Journal of Agricultural Extension and Rural Development Vol. 4(17), pp. 456-464, 21 September, 2012
Available online http:// academicjournals.org/JAERD
DOI: 10.5897/JAERD12.074
ISSN 2141-2154 ©2012 Academic Journals

Full Length Research Paper

Upland rice based intercropping system among farmers in selected villages in Ogun State in South west of Nigeria

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Accepted 21 June, 2012

Rapid Rural Appraisals (RRA) were conducted among one hundred and fifty five farmers in rice growing areas of Obafemi/Owode and Ifo Local Government Areas of Ogun State in South-West of Nigeria to investigate farmers' practices of growing rice in rice/cassava intercropping system in 2007. The farmers in these villages cultivated 2 to 4 farms with an average farm size of about 2 ha. Results from the RRA showed that the farmers have been growing rice for over 21 years. About 31% of the farmers grow WAB 189- B-B-B-6-HB, 19% grow ITA 150 and I8% grow ITA 321 while 11% grow local variety 'Ofada'. About 58% of the farmers practice intercropping and 41% of them intercrop rice with cassava. As 72% of the farmers introduced their cassava one week after the planting of rice and the most commonly used cassava variety is MS6. Also 10.9% of the farmers intercropped rice with vegetable as 40.6% intercropped the same rice with cassava.

Key words: Intercropping, rice, cassava, rapid rural appraisal (RRA).

INTRODUCTION

Intercropping is the growing of two or more crop species simultaneously in the same field during a growing season. Intercropping is been popular in the tropics (Hauggaard-Nielsen et al., 2001) and rain-fed areas of the world (Banik et al., 2000) due to its various advantages (Chen et al., 2004; Agegnehu et al., 2006). Mixed cropping or intercropping is an important practice in tropical developing countries because of its several advantages (Isoken, 2000). The practice of growing several crops on the same piece of land is an ancient strategy for crop production among farmers in the tropics. Traditionally, it is used by subsistence farmers primarily to increase the diversity of their products (Gomez and Gomez, 1983). Ruthenberg (1971) stated that mixed cropping is the expression of African farmers desire to minimize risk. Fisher (1977) and Adetiloye (1985) observed that the yield advantage of intercropping has not been so marked in several situations possibly due to the use of either super-optimal or sub-optimal plant population proportion for component crops. In traditional intercropping systems, the component crops may be sown at the same time or at different times, depending on crop use and farmer preference (Francis, 1978; Remison, 1982). Webster and Wilson (1966) observed that for the tropical small scale farmer, there was no advantage to be gained by replacing the traditional practices of mixed cropping. Intercropping continues to be popular among agronomist and subsistence farmers because it ensures better utilization of crop growth resources (Krantz et al., 1976; Willey, 1979; Francis, 1981). Cassava has also been found to be commonly grown on small farms, and usually intercropped with vegetables, arables or plantation crops such as (*Amaranth* spp., *Celosia* spp., *Corchorus olitorius*,), (yam (*Dioscorea* spp*.)*, sweet potato (*Impomia batata*), melon (*Citrullus lanatus*), maize (*Zea mays*), rice (*Oryza sativa)*) or (coconut

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Table 1. Information on villages/rice growing communities in Ogun State.

Name of villages	Number of farmers	Size of farm (ha)	Experience in growing rice (years)	Cropping pattern
Imo-deboorin	23	2	20	Intercropping and sole
Lipetan	26	2	>20	Intercropping and sole
Egbeda	27	2	25	Intercropping and sole
Adedero	26	2	>20	Intercropping and sole
Masa	25	2	15	Intercropping and sole
Ifo-Ibogun	26	2	20	Intercropping and sole

(*Cocos nucifera*), oil palm (*Elaeis guneensis*) and coffee (*Coffea Arabica)*) or groundnut, or other legumes (IITA, 2003). There is no information on crops associatated with rice in intercropping system. There is therefore, a need for information on crops associated with rice in intercropping system. The objective of this study was to conduct a survey of rice growing communities in Ogun State communities to ascertain if it is intercropped and identify crops associated with it.

