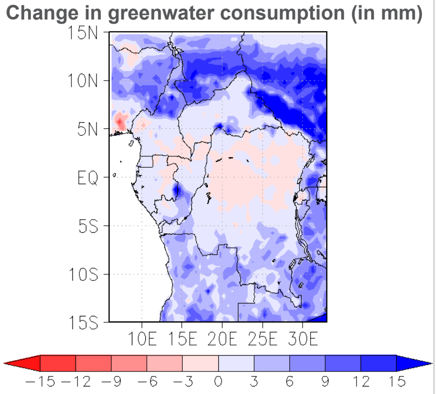
Fact-Sheet - Agriculture - Cameroon - Zone 1

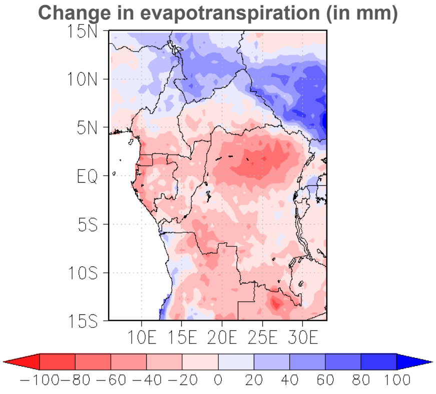
Maps of projected changes

Maps show the projection of change over this century (mean of the period 2071-2100 compared to the mean of the period 1961-1990) under the "High" emission scenario. In the left panel, changes in greenwater consumption are shown and in the right panel, changes in evapotranspiration.

Change in greenwater consumption (in mm)



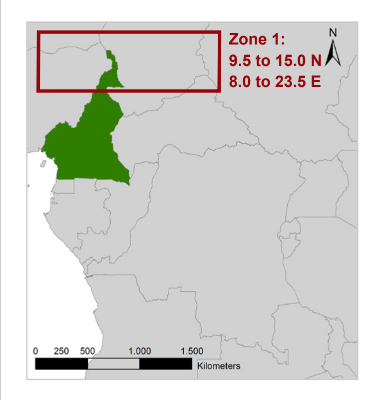
Change in evapotranspiration (in mm)



Definition of Zone 1

The map below indicates the position of Zone 1 (red rectangle), representing the semi-arid Sahel zone region regions in the north of central Africa. All values presented in this fact-sheet are changes spatially averaged over the whole zone.

As the northern part of Cameroon falls within Zone 1, projected changes for this zone are assumed to be representative for this part of the country.



List of projected changes

The tables show the mean of the projected changes in respectively the evapotranspiration, greenwater consumption and water stress (rounded values). Note that current land use is used in this study for all assessed time periods. Consequently all changes are caused by climate change alone.

Parameters describing the water availibility for agricultural production (in mm)		Today	Projected changes			
			Low emission scenario		High emission scenario	
		2000	till 2050	till 2100	till 2050	till 2100
Evapotrans-piration	YEAR	438	+14	+18	+10	+27
	DJF	26	+1	+1	+1	+2
	MAM	52	+2	+2	-1	+3
	JJA	218	+8	+9	+5	+10
	SON	142	+4	+7	+5	+13
Green water consumption		2768	+608	+619	+578	+681
Water stress		-286	+1	+1	+1	+1

Note: Increasing values in the green water consumption indicate that more water becomes available for agricultural production. This may be caused by either increasing rainfall amounts, increasing CO_2 levels or a combination of both. The decreasing values in evapotranspiration indicate that the increasing CO_2 concentration has a stronger effect than the increasing temperatures.

Key findings for Zone 1

- Based on the analyzed ensemble of global climate projections under the assumption of a low and a high emission scenario it can be concluded that the rainy season is extended and the rainfall amount increases. The greenwater consumption increases whereas the changes in the waterstress are limited, which indicates that the agricultural production is less hampered by droughts and may increase in the wetter regions in this zone. The simulated biomass increases as well, which confirms this finding. The dryer regions in the north will continue to experience occasional droughts.

