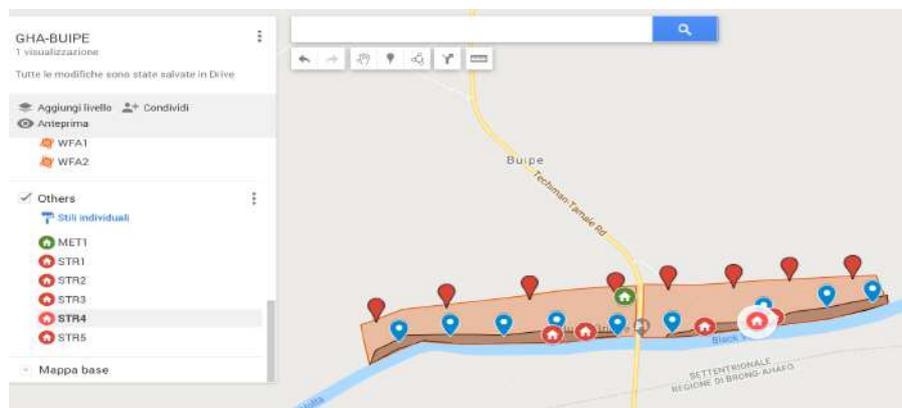
If MFP and WFPS contain fields with descriptions, it is **recommended not to delete them, so as not to lose any meaningful information.**

If CHOICE 2 is the one adopted for finalizing GIS activity about data from local communities, it is compulsory to go in-depth on details, to consider different cases of different surveys, and to choose the proper action to adopt. Different cases are listed in the following.

***TYPE A ***(example)

This case contains areas, lines and points. Points have been categorized as:

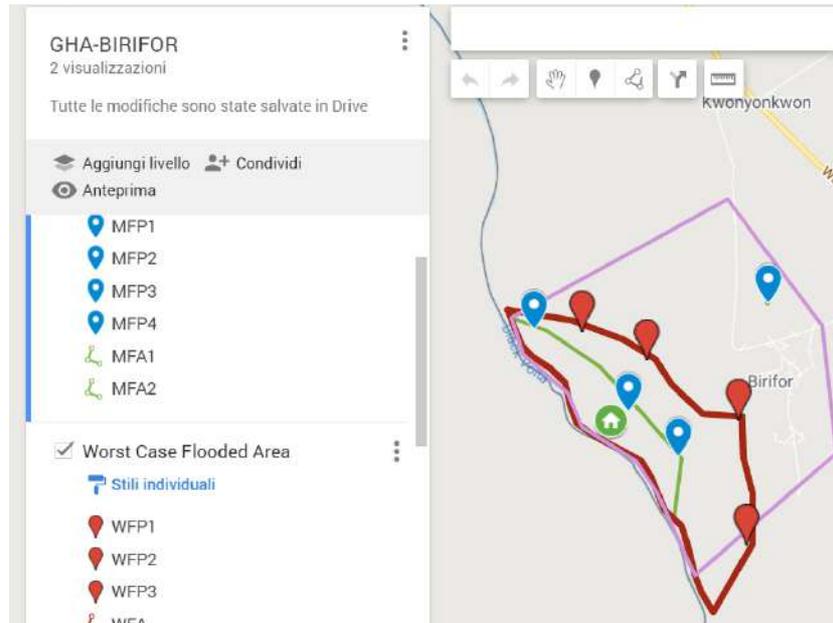
- Most frequent flooded areas
- Worst case flooded areas
- Others



1. Contains MFPs. All points of this category contain a blank description.
2. Contains WFPs. All points of this category contain a blank description.
3. Contains category Others with various points identified during the survey, most of them involved in some flood event.

ACTION TO DO: It is possible to erase MFPs and WFPs, under the condition of acceptance of semantic bias on data.

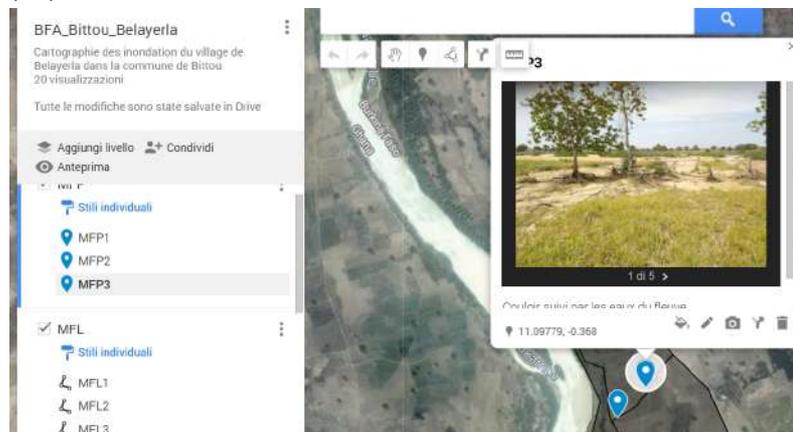
***TYPE B ***(example)



One of MFPs is not nearby the main areas of historical floods, it contains descriptions and it refers to some other mechanism of flood.

