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## Risk Management in the Rain-fed Farming of Gedaref Area, Eastern Sudan

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### Abstract

It is argued that the adoption of the recommended improved technologies in the mechanised rain-fed sub-sector of Gedaref in Eastern Sudan can increase farm income while diversifying by introducing sheep and gum arabic enterprises to sorghum monoculture of Gedaref may lead to farm income stability. Under these arguments in favour of diversification and use of improved technology, this paper aims mainly at studying, analysing the performance and to evaluate different management strategies in this sub-sector under uncertainty. The mechanised rain-fed agricultural sub-sector of the Sudan has high potentiality of building a national food stock and foreign exchange earnings, which could contribute substantially to agricultural development as well as of the whole economy. However, the agricultural production in this sub-sector is generally characterised by a high degree of instability, which arises from the nature of the agricultural production that dependent on uncontrollable weather conditions and unpredictable input and output prices, which resulted in instable, production, farm income and market risk. The financial feasibility of different investment and management strategies is evaluated under both; the current traditional and the improved cultural practices. The stochastic budgeting technique by using NPV of farm income as a measure of performance is used in this paper to simulate production, market risk and the performance over a twenty-years planning horizon on an average farm in the study area. Empirical results showed that the introduction of forest and livestock activities contribute substantially to farm income stability with very low probability of loss at the end of the planning period while the adoption of the new recommended technology also stabilise farm income and guarantee the profitability of the business at the end of the same planning period.

**Keywords:** Gedaref, Mechanized, Rain-Fed, risk Management, Stochastic Budgeting