Further details can be found in the "**Impacts Report**" and the "**Adaptation Report**" in the report section of the final project document - also available online under www.giz.de and www.comifac.org

Data and method

The projected greenwater, evapotranspiration and water stress signals are based on the LPJ-ml Dynamic Global Vegetation model (DGVM) forced by the bias-corrected ECHAM global climate change projections. Projected changes in the climate are assessed for two different greenhouse gas emission scenarios: the "Low" scenario is based upon the SRES B1 (IPCC-AR4) scenario; the "High" scenario is based upon the SRES A2 (IPCC-AR4) scenario. We present the area-averaged mean change, based upon only one climate model, the ECHAM scenario, as this was the only one giving acceptable results. Land use changes up to 2006 have been used. Projections for the future land use depend on many unknown factors and are therefore difficult to incorporate. The data presented here reflect the changes that are only caused by the changing climate i.e. land use is kept constant. Increasing temperature and the rising atmospheric CO_2 concentration have an opposite effect on agricultural production. The increasing temperature results in an increasing soil evaporation whereas the rising CO_2 concentration reduces plant transpiration especially in the C_4-crops. Unfortunately little is known on the interaction of the rising CO_2 concentration, fertilizer inputs and increasing temperatures for tropical crops. More research in this direction is needed. Note that changing agricultural practises such as more inputs, new crop varieties etc. may have a strong positive effect on the future agricultural production and may compensate for the negative climate change impacts.

Key adaptation options

- Introduction of new varieties which are adapted the higher temperatures and heat stress
- Improved management of climate variability to ensure maximum yield during high rainfall years and minimum damage during dry years.
- To adapt to increased climate variability farming systems should become more diverse. This can be done for example by planting multiple crops and using different varieties.
- Improving drought management plans which prevent large scale food shortage during future droughts.

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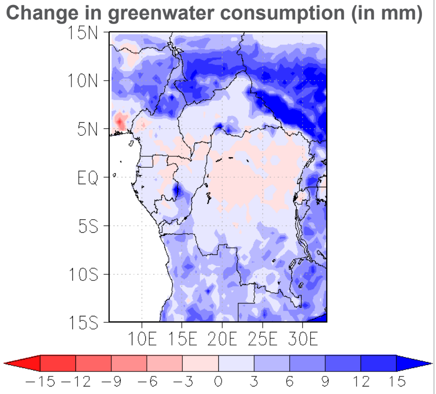
Fact-Sheet - Agriculture - Cameroon - Zone 2

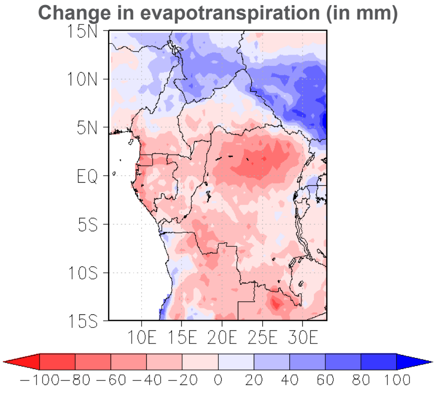
Maps of projected changes

Maps show the projection of change over this century (mean of the period 2071-2100 compared to the mean of the period 1961-1990) under the "High" emission scenario. In the left panel, changes in greenwater consumption are shown and in the right panel, changes in evapotranspiration.