ACTION TO DO: It is not possible to erase all MFPs and WFPs; some of them could be erased under the condition of acceptance of semantic bias on data.

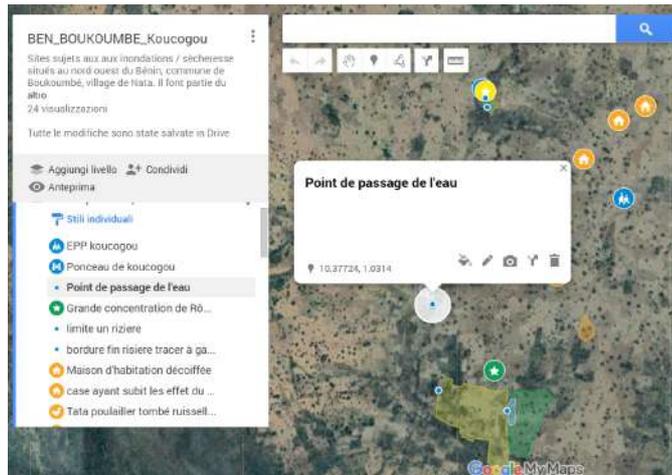
TYPE C(example)



MFPs are inside areas of historical floods, they contain descriptions and they do not represent the base for delineation of historical flooded areas, but rather elements or portions of areas affected by floods.

ACTION TO DO: It is not possible to erase MFPs (or WFPs).

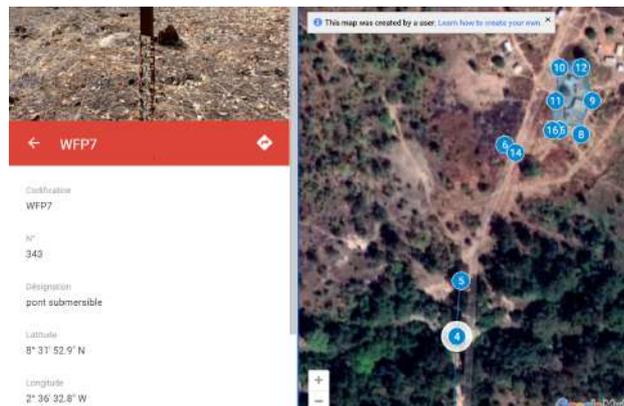
TYPE D(example)



MFPs and WFPs are exposure affected by flood/drought/other event or points affected by flood.

ACTION TO DO: It is not possible to erase MFPs (or WFPs).

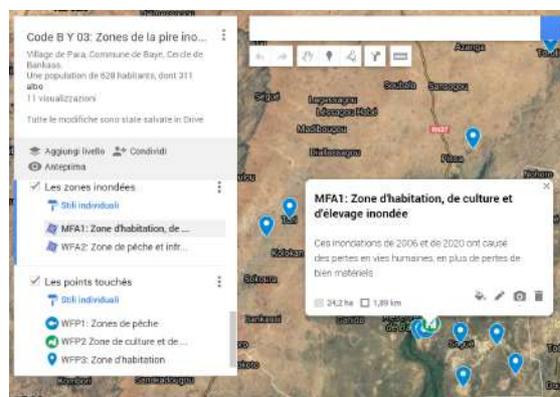
TYPE E(example)



The division between Most frequent and Worst case is not real, names as WFPs are just labels: areas, lines and points equally concur to define a territory prone to flood.

ACTION TO DO: It is not possible to erase anything.

TYPE F(example)



Flooded areas are only a portion of the map and disjointed from points affected by floods.

ACTION TO DO: It is not possible to erase anything.

CONCLUSIONS

If wanted, it would be possible to erase some categories of points, but only under specific conditions. When possible, it should be done under acceptance of semantic bias on original data.