MATERIALS AND METHODS

One hundred and fifty five farmers were interviewed in six rice growing areas of Obafemi/Owode and Ifo Local Government of Ogun State in Nigeria. The villages were; Imo-debonre, Lipetan, Egbeda, Adedero, Masa and Ifo-Ibogun. Rapid Rural Appraisal technique was adopted to study farmers' practices of growing rice and cassava in intercrop. The following questions arose:

1. How many farms do you have?
2. What is the average size of each farm?
3. How long have you been growing rice in this community?
4. What varieties of rice do you grow?
5. Why do you grow these varieties?
6. Do you grow your rice sole or intercrop?
7. If you intercrop, what crops do you intercrop with rice?
8. Why intercrop with rice?
9. If you intercrop, when do you plant your rice?
10. Where do you get your seeds from and how soon do you get them?
11. What spacing do you use in planting your rice?

In view of the fact that the named cassava cultivars are the most common crops that are grown with rice, the following questions arise:

i. What cassava cultivars do you commonly intercrop with rice?
ii. Why did you not use TMS in intercrop? (Follow-up question)
iii. Reason for your choice of cassava cultivar?
iv. What time do you introduce your cassava?
v. Why do you choose to introduce your cassava at that time?

Data analysis

Data was analyzed using Excel package for percentage response to each of the questions and graphical representation of same responses.

RESULTS

Results of Table 1 showed the Information on villages/ rice growing communities in Ogun State and it was discovered that they have an average of 3 to 4 farms where different crops are cultivated. The average farm size was observed to be 2 ha while they have been practicing farming for an average of 15 to 25 years (Table 1). The most common rice varieties being cultivated in the six villages were Ofada, ITA 150 and WAB 189 – HB (Table 2). Their reasons for the choice of certain rice varieties were also reported in Table 2. Var. ITA 150, WAB 189 – HB, WAB 189 – P31 and rice varieties of WAB 450 – P38 were preferred by the farmers because of their earliness and good tillering ability (Table 2). Also, Ofada was picked because of its good aroma and taste. The table of means shows that WAB 189 – HB was a more preferred rice variety grown in most of the Local Government areas surveyed as 30% of all the farmers cultivated it (Figure 1).

Intercropping of rice

In Table 3, it was observed that 58% of all the farmers in the 6 communities intercropped rice with other crop. Cassava was observed to be the major crops intercropped with rice (Figure 2) while the lowest % (10%) of farmers intercropped rice with vegetable. Farmers majorly practiced intercropping in these six communities because they earn double income while about 14.2% of the farmers believed that intercropping is necessary incase of crop failure (Figure 3). Since rice is their major crop, about 71.6% of the farmers plant rice one week before the planting of any other crop (Table 3). Also 53.5% of the farmers plant their rice by close dibbling (Figure 4) as 67.1% of them obtained their planting materials from previous harvest (Figure 5).

Reasons for intercropping with cassava

Different varieties of cassava were observed to be cultivated by the farmers in the six communities. Nevertheless, 33.5 and 31.6% of the farmers in these

Table 2. Rice growing communities, types of rice grown and reasons for choice of rice varieties.