Change in greenwater consumption (in mm)

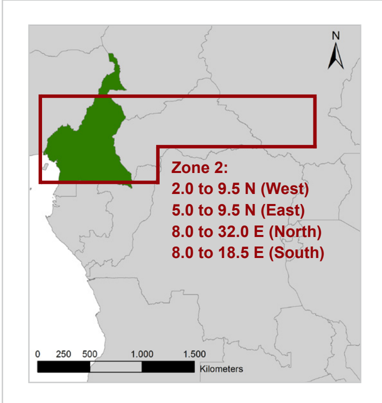


Change in evapotranspiration (in mm)



Definition of Zone 2

The map below indicates the position of Zone 2 (red rectangle), representing the regions north of the equator with predominantly tropical wet and dry climates with a dedicated rainy season. All values presented in this fact-sheet are changes spatially averaged over the whole zone. As the major parts of Cameroon falls within Zone 2, projected changes for this zone are assumed to be representative for these parts of the country.



List of projected changes

The tables show the mean of the projected changes in respectively the evapotranspiration, greenwater consumption and water stress (rounded values). Note that current land use is used in this study for all assessed time periods. Consequently all changes are caused by climate change alone.

Parameters describing the water availibility for agricultural production (in mm)		Today	Projected changes			
			Low emission scenario		High emission scenario	
		2000	till 2050	till 2100	till 2050	till 2100
Evapotrans-piration	YEAR	731	+13	+19	-3	+10
	DJF	97	+4	+4	+4	+16
	MAM	183	+3	+2	-4	-3
	JJA	229	+6	+11	0	+4
	SON	223	+0	+1	-3	-7
Green water consumption		2111	+503	+523	+469	+567
Water stress		-296	+2	+2	+2	+3

Note: Increasing values in the green water consumption indicate that more water becomes available for agricultural production. This may be caused by either increasing rainfall amounts, increasing CO_2 levels or a combination of both. The decreasing values in evapotranspiration indicate that the increasing CO_2 concentration has a stronger effect than the increasing temperatures.

Key findings for Zone 2

- Based on the analyzed ensemble of global climate projections under the assumption of a low and a high emission scenario it can be concluded that rainfall increases 12-20%, The evapotranspiration however, does not change very much. In combination with the increasing greenwater consumption (20-25%) this indicates that more water will be available suggesting that the agricultural production may slightly increase. The biomass (vegetation carbon) increases, which confirms the higher potential agricultural production.

Further details can be found in the "**Impacts Report**" and the "**Adaptation Report**" in the report section of the final project document - also available online under www.giz.de and www.comifac.org

Data and method

The projected greenwater, evapotranspiration and water stress signals are based on the LPJ-ml Dynamic Global Vegetation model (DGVM) forced by the bias-corrected ECHAM global climate change projections. Projected changes in the climate are assessed for two different greenhouse gas emission scenarios: the "Low" scenario is based upon the SRES B1 (IPCC-AR4) scenario; the "High" scenario is based upon the SRES A2 (IPCC-AR4) scenario. We present the area-averaged mean change, based upon only one climate model, the ECHAM scenario, as this was the only one giving acceptable results. Land use changes up to 2006 have been used. Projections for the future land use depend on many unknown factors and are therefore difficult to incorporate. The data presented here reflect the changes that are only caused by the changing climate i.e. land use is kept constant. Increasing temperature and the rising atmospheric CO_2 concentration have an opposite effect on agricultural production. The increasing temperature results in an increasing soil evaporation whereas the rising CO_2 concentration reduces plant transpiration especially in the C_4-crops. Unfortunately little is known on the interaction of the rising CO_2 concentration, fertilizer inputs and increasing temperatures for tropical crops. More research in this direction is needed. Note that changing agricultural practises such as more inputs, new crop varieties etc. may have a strong positive effect on the future agricultural production and may compensate for the negative climate change impacts.

Key adaptation options

- Introduction of new varieties which are adapted the higher temperatures and heat stress
- Improved management of climate variability to ensure maximum yield during high rainfall year and minimum damage during dry years.
- To adapt to increased climate variability farming systems should become more diverse. This can be done for example by planting multiple crops and using different varieties
- More agroforestry prevents erosion, improves soil fertility and makes farming systems more diverse.

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