REPORT

ON

ADVISORY SERVICES AND INPUT SUPPORT FOR IKOT USOP PRODUCTION CLUSTER UNDER FADAMA III ADDITIONAL FINANCING PROJECT

PRESENTED

BY

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EXECUTIVE SUMMARY

The advisory service activities covered land clearing, tractorization, planting, weed control, fertilizer application and pest management among others. The need for farm record keeping was done as incidental to complete the work to encourage entrepreneurship among farmers. The session on land clearing was preceded by site selection where the community and farmers' cooperatives were adequately mobilized with the objectives of the intervention clearly stated. Land clearing lessons focused on the need to prepare land for ease of other field activities. Mechanization was recommended in ploughing, harrowing and ridging as efficient means of seedbed preparation. This was done via tractorization where regular maintenance of equipment was stressed. Planting focused on selection of high quality materials and adherence to recommendations to achieve optimum returns on investment. Weed control lessons highlighted the negative impact of weeds on overall output and recommended timely application of herbicides with adherence to recommended quantity and use of personal protective equipment. Advice on fertilizer application centered on application during the first five months of planting. Pest management and disease control demonstrated the adverse effect on the cassava crop enterprise. It recommended trapping, use of improved varieties and good farm sanitation. Farm record keeping was emphasized as a basis for sound decision on cassava crop enterprise and for access to credit. Recommendation was on continuous building of local capacity to ensure adherence to improved cassava production to improve farmers' welfare sustainably.

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INTRODUCTION

In the course of providing advisory services, several extension methods were applied. For the site selection exercise, the mass method was used in which all participating farmers from three cooperatives namely; Unity and Trust MPCS, Asema MPCS and Utibe Ima MPCS were informed of the parameters that made their farm site suitable for selection of cassava production for the cluster. These factors were listed to include accessibility, and soil physical and fertility profile which were obtained at a glance from the history of previous yield.

Mass method was also used to explain the benefits of ploughing, harrowing and ridging of farmland. However, advisory service approach engaged the group method of extending knowledge in which participating members in the cluster were reached through their group with the leaders as contact agents. Demonstration method ensured that farmers appreciated the use of personal protective equipment, the dipping of stems in *thermex* before planting in order to control cassava mosaic disease and other diseases.

Individual methods were quite effective when participants reported incidence of cassava blight on the plot or drew attention to insect pest found on parts of the plant. A case in point was rodents' burrowing on a plot in which trapping was recommended and this was in conformity with the methods used by community members to catch animals.

Community members' observation of taboo to the farm on a local market day known as *"edereobo"* was well respected in the course of advisory service activities. This was incorporated as local public holiday, and at least twenty such days occurred in the course of the assignment.

Participants expressed the desire to be given cash rather than inputs, and observed that during the farming season, they were strapped for cash. A threat by cattle handlers reported on the 13th of October, 2016 where some parts of the farm were destroyed raised a number of issues from community surveillance, engagement of law enforcement agents to enactment of law to

control the menace of straying animals. It was observed that the community members and farmers had lost confidence in the law enforcement agency especially the Police force having failed to assist them previously when similar events occurred in 2011/2012 and 2013/2014 farming seasons. Recommendations included continuous building of existing farmer cooperatives in the area to ensure local leadership capacity is built to carry on farming as a business. It will be easier to achieve a higher of diffusion of agricultural innovations if intervention in assisting farmers is sustained beyond the lifespan of the donor partners activities. Relevant laws to protect farmers should be enacted e.g. on regulating straying animals, night grazing while the security agencies should engage in confidence-building in the Communities they are assigned to serve.

Given the high level of enthusiasm by the farmers, it will be possible to achieve optimum yield from the cassava production cluster in Ikot Usop.

The advisory services component of the consultancy work covered land-clearing, tractorization, planting, weed control, fertilizer application and pest management. Activities in the advisory services included familiarization with the farmers and project location sites as preamble to securing the needed cooperation of the clientele. Slight adjustment on date of commencement of activities, which differed from the Akwa Ibom State farming calendar, was necessary to ensure that the stated preliminary community engagement was formally concluded.

