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Guidelines for Creating Agri VAS Content

Introduction

This document is a guide for Agricultural Value Added Service (Agri VAS) operators in creating valuable and impactful agricultural content suitable for delivery through mobile channels. Smallholder farmers are usually the main target for this type of information services. This document sets out to guide the reader to first understand the scale and scope of different agricultural content requirements and, then lays out a step by step process to deliver on the requirements. It is highly recommended that readers new to Agri VAS first review the Agri VAS Market Entry Toolkit also developed by the GSMA mAgri Programme.

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1) Background

Criteria of content: In order for agricultural content developed for Agri VAS to be valuable to farmers, the content must conform to the following basic criteria:

Table 1: Content Criteria

CRITERIA	EXPLANATION
Actionable	Farmers should be able to act on the information and advisory delivered within the capacity and restraints of their operating environment
Timely	Information and advisory service must be available when farmers need it; for push elements, this requires Agri VAS operators to anticipate farmers information and advisory needs and deliver this on time
Relevant	Information and advisory service must be applicable to the farmer's situation with regards to location, agro-climactic zone, crop cycle, farming activity and language amongst others
Accurate & High Quality	High level of quality and accuracy of Agri VAS information and advisory services must be ensured at all times to build trust of farmers in the service.

Content Types:

Push vs. pull content: In planning agricultural content delivery via mobile technologies, it is important to consider the mode of information and advisory delivery. Currently, information and services via mobile platforms are accessed either via Push or Pull channels.

- Push Content: short pieces of information (e.g. pest and disease outbreak or weather information) from operators sent out to subscribers mainly through SMS or voice messages.

- Pull Content: information accessed by subscribers as may be available on the operators' platform. Information can be accessed via SMS, IVR, call centre or other means.

Parameters for channels: In choosing channels for information delivery, the following points when carefully considered could improve efficiency and effectiveness of the chosen channel.

- Use a combination of pull and push channels. Experience has shown that it is more effective to employ a combination of push and pull channels to deliver agricultural information and advisory services to farmers.

- Critically consider limitations imposed by available mobile network and technology (phones) in the target area. In most developing countries, rural mobile network strength and capacity tends to be limited in rural areas compared to urban areas.

- Format content with network and technology limitations in mind. Mobile technology in use in most rural areas is usually basic and may not be able to support sophisticated platforms. For areas with significantly weak mobile network, USSD, Voice and SMS channels are more appropriate. Content delivered via apps, mobile web or more advanced channels require strong internet connectivity for access.

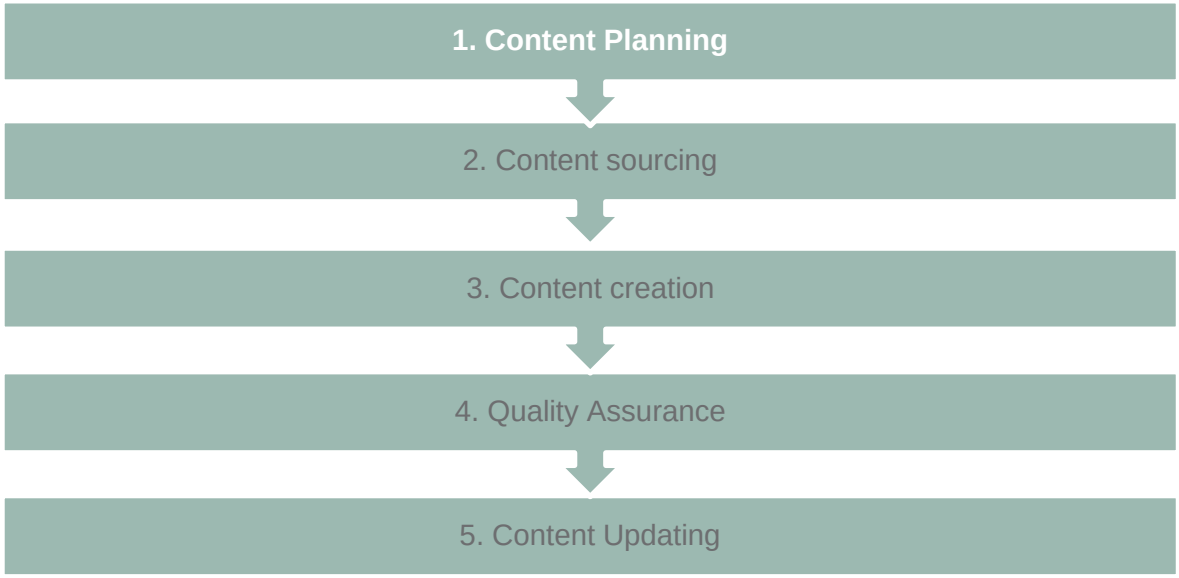
- Further details on service design for this market (handsets, ICT literacy, etc.) is discussed in the Agri VAS Market Entry Toolkit