Question	Imo-deboorin	Lipetan	Egbeda	Adedero	Masa	Ifo-Ibogun
	Farmers responses					
Why do you grow these varieties	Ofada Good aroma Good taste	Ofada Good aroma Good taste	Ofada Good aroma Good taste	Ofada Good aroma Good taste	Ofada Good aroma Good taste	Ofa Good aroma Good taste
	ITA 150 Early maturity Blast resistance	ITA 150 Early maturity Blast resistance	ITA 150 Early maturity Blast resistance	ITA 150 Early maturity Blast resistance	ITA 150 Early maturity Blast resistance	ITA 150 Early maturity Blast resistance
	WAB 189-HB Good tillering Early maturity High yielding	WAB 189-HB Good tillering Early maturity High yielding	WAB 189-HB Good tillering Early maturity High yielding	WAB 189-HB Good tillering Early maturity High yielding	WAB 189-H Good tillering Early maturity High yielding	WAB 189-HB Good tillering Early maturity High yielding
	ITA 321 Good tillering High yielding Drought resistance Late maturing	ITA 321 Good tillering High yielding Drought resistance Late maturing	ITA 321 Good tillering High yielding Drought resistance Late maturing	ITA 321 Good tillering High yielding Drought resistance Late maturing		WAB 450-P38 Good tillering Early maturity Have black tips
	WAB 450-P31 Good tillering Early maturity Have spines	WAB 450-P31 Good tillering Early maturity Have spines	WAB 450-P31 Good tillering Early maturity Have spines			
	WAB 450-P38 Good tillering Early maturity Have black tips	WAB 450-P38 Good tillering Early maturity Have black tips	WAB 450-P38 Good tillering Early maturity Have black tips			

communities cropped Odongbo and MS6 (TME1) (Figure 6). The non-preference of improved cassava variety such as TMS 30572 was because of its shading growth habit it vegetates heavily and produces lots of foliage (Figure 7). The preference of MS 6 (TME1) was as a result of its vertical and non-shading growth habit (Table 4). Due to its slow growth, 71.6% of the farmers planted cassava var. MS 6 (TME 1) one week

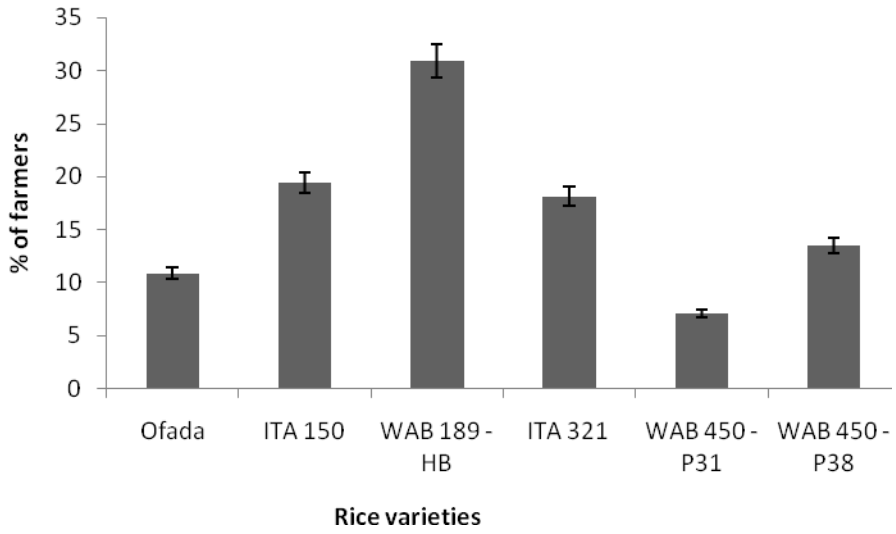

Figure 1. Rice varieties grown by farmers.

Table 3. Rice growing communities, intercropping, and time of intercropping with rice.