SITE SELECTION

Site selection was done based on ease of accessibility. Physical parameters of interest were the well-draining soil with high fertility gathered from the yield of previous season which was about 20 tons per hectare. The altitude is estimated at 1,800±20 above sea level. The farm site is a large area of land of about 65 hectares with an adjourning plot of about 45 hectares cultivated with cassava. In the north east flank of the site is a gentle sloping land

while in the south west portion is a more sloping area. The site is an area with annual precipitation of about 4,500mm. Interaction with farmers shows that the area had been supporting cassava production for many years.

In summary, the entire area of land and the adjourning communities of Ikot Osusu and Ikot Obio-Oko consist of a farmland area of about 250 hectares which could support an expansion of intensive cassava cultivation with the community partnership.

The Inspection Team comprised the State Project Coordinator, Communications Officer, Environment Officer, Monitoring and Evaluation Officer, Community Development Officer and the Community Facilitators.

The entire community was in attendance during the site selection. Among them were the village head and Cluster Chairman, Chief Iko Essien Uko, Cluster Secretary, Mrs. Victoria Ebio, Village Council of Chiefs, villagers who are the farmers in Utibe Ima Cluster.

The actual commencement of advisory services followed the approval of the business plan on the 10th of May, 2016 and initial engagement of Consultants.

Observation

The community was quite receptive of the inspection team. There was a strong local leadership and followership as the traditional institution demonstrated close partnership with the cooperative executive.

Recommendation

Intervention by development partners can achieve much in improving farmers' productivity and welfare if the existing community cohesion and good organization is exploited.

Conclusion

There was proper community mobilization by the intervention agency.

LAND CLEARING

Clearing the land before field activities was emphasized as the first step to preparing the land for farming purposes. Slashing was common as manual approach which was labour-intensive and may not be effective on large hectares such as was being planned for cassava production. Farmers were taken through field management activities beginning from site selection. The farmers were told that the well-drained soil and fertility status as well as gentle sloping topography are important considerations in the site selection exercise. The extension contact during this session emphasized the need to have a well-prepared seedbed as a primary requirement to achieve high yield of cassava. It was further explained to the farmers that land preparation was a function of soil type, depth of water table as well as the time for which planting is intended to be carried out.

In the case of Ikot Usop Cluster location, ridging was adequate to achieve optimum yield which determines returns on investment. Farmers were therefore encouraged to embrace ridging. On the slopy portions of the field, ridging across hilly parts was recommended in order to check the adverse effects of surface run-off thereby making the ridges to play a second role as bands.

Observation

Participants agreed that mechanization was preferable, considering the business approach applied to the cassava production in the cluster. Farmers had earlier adopted the use of tractor on the farm.

Recommendation

Farmers were advised to ensure that they hired qualified and knowledgeable operators who will be willing to adhere to recommended practices.

Conclusion

No issues arose on this topic and the activities to be carried out.

TRACTORIZATION

Participants were reminded that the use of tractor was aimed at removing drudgery and ensuring that land preparation was concluded within the assigned time-line of two weeks.

Ploughing of Field

Farmers were taught that land preparation could be in the form of making mounds, ridges or even zero tillage depending on the time of the year, especially if it is at the onset of rains. An important function of ploughing which was emphasized was the breaking of clods to ensure a leveled seedbed with no risk of water collecting in small pools i.e. ease of water passage (infiltration) into the soil. Cluster participants were also told that the number of ploughing depended on how much clods were broken and weed growth which may require a second time if clods were not broken. Harrowing was done simultaneously to achieve a good seedbed for planting. However, ridging that was recommended was to be done to ensure 1m x 1m spacing between rows which ensured adequate distance between the plants at full development of the canopy.

The farmers were taught that the topography, texture and soil structure are important characteristics in the use of machines in land preparation and subsequent working on the plot. Ploughing involves the use of tractor-drawn disc plough that helps to turn the soil to ensure that ridges could be made. Farmers were told that ridging is to ease tuberization of cassava as well as the carrying out of subsequent farm operations. Ploughing of the field took a total of four (4) days. It was emphasized that ploughing provides a suitable setting to accommodate a cassava density of about 13,000 stands at a planting distance of 1m between rows (ridges) and 0.7m along the rows.

