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## Land Suitability and Socioeconomic Factors for Pigeonpea Cultivation in Uganda

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### Abstract

Pigeonpea (*Cajanus cajan* (L.) Millsp.) is one of Uganda's many traditional pulses and may have an important role to play in helping the country to achieve food and nutritional security, while at the same time protecting and enhancing natural resources. The sustainable cultivation of pigeonpea will require, among other things, identification of suitable regions for cultivation and a better understanding of the factors that influence its adoption by farmers. To offer guidance on production we performed a suitability analysis by matching land characteristics with crop requirements using a GIS weighted overlay technique and gathered related socio-economic data collected with farmers in regions considered suitable. Our findings indicate that a large area of Uganda is suitable for pigeonpea growing and that farmers are likely to adopt, given the right support. The biophysical requirements for cultivation (i.e. rainfall, temperature, slope, soil drainage) were gathered from the available literature. A digital elevation model of the study sites was downloaded from the United States Geological Survey (USGS, <https://earthexplorer.usgs.gov>) to create a data layer for the slope using surface analysis in ArcGIS v10.4 software. We used soil drainage data from the Harmonized World soil database (<http://www.fao.org>) and temperature and rainfall data from the Global Weather Database (<https://globalweather.tamu.edu/>). Suitability analysis revealed that pigeonpea can be grown on 79% of land in Uganda. Generally, the highly to moderately suitable areas were found in central and western regions whereas the northern and eastern regions were either marginally or not suitable. To determine the factors that influence adoption of pigeonpea we conducted a household survey with 283 randomly selected farmers from three of the sub counties identified by the suitability analysis. Farmers cited pest and disease, lack of market, lack of extension services and lack of improved varieties as the major factors constraining pigeonpea production. Seed distribution is essentially informal, either self-saved, purchased from neighbours/relatives or from local markets. Farmers' preferred traits included resistance to diseases, early maturing, resistance to drought and short cooking times. We recommend promotion of pigeonpea in suitable areas, farmers are likely to adopt the crop if provided with the right materials and support.

**Keywords:** Cultivation, land suitability, pigeonpea, socioeconomic factors, Uganda

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