

# **Effects of mixture plant populations on the yield of both components in a maize/cassava intercrop**

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## **ABSTRACT**

In an experiment conducted between 1980 and 1981 at Ibadan, Ilora and Ikenne in southwestern Nigeria, Kewesoke, an upright leaved maize ideotype was planted at nine different plant populations ranging from 12,346 to 55,555 plants /ha with cassava cv TMS 3055 intercropped between the maize stands. Sole crops of maize and cassava were included as controls. Plot size was 7.2 m × 4.5 m. A randomized complete block design with four replicates was used. On intercropped plots, maize yield increased as plant population increased up to 55,555 plants/ha. Intra-row spacing had no significant effect on yield, whilst the number of plants per stand significantly affected maize grain yield. At 55,555 maize plants/ha there was no significant difference in yield between sole maize and that intercropped with cassava. Cassava yields from sole and intercrop plots were not significantly different, irrespective of the maize population intercropped with cassava. When the yields of both components in the intercrop were computed using both the Land Equivalent Ratio (LER) and the Land Equivalent Coefficient (LEC), productivity and land use efficiency was highest when Kewesoke was planted at 37,038 plants /ha (i.e., 2 plants 60 cm apart on ridges spaced 90 cm apart) and intercropping cassava between the maize stands.

**Key words:** maize/cassava intercrop, Nigeria, Kewesoke, TMS 30555, LER, LEC

Pages 5-9

# **Utilization of cassava storage root wastes in small-holder pig and small ruminant production systems in Nigeria**

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## **ABSTRACT**

A total of 4.4 million tonnes of cassava peels produced annually in Nigeria is wasted. This mass of potential energy source can be efficiently utilized in small-holder pig and small ruminant production systems. The production of pigs and small ruminants has always been a feature of our traditional livestock production system. But this system has been characterized by inefficient feeding. Cassava peel can be processed by simple and inexpensive methods to feed pigs when supplemented with concentrates; and small ruminants when it is used to supplement legume forages. Evidence so far shows that up to 40% cassava peel can be incorporated in the diets of pigs while small ruminant can be produced on up to 70% cassava peel when such diets are supplemented with legume forages. The increased utilization of cassava peel to alleviate feeding problems in small-holder pig and small ruminant units, which will have beneficial increase in the income farmers, is, therefore, advocated.

**Key words:** cassava roots, small ruminant, pig, Nigeria

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# **Comparative economics of minisett and traditional seed yam production technologies at the farm level in the eastern forest zone of Nigeria**

G.N. Asumugha & C.O.B. Obiechina

## **ABSTRACT**

Yam minisett technology was developed at the National Root Crops Research Institute (NRCRI), Umudike to solve the problem of high cost and scarcity of seed yams for yam production in Nigeria. This paper compares the economics of minisett technology with the traditional method of seed yam production at the farm level in the eastern forest zone of Nigeria. Results show that the minisett technology is more labour intensive requiring 282 mandays/ha compared to 255 mandays/ha used by the local method. However, a lower total operating cost of N11, 030/ha is utilized in the minisett compared with N14, 429/ha for the traditional method. Also, the minisett technology gives higher net operating margin of N7, 260/ha compared to N1, 337/ha for the local technology. The results of the test of significance shows that there were no significant differences between the two technologies in the labour required for planting, weeding, staking, harvesting and storage, except for sett preparation and transportation.

**Key words:** Yam minisett, traditional seed yam, production technologies, comparative economics.

# **Cassava-based cropping systems and use of inputs in different ecological zones of West and Central Africa**

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## **ABSTRACT**

The Ecologically Sustainable Cassava Plant Protection Project (ESCaPP) conducted extensive surveys of 3 West African countries (Ghana, Nigeria, Benin) and a Central African country (Cameroon) during the wet and dry seasons of 1994. The study area was sub-divided in 5 agro-ecozones namely: the montane forest, rainforest, transition forest, wet savannah and dry savanna. The objective was to study farmers practices with respect to spread, crop association and input use in the farming systems in general and in cassava-based cropping systems as part of the regional effort at sustainable cassava crop protection. The 4 major cropping system practices identified were: mixed cropping, monocropping, alley cropping and taungya systems. Most common cassava based mixtures across the 5 ecozones were cassava/maize, cassava/yam, and cassava/legume crops. The legumes intercropped with cassava across all ecozones were either groundnut or cowpea. Mixed cropping involving 3 or more crops was also noted. These include cassava/cowpea/melon (3.3%) of all observe crop mixtures in dry savannah, cassava/groundnut/plantain/cocoyam (2.3%) in rainforest, cassava/yam/maize or cassava/maize/cowpea (1.6%) of occurrence for each mixtures in the transition zone. Vegetable crops were also a component of cassava based mixtures in the transition forest and wet savannah ecozones. Use of inputs like herbicide was not recorded anywhere. Furthermore, most farmers (90% in rain forest and 93% of farmers in wet savannah) did not use any form of manure. The transition forest recorded highest number of farmers (21%) using fertilizers while animal manure (cowdung) was used by 11% of farmers in the dry savannah ecozone. The high population of cassava observed on the fields was attributed to adjustment to poor soil fertility status to compensate for good yield. The results suggest that more work needs to be done by extensioners on popularising fertilizer use and herbicide use by farmers and the need to ensure their availability at reasonable costs by the government of the different countries.