Observation

The tractor operator was an experienced worker and had good knowledge of the operations and different activities on the farm.

Recommendation

Farmers were advised to ensure the equipment was adequately maintained. This included checking the oil level, fueling, pretesting of the lever system, air pressure on tyres as well as regular servicing.

PLANTING

This activity was to be preceded by selection of planting materials. Farmers were again instructed that planting needs to be done according to specification to ensure achievement of desired maximum plant population density. To achieve the highest optimal yield, two planting distances were exposed to the farmers namely; 1m x 1m along rows and between ridges and 1m x 0.7m. The farmers were told that the former distance would result in a population plant density of 10,000 stands while the latter would give a population of 13,000 stands per hectare. This would translate to about 60 bundles per hectare. The cuttings were thrust into the ridges in a slanting position with 80% of the stem in the soil. In order to maintain 100% planting rate or population, farmers were advised to observe the field and promptly replace non-viable cuttings or those that may have died after being planted.

The position of the stem with respect to the ridge depended on a number of factors. Horizontal planting was desirable if more sprouting was the objective and it was recommended for environment with low precipitation. In this case, the stem was completely buried in the soil in a horizontal position at a depth of 5 to 10 cm. However, for the soil in Ikot Usop area, stem cutting buried at 45^0 was considered suitable.

This extension session was demonstration-oriented using the group method after giving general information to all the farmers in attendance. Farmers were informed that final output of cassava cultivation depended among other things on the proper agronomic practice at this stage. The confidence of the farmers was secured as they were informed that the input supplier was instructed to provide improved varieties including the following; Tropical

Manioc Selection (TMS) 2101 (known locally as 'Ndaana Okpo'), TMS 98/210 and TMS 00/581.

Farmers were informed that the cultivar had successfully withstood the Cassava Mosaic Disease (CMD) which first emerged in 1998 in Akwa Ibom State with colossal damage to farms and adverse reduction in the yield of that year. As a prelude, farmers were told to cut stems in a slanting direction at the length of 25cm with a minimum of 0-5 nodes/buds alternating on each stick as sprouting points. The cutting was done such that the middle mature parts of the stems were used and the upper growing tips were avoided.

Selection of Planting Materials using Age and Physical Parameters

Interaction with the participants on this pre-planting activity emphasized the need to select good planting material. Farmers were told that the growth of the cassava plant and how much was obtained as yield per plant was a direct function of the quality of the planted materials i.e. the stem cutting.

On the physical parameters of selecting the materials, farmers were told to look for stems that have not stayed beyond one year and six months. When stems are too old on the field, they lack adequate nutrients, and are highly vulnerable to disease-causing organisms. Where planting is delayed, it was recommended that a dry, cross-ventilated and shaded place away from direct sunlight was adequate to ensure the moisture content was not reduced. Farmers were asked to look out for stems with good thickness which indicated adequate nutrients and moisture required for prompt sprouting. However, medium-sized stem thickness was most suitable. The health of stem was also an important consideration in selecting planting materials.

Farmers were advised to request from their input suppliers high-yielding varieties with excellent processing qualities. The session noted that among other considerations, varieties should be those that may have been tried in the community and found to have a good

adaptation quality which was a reflection of how well the varieties will give good yield when planted there. Other considerations were that selected cassava planting materials should be those that have multiple purposes i.e whose products and by-products can be used as food and as raw materials for the livestock industry, as well as for the industry to achieve maximum benefits from the investment.

The desirable characteristics of growing cassava plants to bulk early translated to early swelling of the roots. This trait was considered an advantage, and farmers were informed that it helps the crops to overtake weeds' competitive role for nutrients. In addition, the session also highlighted that selected cultivars should produce roots that will remain in the soil till maturity in order to reduce losses associated with rotting as a way to obtain optimal yield or output.

On the basis of the above-mentioned characteristics, the following varieties were recommended; *TMS 30572, WR 80802, NR 8083, TMS 97/2205, TMS 98/0505, TMS 98/0510, TMS 98/0581, TMS 92/0057, TMS 92/0326, TMS 96/1632, TMS 98/0002 and TMS 419.*

Dipping of Stem Cuttings in *Thermex*

Farmers were told that research has shown that 81% of the dreaded CMD is usually transmitted by cuttings infected with only 19% of the disease carried by whitefly vector. This then underscores the necessity of dipping each cutting in *thermex* prior to planting. This was demonstrated for farmers to appreciate and subsequently adopt.

