

Namibia's rainfed agriculture

At the whim of a very erratic rainfall regime

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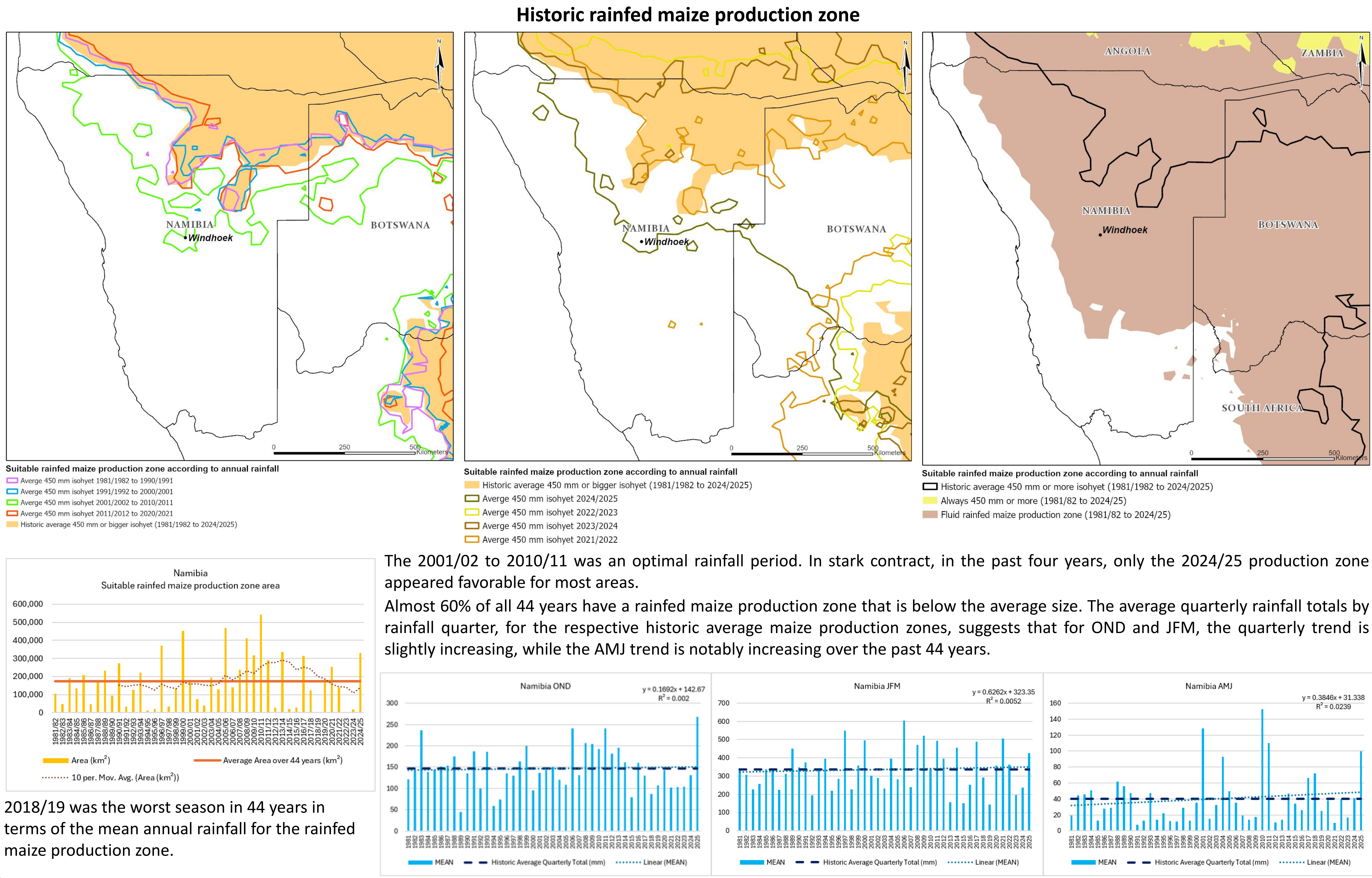
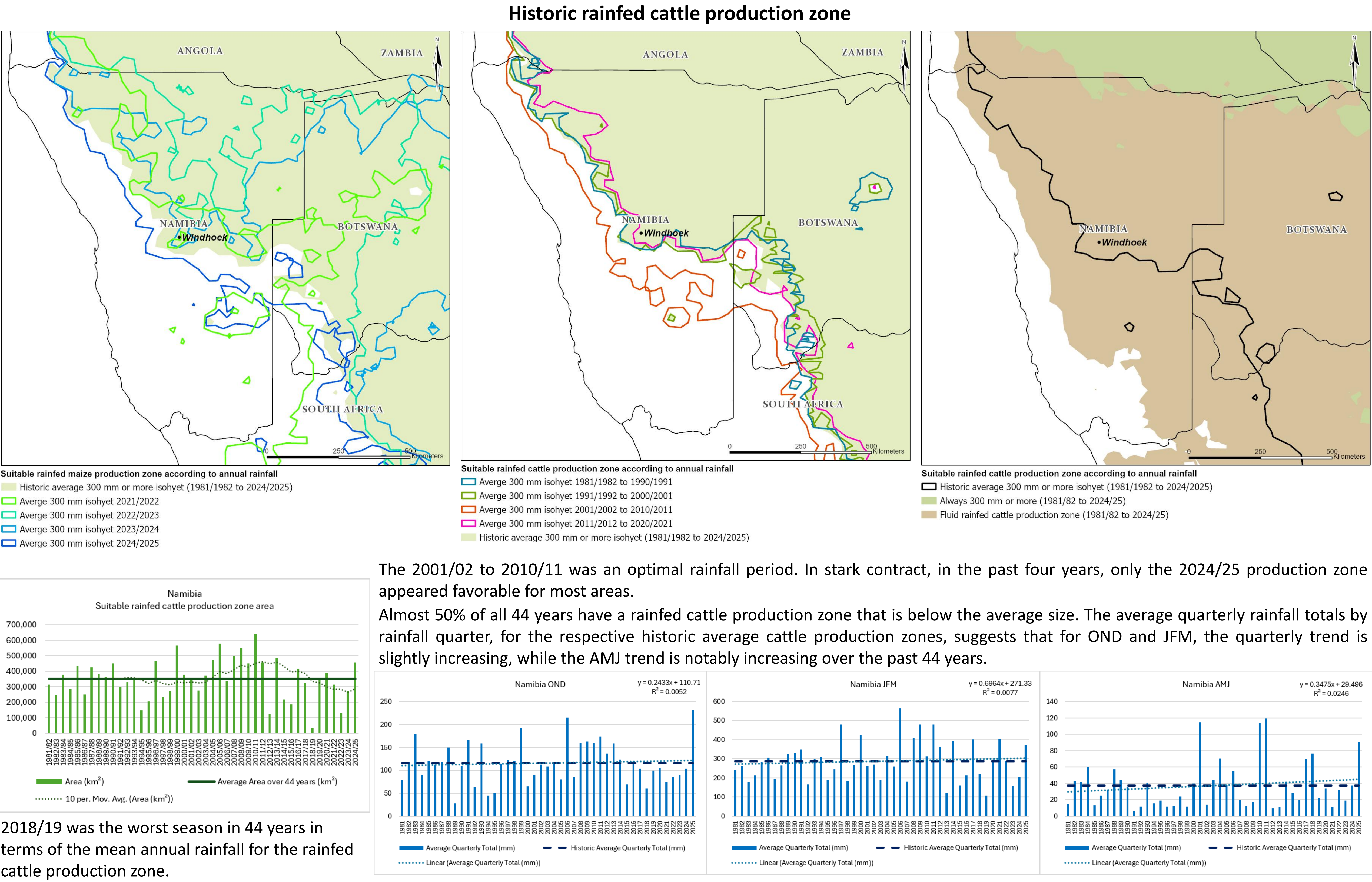
It is estimated that 70 % of the total population of Namibia relies directly or indirectly on agriculture (GIZ 2022).