Questions	Imo-deboorin	N	Lipetan	N	Egbeda	N	Adedero	N	Masa	N	Ifolbogun	N	EX	– EX	% of EX
							Farmers responses								
Do you grow rice sole or intercrop?	Intercrop	16	Intercrop	16	Intercrop	15	Intercrop	17	Intercrop	13	Intercrop	13	90	15	58
	Sole	7	Sole	10	Sole	12	Sole	9	Sole	12	Sole	15	65	10.8	41.9
If you intercrop, when do you plant your rice?	As soon as rice is planted cassava is also planted	8	As soon as rice is planted cassava is also planted	7	As soon as rice is planted cassava is also planted.	8	As soon as rice is planted cassava is also planted.	5	As soon as rice is planted cassava is also planted.	8	As soon as rice is planted cassava is also planted.	8	44	7.3	28.4
	Rice is planted one week before cassava.	15	Rice is planted one week before cassava	19	Rice is planted one week before cassava	19	Rice is planted one week before cassava.	21	Rice is planted one week before cassava.	17	Rice is planted one week before cassava.	20	111	18.5	71.6
What time do you intercrop your cassava?	Simultaneously	8	Simultaneously	7	Simultaneously	8	Simultaneously	5	Simultaneously	8	Simultaneously	8	44	7.3	28.4
	1 week after	15	1 week after	19	1 week after	19	1 week after	21	1 week after	17	1 week after	20	111	18.5	71.6
Why do you choose to introduce your cassava at that time?	Slow growth	23	Slow growth	26	Slow growth	27	Slow growth	26	Slow growth	25	Slow growth	28	155	25.8	100

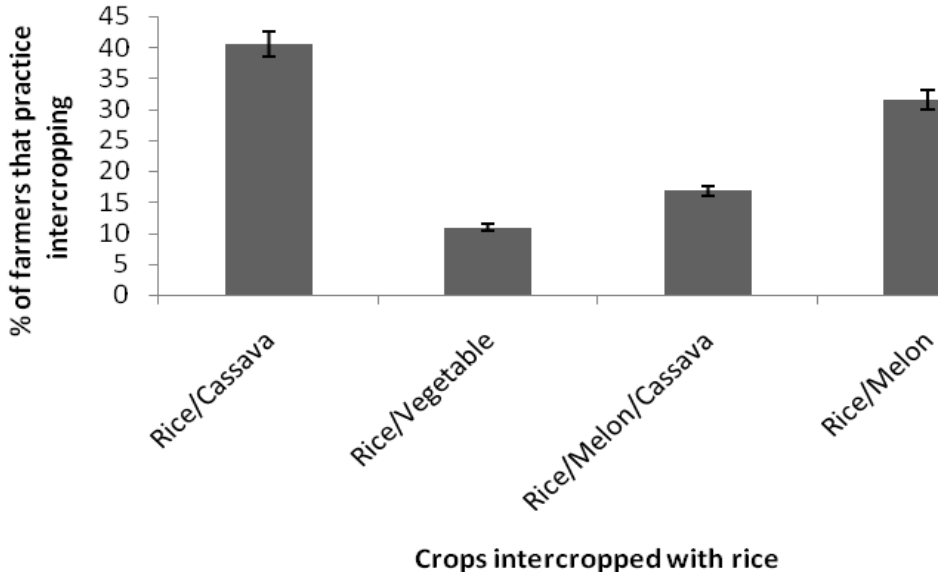

Figure 2. Intercropping of rice with other crops.