Partnerships to develop content: Creating content to meet the necessary parameters indicated above has proven to be one of the most difficult aspects of the content development process. Partnerships and collaborations with agricultural based organizations (such as research institutions, service providers and meteorological service agencies), and experts with adequate local expertise are useful in delivering appropriate content. Relevant partnerships may also be useful for delivering non-agronomic content, like market prices and weather information.

TIP	Establish a clear and well-laid out process with partners from the beginning before proceeding with the actual content development. Establish detailed checklist to ensure no step is missed-out in the process

2) The Agricultural Content Development Process

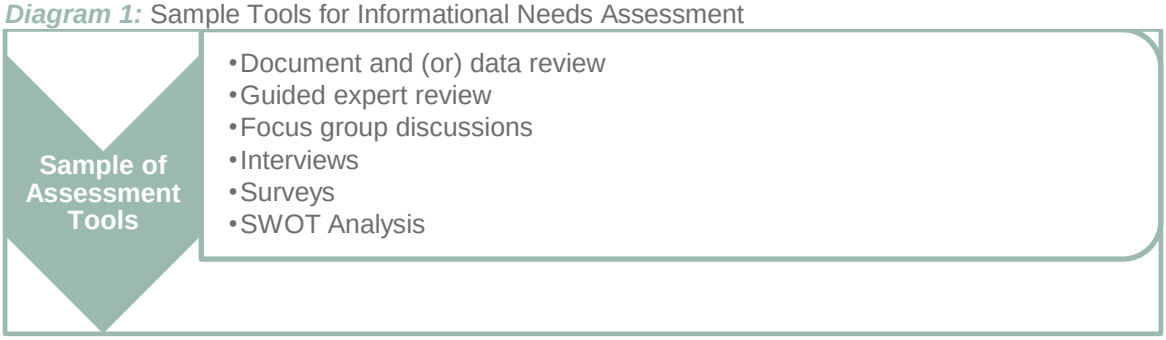
The following five (5) simple steps - Planning, Sourcing, Creation, Quality Assurance and Updating outline the Agri VAS Content Development Process. Details (objective, guidelines and notes) are provided for each step in this section.



2.1 Content Planning

Before creating content, it is imperative to understand the needs of target farmers. This will promote relevancy and efficiency of the information and advisory service delivered. It is therefore a pre-requisite to undertake a comprehensive farmer (or user) needs assessment as a first step (see Text Box 1 on undertaking needs assessment). Agricultural content should focus on the important information needs of farmers and; must be timely and be provided in ways that it can be easily understand and utilised.

Diagram 1: Sample Tools for Informational Needs Assessment



Once information needs of farmers are established, proceed to define the scope of content deliverables and allocate resources accordingly.

2.1.1 Assessing Farmers' Informational Needs

Objective: To determine what crops, livestock and information topics to provide content on.

Guidelines:

I. Identify and work with relevant locally based agricultural organisations such as the ministry of agriculture, NGOs and Farmer Based Organisations (FBOs) who may possess solid understanding of farmers' informational needs. This will greatly narrow down the scope of the needs assessment exercise and ensure existing and proven knowledge is utilised in selecting content topics.

