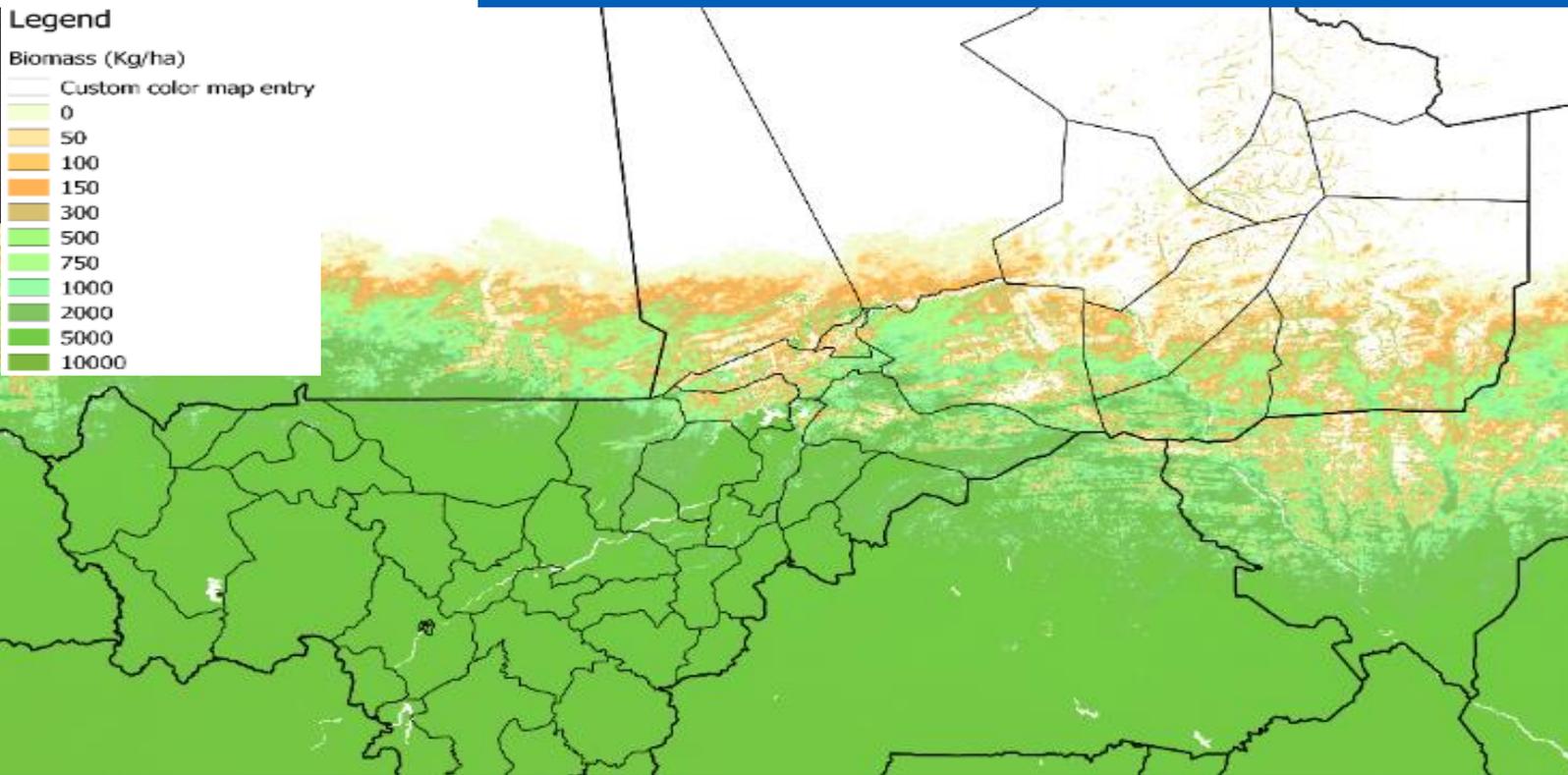
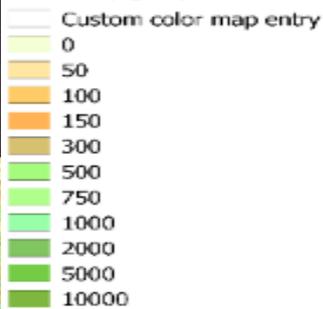


Legend
Biomass (Kg/ha)

BIOMASS MEASUREMENT - HOW TO READ BIOMASS MAPS?
WHAT IS BIOMASS?