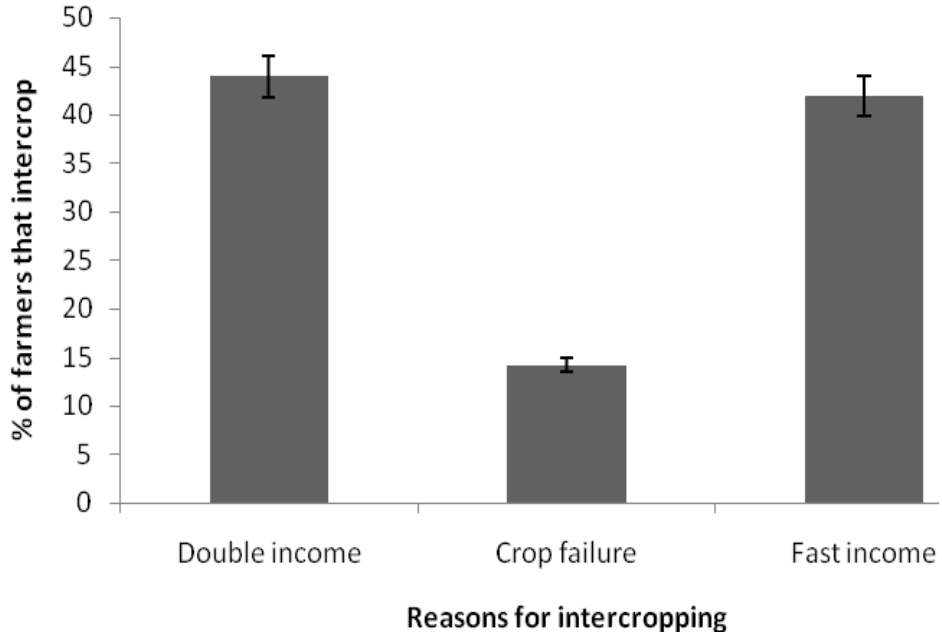

Figure 3. Farmers reasons for intercropping.

after rice (Table 3).

DISCUSSION

Intercropping has been observed to be an old practice by farmers and to these farmers in Nigeria seldom plant sole crop. Adetunji and Amanze (2001) reported that long duration crops are often intercropped with shorter duration crops. This was also observed in the RRA conducted in the six village communities as cassava was mostly intercropped with rice. Their choices of cassava and rice varieties were found to be of different reasons. Since rice was their major crop, emphasis was placed on it and to this, a more preferred cassava that does not produce plenty leaves to avoid shading was used. Their reasons for choice of rice varieties was due to its earliness and ability to produce more tillers which results

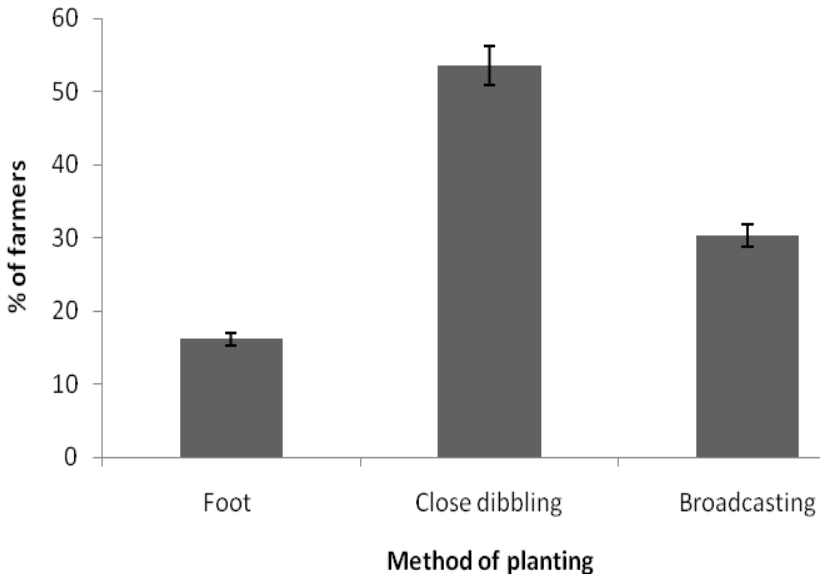

Figure 4. Farmers methods of planting.