**Key words:** cassava, ecozones, cropping systems, alley cropping, fertilizers

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# **Garification of five improved cassava cultivars in Nigeria and physico-chemical and sensory properties of the gari yield**

S.C. Achinewhu & C.I. Owuamanam

## **ABSTRACT**

Gari produced from the roasted grit of the fermented pulp of five cassava cultivars: TMS 4(2)1425, TMS 30572, NR 8083, NR 8212, and NR 8082 by a process of garification were analysed. Chemical analysis of the gari samples showed pH values of 4.1, 3.9, 3.9, 4.1, and 4.0, respectively and corresponding total titratable acidity values of 0.9, 0.95, 0.8, 0.78 and 0.75% lactic acid. Chemical properties of the test samples of gari showed starch content of 27%, 34%, 23%, 15.60% and 21% respectively. Their swelling indices were 345%, 345%, 290% and 330%, relative bulk densities of 0.50, 0.54, 0.54 d 4.7, g/cm<sup>3</sup>, water absorption capacities of 7.5, 7.5, 6.0, 7.0, and 7.0 gg<sup>-1</sup> and gari yields 23%, 20%, 22.5%, 21.5%, and 20.5% in the same order. The particle (size) distribution profiles of the respective samples differed from cultivar to cultivar and influenced the sensory quality of gari. The cultivars contained HCN levels of 115-185 mg HCN kg<sup>-1</sup> in their pulp and 18-25 mg HCN kg<sup>-1</sup> for their gari. An average of 84% HCN reduction was achieved by the 72 hr fermentation. Sensory evaluation of gari samples showed no significant difference ( $p>0.05$ ) for stickiness to the palm in contrast to the texture and general acceptability ( $p<0.05$ ). The cooked gari paste (eba) showed no significant difference for general acceptability. However, least significant difference (LSD) evaluation showed differences in binding qualities of TMS 4(2) 1425, NR 8083, and NR 8212.

**Key words:** cassava, cultivars, garification, sensory, physio-chemical, properties

Pages 21-25

## **Influence du prélèvement des boutures de manioc (*Manihot esculenta* Crantz) sur le rendement et la matière sèche**

N'Zue Boni & Doumbia Sekou

### **Résumé**

Le présent essai, conduit en Côte d'Ivoire pendant deux années consécutives, a consisté à prélever des boutures, à 10 cm, 35 cm et 60 cm du sol, sur trois variétés de manioc (*Manihot esculenta*) en cours de végétation. L'opération, effectuée sept mois après la plantation, n'a pas altéré de manière significative l'ensemble des paramètres mesurés (rendement, taux de matière sèche) liés aux racines tubéreuses récoltées 15 mois après la plantation. Toutefois, le prélèvement des boutures, à 35 et 60 cm du sol, a occasionné une perte de matière sèche significative de 3,9% lorsqu'il s'agit de la moyenne sur les deux années. Cette technique pourra permettre au producteur de disposer de boutures de manioc avant la récolte des racines tubéreuses et de satisfaire ainsi la demande de boutures en milieu paysan.

**Mots clés:** manioc, prélèvement, recépage, variété

# **Intercropping sunflower with local varieties of cassava in a moist savanna site of Nigeria**

I.A. Adetunji & C.O. Amanze

## **ABSTRACT**

A two-year field study examined intra-and inter-row mixtures of 2 local cassava varieties with sunflower at Ogbomoso, Nigeria. There were 8 intercropping and 3 sole crop treatments replicated 4 times in a randomized complete block design. Generally, intercropping depressed the performance of sunflower more than cassava. Cassava and sunflower intercropped at alternate hills and single alternating rows had the poorest growth and yields compared with other planting patterns. There were no significant differences in the growth and yields of cassava and sunflower intercropped in 3 and 5 alternating strips. Light transmission, leaf area index and yields of both crop species followed similar trends under the various planting patterns. Intercropping at 5 alternating strips that allowed the highest leaf area also allowed the lowest light transmission and produced the highest yields. Compared to the slow growing Odongbo, the fast growing Okoyawo cassava significantly suppressed the growth and yield of intercropped sunflower especially when intercropped in alternate hills and single alternating rows. Irrespective of the planting pattern, cassava contributed more to Land Equivalent Ratios (LERs) than sunflower. Whilst Odongbo contributed 21, 34, 18, and 0.05% more than sunflower to LERs, Okoyawo cassava 41, 48, 28, and 30% more than sunflower when interplanted at alternate hills single alternating rows, 3 and 5 alternating strips, respectively. Interplanting Odongbo and sunflower at 3 and 5 alternating strips improved LERs by 72 and 89%, respectively, while an improvement of 46 and 62% were obtained in mixtures of Okoyawo and sunflower for the same planting pattern.