Most of Namibia's crop production is rainfed. It is estimated that 82% of maize and 90 % of pearl millet (mahangu) are rainfed. Traditionally, livestock dominates the agricultural sector in Namibia and relies predominantly on the productivity of the natural rangeland. Against a background, where 92% of Namibia's surface area is classified as hyper-arid, arid, or semi-arid (Atlas of Namibia 2022), and over 70% of the active labor force faces occupational vulnerability, with the official unemployment at approximately 33 %, informal employment at about 17 % and vulnerable occupations at around 21 % (Atlas of Namibia 2022), it goes without saying that Namibia's economy, as well as its food and water security are directly correlated to its precipitation regime.

Optimal production zones

Cattle production performance in southern Africa becomes less optimal when mean annual rainfall drops below 300 mm (Coetzee & Werger 1975, Briske et al 2005). In rangeland ecology and livestock management, 300 mm of annual precipitation is considered a critical ecological threshold (Tothill 1990). Below 300 mm of rainfall per season, soil moisture is the most important factor controlling plant growth, while at higher rainfall, soil nitrogen and phosphorus are major contributing factors (Penning et al 1982).

The requirement for **maize** production in the southern African region is at least 450 mm of mean annual rainfall, due to the high evaporation rate in the region (Bagula et al 2022).



From 44 years of CHIRPS v3 precipitation data, from 1981/82 to 2024/25, the consecutive rainfed cattle and maize historical average annual rainfall isohyets and regions of 300 mm or more and 450 mm or more were derived .

This shifting or variable isohyet, from season to season, was denoted by a fluid production zone, while the zones that for all 44 seasons, receiving at least 300 mm or 450 mm consecutively for cattle and maize, are the most reliable zones for rainfed cattle and maize production.

Notably, the fluid zone for both the rainfed cattle and maize production is large for Namibia. Almost the entire production zones for rainfed cattle and maize production can be categorised as erratic and unreliable.



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