In main cases points contain information that deserve to be maintained or represent specific exposure also put as a constraint in the delineation of historical flooded areas. It is also possible to find specific points as unique georeferenced site to identify flooding mechanisms.

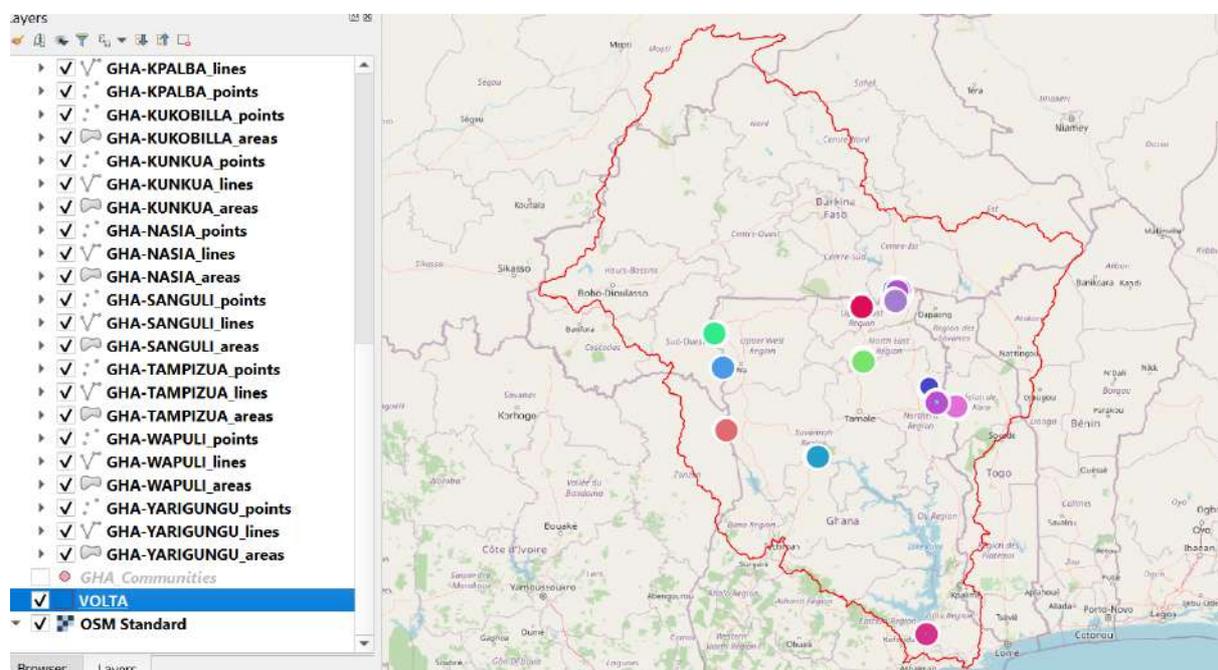
After a long internal discussion, it seems advisable to manipulate points retrieved from the survey on the field in order to finalize data for the DEWETRA platform: only points representing damaged exposure have been maintained for DEWETRA publication. Moreover, an additional column has been added to the layer points so to improve at best thematic legends on DEWETRA., with homogeneous classifications.

Surveys on the field: Google My Maps Editing and Publication on DEWETRA

For each Country a specific session of editing has been done on data, also as a consequence of the analysis phase described in the previous chapters.

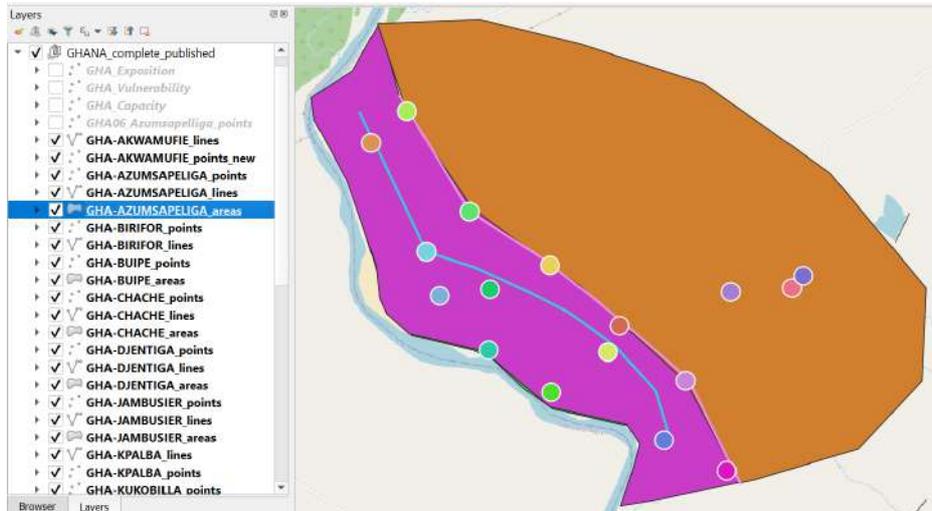
The manipulation of data has been performed with QGIS software. In the following figure it is visible an example containing the whole collection of surveys for GHANA.