**Key words:** cassava, sunflower, intercrop, growth, yield

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# **Economic analysis of cassava-based farming in south-eastern Nigeria under structural adjustment programme**

J.A. Mbanasor & S.A.N.D. Chidebelu

## **ABSTRACT**

This study was conceived against the persistent inadequacy in food supply despite the potential benefits from the Structural Adjustment Programme (SAP) measures on the cassava based cropping system. Yet the impact of the programme on cassava based production has remained a subject of controversy since the programme was put in place in 1986. The study was conducted in South Eastern Nigeria using disaggregated data covering the periods between 1980-1985 (Non SAP era) and 1987-1995 (SAP era). Data generated were analysed using econometric tools. Evidence from the investigation indicated that the cassava based farmers were significantly different in their production behaviour prior to, and during SAP. During SAP, there was an increase in the use of modern inputs/fertilizer, herbicides improved planting materials and yields of all crops grown in the mixture (cassava, maize, vegetables, and melons). This findings contradicts the previous one that increased costs of improved farm inputs could lead to their under-utilisation. However, farmers were technically more efficient before SAP than during SAP. They were inefficient in the use of farm size and local inputs during SAP unlike before SAP. Similarly labour and other investment expenses were better utilized during SAP than before SAP. It is observed that the farmers needed to intensify their farm lands, discontinue the use of local planting materials, increase other investments expenses, and reduce the use of modern inputs in order to be efficient in the use of resources in cassava based crop farming in the post SAP era.

**Key words:** cassava, economic analysis, Nigeria, Structural Adjustment Programme.



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## **Processing of cassava into *water-fufu* and *miondo/bobolo*: from a household recipe to an industrial process**

G. Tiky-Mpondo & S.A. Bikoï

### **ABSTRACT**

*Miondo* and *bobolo* are noodle-like products made from retted cassava roots, and are important foods in the Cameroonian diet. Their processing methods have a common transition product called *water-fufu* (55-60% moisture content), which did not have a market importance for many years. Traditionally, these products are mainly made by households in rural areas, where processes are handled as simple recipes by some ethnic groups. The handling of both *water-fufu* and *miondo* is highly labour demanding for women. Since the beginning of 1990, the local consumption and exports of *water-fufu* and *miondo/bobolo* have considerably increased. The need to alleviate the physical work at the women level has led to the separation of the production of *water-fufu* from that of *miondo/bobolo*, and the development of a process of making *miondo/bobolo* with cassava flour. The cassava-flour method of making *miondo/bobolo* occurs in 3 separate units: *water-fufu* unit, cassava-flour unit and *miondo/bobolo* unit. The utilisation of cassava flour presents several advantages: the flour can be reconstituted anywhere, anytime and by whomever knows how to make *miondo*, it is easy to store and use, appropriate for transportation and cumbersomeless.

**Key words:** cassava, water-fufu, miondo, bobolo, cassava flour

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## **Evaluation of cassava (*Manihot esculenta* Crantz) farine and wafer**

S. Khan, N. Badrie, G.S.H. Baccus-Taylor & E. Comissiong

### **ABSTRACT**

The effects of temperature, moisture and starch content, and duration of heat treatment of cassava (*Manihot esculenta* Crantz) meal on farine and wafer were investigated. Acceptable granular and crisp farine was obtained from cassava meal with 37.2-37.6% moisture, roasted at 75-80°C for 10 min. Cassava meal (41% moisture; 29.3-30.4% starch) baked at 140-160°C for 20 min followed by 120-140°C for 40 min, resulted in an acceptable uniform-textured, white-coloured wafer. The effect of the length of heat treatment was significant ( $p < 0.01$ ) on the color of cassava farine, but was not significant ( $p < 0.01$ ) on aroma, texture and taste of the farine and wafer. Both products with 3% sugar were preferred ( $p < 0.01$ ) by sensory panelists. All panelists preferred ( $p < 0.05$ ) the experimental farine over a commercial product.

**Key words:** cassava, heat, salt, sugar, farine, wafer

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## **Genetic diversity in cocoyam as revealed by random amplified polymorphic DNA**

E.Y. Danquah, E.T. Blay, S.K. Offei, J. Fosu-Nyarko & S. Amiteye

### **ABSTRACT**

Forty-eight accessions of cocoyam (*Xanthosoma sagittifolium*) were evaluated for genetic diversity using random amplified polymorphic DNA (RAPD) analysis. Out of 50 primers screened, 10 were able to amplify the genomic DNA giving reproducible amplification patterns with individual fragments that stained intensely. Two of the primers OPA-05 and OPE-09 were considered highly informative because they amplified one or more polymorphic bands that distinguished between accessions. RAPDs showed higher genetic diversity in the accessions from Kade than those from Bunso, where the nation's germplasm is maintained. UPGMA cluster analysis of genetic similarity estimates (Jaccard's coefficient), separated the accessions into 5 main groups, 2 of which were one member groups. The primers will be useful for further genetic analysis and provide cocoyam breeders with suitable genetic markers for the selection of parents for crop improvement and germplasm conservation. Polymorphic markers identified in the DNA fingerprinting will also be useful in the study of mutant populations, which are currently being studied in our laboratory.

**Key words:** cocoyam accessions, genetic diversity, RAPD markers.