Biomass is the total production of above-ground dry matter. In our case, we are talking about Dry Matter Productivity (DMP) measured in Kilograms per Hectare. The higher the value, the more dry matter produced. The term "dry matter" is used to describe any form of vegetation above the ground without accounting for its water content. For an analysis of the pastoral situation, the DMP is an effective means of measuring the availability of quatrnanagic resources.

WHY USE DRY MATTER AS A PASTORAL INDICATOR?

All forms of fodder and vegetation are composed of water and dry matter, but at variable rates. For example, the percentage of dry matter in the hay is much higher than in the green grass.

In addition, all the nutrients needed for livestock are in the dry part of the forage (energy, protein, minerals). Therefore, livestock feed requirements are generally calculated in terms of DM.

Data on the amounts of MS produced do not inform about their edibility. The type of pasture and its

edibility are essential to determine the animal carrying capacity of an area, ie the number of herbivores that can graze. Furthermore, not all forages are identical and may contain different levels of energy, protein and minerals.

HOW IS IT MEASURED?

Biomass data is gathered every 10 days from satellite imagery generated by the Belgian Satellite Proba-V. The imagery is provided by ACF's scientific partner, the Flemish Institute of Technology (VITO). This is done by measuring the light reflection from the vegetation. The healthier the plant, the more light it absorbs. An algorithm is then used that combines the data on light interception with meteorological data (namely mean temperature and evapotranspiration) to create the estimate of Kg/ha.

The Sahel, and in particular the pastoral zone, is characterized by considerable yearly variations of vegetation growth and rainfall. As a result, it can be difficult to compare DMP using a reference period. An ACF tool called the Biogenerator is used to measure changes in DMP, the data for the current year is measured from the period of 1998 onwards. The

BIOMASS MESUREMENT

calculation creates a map where each pixel (1km²) shows that zone's biomass production, compared to every year since 1998.

TYPES OF MAPS PRODUCED AND HOW TO READ THEM

Three types of biomass maps are produced:

1) A production map showing the total production of biomass since the last rainy season, expressed in kg of DM per ha.

Production de la Biomasse (Saison des Pluies 2016): Sénégal

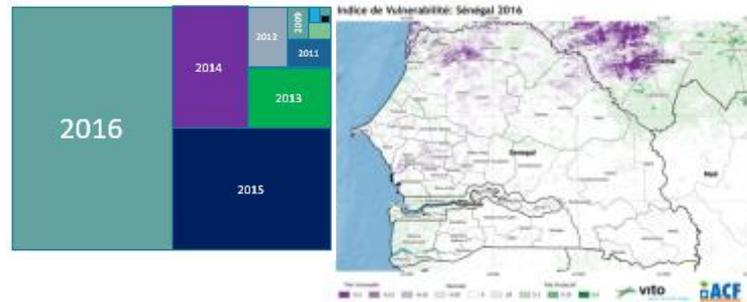


2) A map of the analysis of the production anomaly which compares the total production of the current year with the average of the period 1998-current year. This anomaly is calculated on a scale of -100 (deficit) to 100 (excess) for each pixel. The most negative anomaly areas are red and the surplus areas are green.



3) A "Vulnerability Index" map to compensate for a simple anomaly analysis that compares the current year with all the previous years, without considering

the chain of anomalies. It is a recursive analysis that puts a weight on the recent years. In this index, the current year accounts for 50% of the index, the previous year at 25%, the year before that at 12.5%, etc. etc.



The biomass anomaly is a relative measure. Looking at the map is not enough to indicate the presence of a boon or famine. For instance, a zone shaded deep red with a typically insignificant production may be less worrying than a zone shaded orange with a normally stable and high production. While the anomaly is often a good measure of the state of dry matter, some zones have a very volatile production (Such as Gao, noted in Figure 1). These areas often have DMP values quite distant from the average. With these zones, a historical analysis of previous DMP values is important to ascertain the state of production. It is particularly important to examine previous years of production, as pastoralists are often vulnerable to consecutive bad years. A downward trend of production for a zone lasting over 2 years, for example, should be cause for alarm.

USES OF THE SYSTEM

measurements are particularly adept for measuring forage availability in semi-arid environments, such as the Sahel or the Horn of Africa. The biomass analysis is conducted at the end of the rainy season, when biomass production ends for the year. As the analyses include the totality of production, they are valid for the entire period before the next rainy season. As a result, it's possible to identify potential stress zones, areas to be avoided by herds or areas to restock animal feed.

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