Observation

Feedback showed that farmers were ready to adopt the lessons learnt although some complained of the workability. While some accepted the slanting position, others would have preferred more cuttings per hole for the recommended distance.

Recommendation

Participants were advised to try the methods as they were based on well-researched findings which were quite reliable.

WEED CONTROL

The session commenced with weeds as plants that grow where they are not desired. Common weeds identified on the plots were mostly grasses. Farmers were asked to pick weeds individually, and the following weeds were identified; *imperata cylindrica, panicum maximum and pennisetum purpeurum.*

Participants were reminded of the need to control weeds in the first 120 – 150 days of the growing cassava plants. This was because, it represented a critical growing period of the crop. Similarly, every weed was a plant and if allowed, will struggle with the cassava plants for space and sunlight, harbor insect pests, absorb nutrients meant for the field crops as well as consume moisture needed by the cassava plants. It was therefore emphasized that not only should weeds be controlled, the field activity should be done more timely, before much damage is done to the field. Where weeds overtake plants grown, output was bound to fail. Participants were told that weeding with hoe was one option which required labour. However, herbicide application was another method which was cost-effective on large plots such as theirs.

Herbicide Application

Farmers were informed that herbicides are chemical compounds formulated to kill weeds. It was noted that the underlying principle of use of all agrochemicals is caution since all of these substances are poisons with varying degree of risks to users. Efforts were made to ensure that application of herbicides to the farm followed a careful reading of instructions, reading of literature, labels and symbols. Emphasis was made to ensure also that farmers understood symbols such as highly toxic, acidic forms (emulsifiable concentrates) etc.

Farmers were also taught that pre-emergence herbicides are applied during land preparation while the post-emergence herbicides are usually applied 3 days after planting. *Primextra* for example, could be applied 3 days after planting as a selective herbicide at the rate of five litres per hectare. On the other hand, *Round Up,* a total herbicide could be applied to the land 10 days before land preparation at the rate of 4-5 litres per hectare. Farmers were also advised to use *Delsate* or *Gramoxone* pre-emergence herbicides which are systemic and contact herbicides respectively. Systemic type kills through tissues of weeds while contact kills when it touches the tissues externally.

The emphasis was on the time of application before seed bed preparation or after planting as an impact point of extension information. In all agrochemical application to the field, farmers were told to ensure that they prevent tiny fumes and sprays from having contact with their skin, eyes or any other part of the body. To achieve this risk management, farmers were told to spray in line with the direction of a gentle breeze if they noticed any form of mild wind; and to ensure that spraying was done very early in the morning or late in the evening.

The farmers were also advised to ensure the use of Personal Protective Equipment (PPE)/devices like mask, hand gloves and goggles to protect the face and nose, hands and eyes before applying agrochemicals generally. Farmers were told that a six-hour period was enough to ensure the substance penetrates properly into the soil. Due to its availability in the state which is critical to agro-input utilization, farmers were advised to use full harvest liquid fertilizer. To prevent rainfall from disrupting the spraying process, farmers were advised to use the Nigerian Television Authority (NTA) weather prediction service between two days to estimate the possibility of having heavy precipitation.

Observation

Feedback showed that despite the benefits of herbicide application, the women preferred hand weeding in some cases. It was noted that manual weeding was done on a share basis

where either fellow farmers worked on group members' farm plot on a rotational basis or hired labour. The female folk used the weeding period to socialize, share gossips and build stronger ties among themselves.

Recommendation

Farmers were advised to apply weed control measures according to the circumstances. Where the weeds were not much, hand picking, weeding with hoe could be done over a small area. However, where the farm was invaded by weeds and there was a risk of crop failure, herbicide was recommended. On the whole, a mixture of both manual weeding and herbicide application based on group decision was suggested. Advisory service position was on herbicide application.

