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Assessing the Vulnerability of Agriculture to Climate Change in Jordan

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Climate change represents one of the greatest environmental, social and economic threats facing Jordan. In particular, the combined effects of climate change and water scarcity threaten to affect food and water resources that are critical for livelihoods in Jordan. This is especially true for those communities who live in the dryland area in the country and who rely wholly on rain-fed agriculture. The exact nature and extent of the impact of climate change on temperature and precipitation distribution pattern remain uncertain and it is the poor and vulnerable who will be the most susceptible to climate change adverse effects. A vulnerability assessment of rain fed agriculture to climate change and variability in semi-arid parts of Jordan was conducted in 2014.

The purpose of this study is to assess the vulnerability and resilience of the most vulnerable groups where rainfed and irrigated agriculture is practiced. Also, the study focused on quantifying the impacts on agricultural productivity in response to climate change. This will help policymakers and researchers better understand and anticipate the likely impacts of climate change on agriculture and on vulnerable communities in Jordan. Also, it will provide them with tools to identify and implement appropriate adaptation strategies.

The data used includes; Representative Concentration Pathways (RCPs), RCP 4.5 and RCP 8.5 adopted by the IPCC for its fifth Assessment Report (AR5). Those pathways were used for climate modeling. A decision support system (DSSAT) for agricultural production was used to assess the impact of climate changes on agricultural production. This approach was used for the Identification of climate change risk and their impacts on Agriculture.

Outputs from models are used to assess the vulnerability of farmers and crops to climate and socio-economic change by estimating their sensitivity and capacity to adapt to external factors as a means of identifying what causes the differences in their vulnerability.

Based on the projection models for the area, average temperature in Jordan is projected to increase between 1.2 and 1.6°C by 2050. These upward temperature trends are projected to continue beyond 2050. Projections for precipitation trends are projected to decrease by 16% by the year 2050. Evaporation is likely to increase due to higher temperatures. This is likely to increase the incidence of drought potential since precipitation is projected to decrease.

It is concluded that the Overall vulnerability of agriculture to climate change in Jordan is high, where impacts such as drought and increased temperatures and decreased precipitation will be more pronounced. Major implications on rain fed agriculture are possible shorter growing season, increasing moisture and heat stress to field and horticultural crops and eventually low income and food insecurity. There were different impacts among studied communities, which is related to the: economic capability, local knowledge, physical infrastructure, institutional capacity, modern technology used, age group of farmers and diversification of their income.