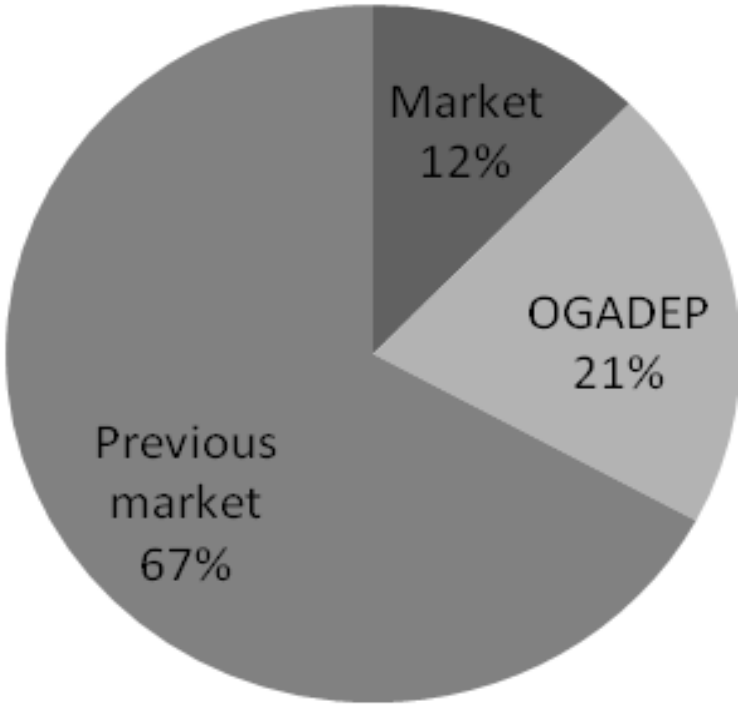

Figure 5. Farmers source of planting materials.

into more grain yield (Hasegawa et al., 1994). Another reason for their choice of Ofada was because it commanded a lot of money in the market. The farmers generally regarded rice as a source of fast income and a crop that can be relied upon in case of crop failure (Ibeawuchi et al., 2004; 2005). Farmers' non-preference of ITA 321 was because of its lateness to maturity. The study of Okonji et al. (2007a) reported that in spite of its lateness to maturity ITA 321 still performed better than WAB – HB and ITA 150 when planted sole and as an intercropped.

The preference of farmers to cassava is of the fact that it has slow initial growth and as a result a short duration crop would have been harvested before it exerts shading

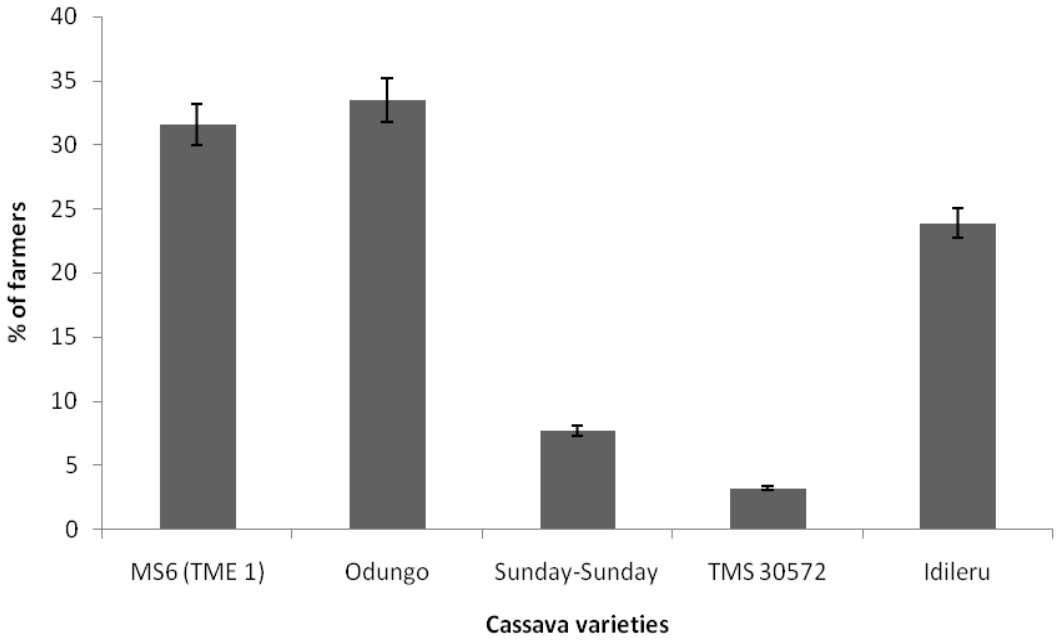

Figure 6. Cassava varieties grown by the farmers.