FERTILIZER APPLICATION

As a logical step, farmers were advised to apply fertilizer after weeding to ensure optimum utilization of the nutrients by the cassava plants. In this extension service session, farmers were reminded that fertilizers are also chemical substances used on farm; as such the risk mitigation lesson previously given on herbicide application also applied. However, farmers were informed of the types of fertilizer available; straight or single fertilizer which supplies single nutrient or compound type which supplies different types of nutrients in varying proportions. Accordingly, the type of fertilizer used should be based on soil analysis result which would show which nutrient(s) is/are deficient. Two types of fertilizer were recommended; the Nitrogen Phosphorus Potassium (NPK) Compound fertilizer and Urea fertilizers which would be provided by the input suppliers.

Farmers were reminded that fertilizer application was very important during the first 6 – 8 weeks after planting which was equivalent to the first 42 – 56 days after planting. This was because research has shown that as roots of cassava plants are being produced, they promptly absorb nutrients from the soil.

Secondly, the next critical period in the life of growing crops is the 16th week after planting (112 – 120 days after planting) which coincide with the period when the roots start to bulk up, during which several types of carbohydrates are in high demand which is what the root tubers actually store. At this stage, fertilizer containing potassium will be added to increase the amount of nutrients stored as starch in the tuber.

Method of Fertilizer Application

Farmers were to select suitable method of fertilizer application; either the ring method of 6cm from each stand or the broadcast method of 10cm from plant with care to ensure no contact with plants. The impact point of the advice for the farmers was that the fertilizer should not have any contact with either the growing plant or the person carrying out the operation. Fertilizer application should be done 21 days (3 weeks) after planting.

Quantity

Farmers were told that 6 bags (50Kg) of NPK mixed with 2 bags (50Kg) of Urea per hectare are adequate to supply nutrients to the growing plants. Additional amount of potassium fertilizers should be used 16 weeks after planting; when the swelling of tuber starts.

Observation

Participants were knowledgeable on the ring method of fertilizer application and easily demonstrated the process. The farmers complained of untimely supply as a likely reason for low adoption.

Conclusion

The farmers expressed readiness to adopt the method of fertilizer application taught. Advisory service provider's conclusion resolved to relate with input suppliers to ensure timely delivery of inputs including fertilizer in order to achieve high adoption.

PEST MANAGEMENT AND DISEASE CONTROL

Farmers were told that Cassava Bacterial Blight (CBB) affects cassava stems. The session advised farmers to look out for the symptoms; angular leaf spots under leaf surfaces, leaf blighting and wilting. Farmers were asked to observe if were gum exudates in the stems with shoot tip die-back as a confirmation of the disease.

Major pests of cassava in the growing field include; cassava mealy bug, whiteflies and cassava green mites. Others include rodents, millipedes and termites. The aforementioned were those identified by the farmers, and the farmers were educated on their management and control. As a first step, farmers were asked to look out for damage on leaves, tips, petioles and stems with symptoms to include shortened inter-node lengths, "bunchy tops", stem distortion, defoliation and "candle stick" appearance for the cassava mealy bug attack.

The Cassava Green Mites (CGM) were mostly found on the undersurface of young leaves, green stems and auxiliary buds of cassava. Mites are carried on stems and leaves into new plots. The symptoms include yellow chlorotic leaf spots and "candle stick" appearance on the shoot tips which results in stunting of plants. It is obvious that when the growing portions are affected, growth will ultimately be impeded.

For the whiteflies, farmers were informed that they were similar to mosquitoes for humans in the incidence of malaria. Whiteflies were agents of pathogens that caused Cassava Mosaic Disease and Cassava Bacterial Blight Disease. These pests inflict damage on crops by sucking saps from leaves. Farmers were asked to look out for black sooty mould on the upper leaf surfaces, petioles, stems and premature leaf fall.

Farm sanitation was recommended to control rodents in which case, debris should be removed and discarded in a designated portion of the farm. Trapping and baiting were considered effective control measures. Use of *Baudin* at 40ml in every 20 litres of water or *Benlate,* based on application instructions was recommended to control termites. It was

earlier recommended at the planting stage the dipping of cuttings in *thermex;* this was again re-echoed as an effective means of controlling the CMD and CBSO. Any diseased planting material should not be used. Furthermore, stem cuttings from the branches have very low possibility of introducing the disease into the field.

