Extended Abstract
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Paper/Poster Title	**Profitability of improved seed multiplication and matching supply and demand: the case of the maize and cassava sectors in Cameroon**

Abstract prepared for presentation at the 98th Annual Conference of The Agricultural Economics Society will be held at The University of Edinburgh, UK, 18th - 20th March 2024.

Abstract	***200 words max***
The aim of this paper is to assess the match between supply and demand on the seed market, based on an analysis of the profitability of seed multiplication. To achieve this, we used data from a diagnostic study of the maize and cassava sectors, carried out in Cameroon in 2022. The profitability of seed multiplication was estimated by calculating the gross margin rate. A comparative analysis between the seeds identified by seed-multipliers and the varieties used by households was carried out in order to determine suitability. Finally, a binomial logit model was estimated to assess the determinants of willingness to pay for improved seeds. The results showed that the margin rates were quite high (51% and 62% for maize and cassava respectively). This shows that the market for maize seed is relatively adequate, but not for cassava planting material. In view of the determinants of willingness to pay for improved seeds, recommendations have been formulated with the aim of strengthening cohesion on the seed market.	

Keywords	Profitability, allocative efficiency, seed security, maize, cassava
JEL Code	D24, Q11, Q12 see: www.aeaweb.org/jel/guide/jel.php?class=Q)

Introduction	***100 – 250 words***

The subprime crisis, which began in the United States in 2007 and spread worldwide in 2008, revealed the vulnerability of African economies to fluctuations in international food prices. This vulnerability became even more acute during the Covid-19 pandemic and the Russo-Ukrainian conflict (Balma et al., 2022). In the report of the 170th session of the Council of the Food and Agriculture Organization of the United Nations (FAO), published in June 2022, we read: "Before the war in Ukraine, international food prices had reached an all-time high. This was due to market conditions, but also to high prices for energy, fertilizers and all agricultural services. The Russo-Ukrainian conflict exacerbated the situation. Indeed, in March 2022, the FAO food price index reached a new all-time high, exceeding its February level by 12.6%, the value recorded a year earlier by 33.6%, and the February 2011 peak by 15.8%. This situation has led to a worsening of food insecurity. For example, the prevalence of undernourishment in sub-Saharan Africa rose from an average of 18% between 2015 and 2018, to 23% in 2021 (FAOSTAT, 2023). At the same time, the dependence of sub-Saharan African economies on the outside world for food is steadily increasing. According to the World Development Indicators provided by the World Bank, food imports from this sub-region have risen from 11% of total imported goods in 2008 to over 14% in 2021 (WDI,

2023).

Methodology

100 – 250 words

The profitability of maize seed and cassava planting material production was estimated using a calculation algorithm including gross margin, which is an essential indicator in the income statement.

After estimating the profitability of seed-multipliers, we assess their economic performance through an analysis of allocative efficiency. We use the data envelopment analysis (DEA) approach, a benchmarking technique proposed by Banker et al. (1984); Charnes et al. (1978). In a second step, we perform a split regression with the logit model. This choice is justified by the concern to understand the non-managerial variables that explain efficiency. Taking into account the very limited size of the sample of seed-multipliers, the efficiency analysis focused only on the cassava sector.

To assess the match between supply and demand, a comparative analysis is carried out between the seed varieties available to seed-multipliers and to households. This analysis is based on samples (maize and cassava) and photos collected during the survey of the various statistical units. The identification carried out by the IITA team of experts is also used. We then use the question "Would you be willing to buy improved varieties on a regular basis?" to analyze the factors that explain households' responses to this question, for both maize seed and cassava planting material. To do this, we used a binomial logit model

Results

100 – 250 words

For a cassava planting material multiplication cycle, the seed-multiplier's gross margin is 2 million FCFA on average, representing a margin rate of nearly 63%.

For maize seed-multiplier, the gross product per hectare is around 1.5 million FCFA, and the gross margin is around 900,000 FCFA, i.e. a gross margin rate of 51%.

The average score of 63.6% obtained for allocative efficiency reflects the fact that the same level of gross margin could be achieved by reducing operating costs by 36.4% (100- 63.6).

The results of the analyses show that there is no match between supply and demand for cassava. However, the multiplication of cassava planting material is very profitable. On the other hand, in the maize sector there is a relative match between supply and demand, but this sector is less profitable. These results may reflect the reality that, when a production sector is highly profitable, the producer is content with the small share of the market that has been won over to his cause. He thus adopts a classic attitude (supply creates its own demand). On the other hand, when profitability is limited, producers are more concerned with consumer preferences and anticipate demand. They then respond to the needs of a specific market, adopting a Keynesian attitude (the market is driven by demand).

Discussion and Conclusion	***100 – 250 words***

The aim of this study was to analyze the match between supply and demand for improved maize seed and cassava planting material, in terms of the profitability of seed multiplication in Cameroon. Survey data showed that cassava is highly profitable (62%), but there is no match between supply of cassava planting material and demand. Maize seed multiplication, on the other hand, offers lower profitability, but is relatively well matched to market demand. We have also observed that the economic potential of cassava planting material multiplication is not fully exploited, as production costs could still be reduced. The analysis of adoption barriers through willingness-to-pay revealed that socio-cultural factors can explain the propensity to adopt improved cassava and maize seeds. These results lead us to formulate policy recommendations.

The exchange of cassava planting material in an informal seed system has accentuated the spread of disease in the cassava sector. Yields, which were already at a mediocre level, are likely to fall further, accentuating Cameroon's food crisis. The willingness of the International Fund for Agricultural Development (IFAD) to provide a lasting solution to this problem by financing programs designed to improve seed security is already a fundamental element of the response. For this intervention to be effective, a number of factors must first be taken into account:

Consider a participatory varietal creation solution
Promoting a gender and youth approach

Overcoming illiteracy