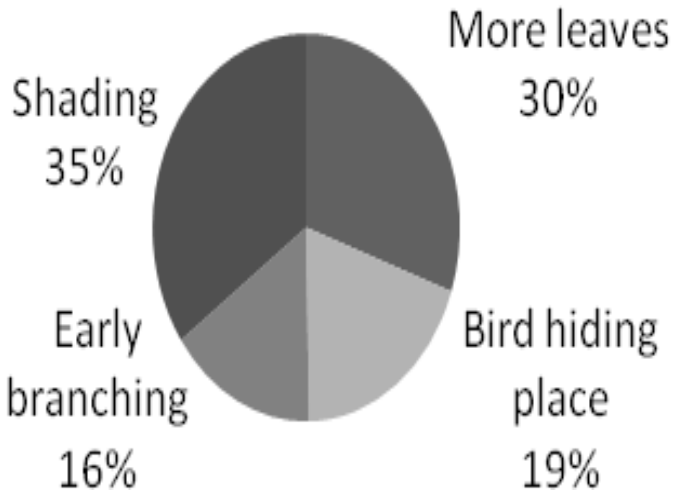

Figure 7. Farmers reasons for rejection of TMS 30572.

effect on rice. This was the main reason why the farmers preferred MS 6 (TME 1) and Odongbo. The preference of these two cassava varieties was because they grow lesser leaves and branches and also because they can be boiled and eaten as yam. The bigger tubers produced by TMS 30572 and its ability to suppress weed (Raymond, 1990; Melifonwa 1994; Okpara et al., 1995; Mbah et al., 2003) was not enough to convince the framers on its adoption in rice based intercropping because it extends its branches widely with leaves causing shades on rice plants. .In an earlier research, Okonji et al. (2007a) reported that TMS 30572 planted two weeks after rice did not depress the yield of rice and as such TMS 30572 could be intercropped and planted two weeks after rice.

Conclusions

The result indicated that majority of rice farmers in the communities had more than one farm and often planted rice in association with other crops in inter- cropping system. Cassava was the most common crop intercropped with rice. Cassava var TME 1 was the most

Table 4. Types of cassava grown and reasons for choice of cassava varieties.

Question	Farmers responses					
	MS6. (TME 1)	**MS6. (TME 1)**	**MS6. (TME 1)**	**MS6. (TME 1)**	**MS6. (TME1)**	**MS6. (TME 1)**
Reason for your choice of cassava cultivar	Less leaves Teats like yam Early maturity No branches Odungo Less leaves Early maturity Big tubers No branches Sunday-Sunday Less leaves Early maturity Big tubers No branches TMS 30572 High yield More leaves Idileru Less leaves Early maturity Big tubers No branches	Less leaves Teats like yam Early maturity No branches Odungo Less leaves Early maturity Big tubers No branches Idileru Less leaves Early maturity Big tubers No branches	Less leaves Teats like yam Early maturity No branches Odungo Less leaves Early maturity Big tubers No branches Sunday-Sunday Less leaves Early maturity Big tubers No branches Idileru Less leaves Early maturity Big tubers No branches	Less leaves Teats like yam Early maturity No branches Odungo Less leaves Early maturity Big tubers No branches TMS 30572 High yield More leave Idileru. Less leaves Early maturity Big tubers No branches	Less leaves Teats like yam Early maturity No branches Odungo Less leaves Early maturity Big tubers No branches Sunday-Sunday Less leaves Early maturity Big tubers No branches Idileru Less leaves Early maturity Big tubers No branches	Less leaves Teats like yam Early maturity No branches Odungo Less leaves Early maturity Big tubers No branches Idileru Less leaves Early maturity Big tubers No branches

preferred variety because of its non- branching morphology. Cassava was usually introduced one week after planting rice. Criteria for choosing rice varieties planted were early maturity, aroma and taste.

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