

**QUALITY OF COWPEA SEED USED BY FARMERS IN MAKUENI AND TAITA  
TAVETA COUNTIES AND ITS EFFECT ON CROP PERFORMANCE**

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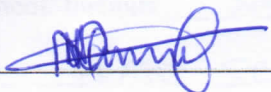
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**DECLARATION**

This thesis is my original work and has not been presented for the award of a degree in any other University.

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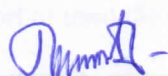
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## GENERAL ABSTRACT

It is estimated that 80% of the farmers in Africa use seeds from the informal seed system that are of unknown quality. Contamination of such seeds with impurities and disease causing pathogens is common leading to reduced establishment in the field, high incidences of seed borne diseases and reduced crop establishment. An understanding of the status of the cowpea seeds used by farmers will be vital in giving appropriate recommendation to cowpea farmers on how cowpea productivity can be improved. This study was conducted to assess cowpea production practices, purity and physiological quality of the seeds and the effect of the seed source on the grain yield.

A survey was conducted in Makueni and Taita Taveta counties by administering a semi-structured questionnaire to 114 farmers selected by purposive sampling. Information was collected on seed used, seed sources, varieties grown, number of seasons the seed is recycled, acreage under cowpea, cropping systems, production trend of yields in 2015 and 2016, methods of harvesting and post-harvest handling practices of cowpea seed. From each farmer 500g of cowpea seed samples were collected and in addition 34 samples were collected from local markets within areas of study. The seeds were analysed for purity, germination and seedling vigour following ISTA procedures. Purity was by separating each of the four replicates each of 100g of the seed samples into pure seed, other crop seeds, discoloured and shrivelled seeds, weed seeds and inert matter. Germination was assessed by planting four replicates each of a 100 seeds on paper towel and the number of germinated seeds, normal seedlings, mouldy seeds and infected seedlings counted while seedling vigour index was obtained via measuring the dry weight of the seedlings as well as measuring the seedling length. Three varieties of cowpea seed (KVU, K80, and M66) from farm, market and certified sources were planted in RCBD design in split plot layout in two sites at Kambi Ya Mawe (LM4) and Kiboko (LM5) during 2016 short rains. The data collected included emergence,

plant stand, disease incidence and severity, yield and yield components which were pods per plant, seeds per pod, 1000 seed weight, grain yield and dry matter yield.

Majority of the farmers (64%) were using farm saved uncertified seeds at up to 82%. Physical purity levels of all seeds samples from markets and farmers were below the recommended 98.0% while only farm saved from Mwatate met the recommended 75% germination. There was no significant difference in the germination of the five varieties tested and none attained the recommended rate of 75%. Farm saved seeds had the highest mean vigour index with the seeds from Mwatate being the highest and significantly different from the one from the other two areas.

Certified and market sourced seed had the highest seedling emergence at up to 79% and 80% respectively. Farm saved seeds had the highest percentage of rotten seeds at up to 35% which was significantly different from the other two seed sources. Certified and market sourced seeds had the highest plant stand compared to farm saved seeds with over 58% and 20% at Kambi Ya Mawe and Kiboko site respectively. Bacterial blight incidence and severity was not significantly different between the seed sources while the dry grain and dry matter yield was highest in certified seeds. The seeds per pod and pod length were not affected by the seed source.

It was therefore concluded that the cowpea seeds used by farmers do not meet the set thresholds of cowpea seed quality and therefore they are not recommendable for use if farmers are to achieve high yields from the crop.

**Key words:** Cowpea, seed quality, seed system, seed source, variety performance.