Observation

Only one farmer observed cassava blight disease on the farm.

Recommendation

The farmer was advised to remove the plant from the field and some of its leaves were taken away for further analysis. Use of improved varieties of cassava stems and maintenance of high farm hygiene were encouraged for optimum yield.

FARM RECORD

The advisory service interaction centred on the need to document the farming activities since farming is being considered as a business. At the outset, farmers were encouraged to keep visitors' notebook in which names of visitors to the farm are to be recorded. Such record is also to supply information on the purpose, time, duration and date of visits.

Farm Diary

This record is a very important document on the farm as vital information on various farm operations are to be recorded here. For example, dates of specific farm operations, number of labourers, man-hours and other information are to be kept in the farm diary. Observations on the condition of the field/crops are to be recorded here as well.

Production Records

The farmers were informed that their farm operation was a business which must have accurate and timely record of the inputs used on the farm and the output realized. It was necessary to remind the farmers that every successful business including agro-business is

dependent on the soundness of decisions taken. This in turn depends on the keeping of relevant records including production records.

Observation

Some farmers could not fill the farm record provided by State Fadama Coordination Office. At least 70% of the farmers were able to complete information on the farm record by themselves.

Recommendation

The literate farmers in Ikot Usop cluster were encouraged to assist farmers who could not complete the farm records. A group approach was used to supply information on bank account details as every member had a common account number for their cooperative. The Cluster Secretary was entrusted with the safe keeping of the farm record for those who wished to have it kept in the cooperative office.

ADVISORY SERVICES OUTCOMES

The advisory services carried out in Ikot Usop production cluster were able to reveal some important lessons for future programmes.

Advisory Service Activity	Issues	Recommendations
Pre-planting activities	Initial difficulties in mobilizing participants.	Early mobilization of clientele and deepening of local leadership.
Field activities	Local taboo days where farming was forbidden	Those days to be used as local public holidays and for advisory services.
	Farmers' interest in being given inputs on time, and verification of good quality inputs.	Stronger collaboration with input suppliers; local procurement committee advised.
	Initial resistance in using recommended husbandry practices by farmers.	Assurances of workability and more demonstrations and sharing of research findings

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Advisory Service Activity	Issues	Recommendations
	Planting operations nearly staggered by farmers	Farmers to plant uniformly to enable application of husbandry practices; to achieve uniform growth and harvest and to ensure that large-scale production was achieved.
Off-farm Activities	Inability to keep farm records by some farmers.	Advisory service encouraged literate members to assist those who could not do so and also encouraged all farmers to take advantage of adult literacy programme in the area as a long-term measure to address the challenge.
	Farmers initially reluctant to collect insects of cassava for observation	Farmers to collect insects as primary diagnosis to avoid large-scale damage if not controlled.
	Farmers were unable to describe symptoms of diseases on plants e.g chlorosis reported on few stands of crops on the farm	Reinforcement of the lessons on symptoms of cassava mosaic disease and cassava leaf blight. Demonstration and examination of samples on the field.
	Older farmers were less interested in advisory services	Advisory service adopted group approach and participatory method to capture the attention of older farmers and encourage the adult learning process.
	Farmers questioned application of fertilizer at 6 – 8 weeks and 42 – 56 days after plating.	Advisory service interaction highlighted those periods as critical growth milestones, where nutrients were absorbed during food storage activities in the roots.
	Gender role in pest management was raised	Advisory service agreed that male farmers should do the trapping of rodents while the women who were more observant could apply *Benlate* and *Basudin* at recommended rates.
	Farmers raised the need to have financial resources increased in future intervention.	Farmers were reminded that intervention was based on Business Plans submitted and duly signed by all parties.

CONCLUSION

The advisory service activities afforded participants the opportunity to learn and apply recommended crop husbandry practices towards achieving optimum yield. Group cohesion was enhanced and social inclusion was actualized.

RECOMMENDATIONS

Continuous capacity building of local leadership through the cooperatives will lead to a sustained success of the cassava productivity increase among the farmers. Additional extension agents/facilitators should be engaged as the present ratio was grossly inadequate.