Google My Map Maps have been downloaded as kmz files and opened in QGIS. Attributes tables have been optimized in order to reach an homogeneous content previous the publication on DEWETRA.

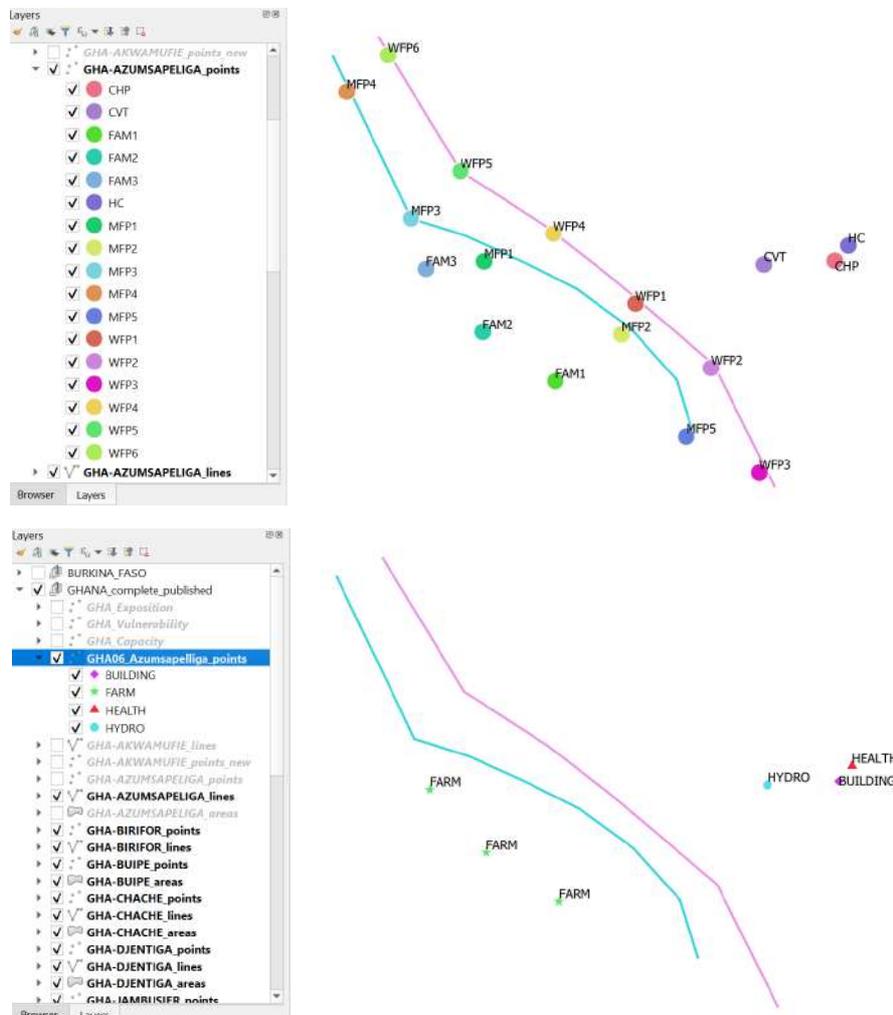


For each layer, the content has been analyzed and, if necessary, modified.

In the following example it is visible the community of Azumsapelliga (GHANA). The point layer contains elements representing markers for most frequent/worst case floods but also exposure damaged during historical floods or other elements.

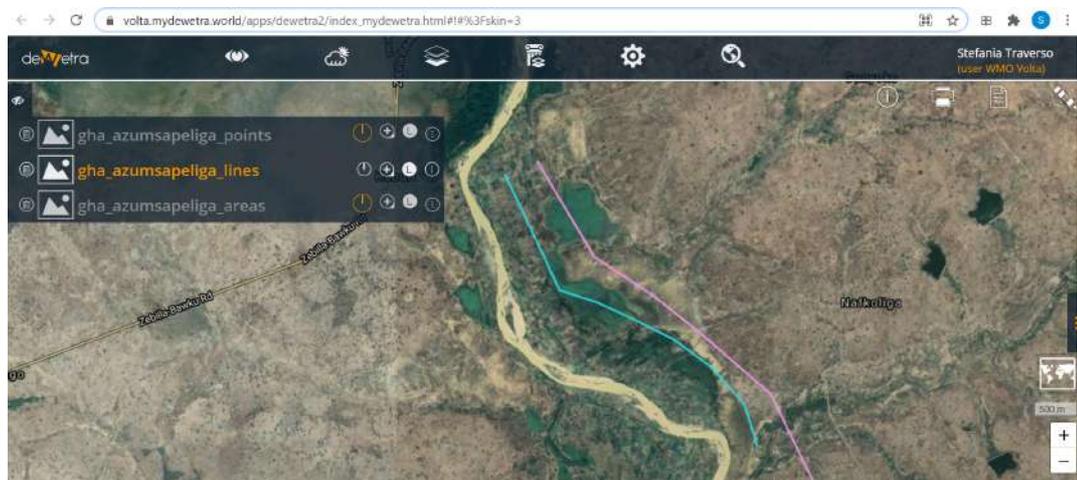
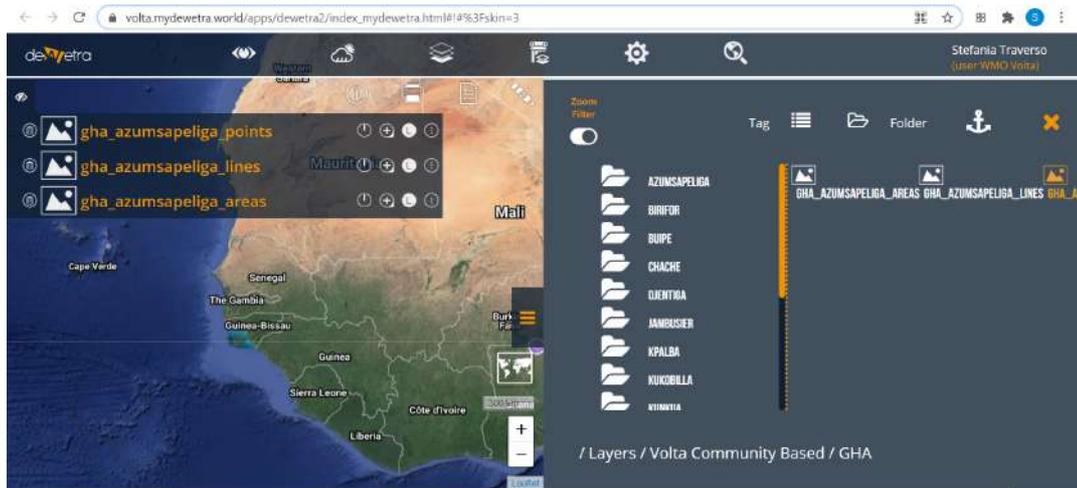


The manipulation of data, performed according to the main directives agreed after the analysis phase, changed the layer point and simplified it, as visible in the next two figures.



This kind of selection on point layers has to be performed on all point layers of all communities, so to optimize data for the publication on Dewetra.

All vector layers, once optimized, have been processed for the publication and made available on the DEWETRA platform according to users' profiles. A visualization on the same community above in the QGIS environment is visible in the next two figures inside the DEWETRA platform.



It has to be highlighted that all data from surveys at community level is collected and visualized within the Tab EVENTS of the DEWETRA platform, in the VOLTA COMMUNITY BASED folder.



Surveys on the field: manipulation of CERFE indexes and publication on DEWETRA

Local experts have compiled Questionnaires for each Community. According to information retrieved by these means, CERFE built complex analyses in order to identify Exposition, Vulnerability and Capacity indexes for each Community.

The elaboration of CERFE indexes has been realized in MS Excel. The manipulation within QGIS environment consisted in:

- Creation of a geospatial layer that contains the geographical representation as a point, and names, of all communities
- Join of CERFE indexes table with the geospatial layer containing communities
- Selection of specific attributes for the identification of Exposition, Vulnerability and Capacity indexes layers
- Export of the selections and creation of Exposition, Vulnerability and Capacity indexes shapefiles

All communities indexes produced by CERFE have to be processed as described, and made available on the DEWETRA platform according to users' profiles. An example of visualization is visible in the next figure.