II. Contact key government agricultural institutions and units to understand their views regarding farmer information needs. Also seek to understand on-going or planned state agricultural strategies, investment, goals and direction and; farmer support strategies in the short, medium and long term. This will ensure that information provision supports broad national goals for agricultural development.

Note:

Agri VAS will be more useful and economically sustainable if it complements state strategies and focus areas with greater economic potentials and general government support.

III. Talk to farmers and understand their needs – the focus of Agri VAS is the farmer. Select a sample of farmers based on area and diversity of crops or livestock production in the catchment area. Obtain good understanding of the economic importance of various agricultural activities and existing sources of agricultural information. This will aid decisions regarding crop choice, type of information and mode of delivery.

IV. Selecting Crops and Livestock: Based on the outcome of steps 1-3 above, select crop(s) or livestock for content creation. However, the overall objective, financial sustainability of the Agri VAS are also critical factors and should be considered. The table below is a guide to choosing crops or livestock for content creation based on overall service objective and financial sustainability.

Table 2: Criteria to Aid Crop or Livestock Selection for Agri VAS Content.

CRITERIA	SPECIFIC OBJECTIVE	MAIN AREA OF FOCUS	KEY FACTORS TO NOTE
Objective of the Service	Grow the cash crop sector	Export and High Value Crops e.g.hortcultural crops	Easy to target, high sustainability factor, farmers more likely to pay for information; will support agricultural commercialisation process, will leave-out many smallholders producing food crops.
	General support for the agricultural sector	Export and food crops (for household consumption and national market)	Complex information platform required, wide range of crops covered; expensive due to number of crops or livestock involved, may supports national food security strategy, agricultural income generation. Medium sustainability factor.

	Support natioal food production and food security	Food crops and subsistence agriculture	Wide range of crops covered across different regions (different regions may cultivate and consume different crops), focus is on food crops and livestock for household consumption, very low sustainability factor, require long-term external capital injection to keep system running and up to date.
Financial sustainability	Public service	Mainly state and donor driven	Low sustainability factor, service requires continuous injection of financial resources, often designed to support broad national goals
	For profit or mixed financial objectives	Private sector driven, or mixed NGO-private sector	Focus is on high value crops, high sustainability factor, information and advisory services are well-defined and targeted.

V. Identifying Content Topics for selected crop(s): It is critically important to select crops based on the outcomes of the needs assessment and primary objectives of the service as discussed presented in Table 2 above. Always focus on the greatest information needs of farmers and consider financial sustainability of the service.

Identified information needs may be categorised as follows – (i) pre- production information, (ii) production information (including diseases and pests management), (iii) post-harvest management information and (iv) market information. Activities within these different stages of production often define the cropping calendar. Frequently, information needs are greater for specific activities within one or more of these categories or stages of production. For relevancy of the service, focus on activities where information need is greatest. Where farmers are weak in post-harvest management of their harvest and thereby affecting produce quality and ultimately, market prices and profitability; it may be important to adequately focus on this area. In doing so, the service will be of higher relevance and value to targeted farmers. Effective focusing of the Agri VAS information and advisory service will contribute to sustainability of the service.

Example: Table 3 provides examples of activities within different production stages of a maize crop.

Table 3 Categorization of Farmer Informational Needs

CROP	INFORMATION CATEGORY	TOPICS (WITHIN THE CATEGORY)
Maize	Pre-production information	Cropping calendar, suitable varieties, accredited input dealers and input availability locality (seeds, tools, equipment, licensed chemical dealers etc.) in the area, marketability of the crop, potential yield information, and contacts for agricultural experts in the area.
	Production information (including pest and diseases management)	Land preparation techniques, planting methods, water management, weed management, soil nutrition management (including fertigation) techniques, harvesting techniques and other husbandry practices. Also, include comprehensive pest and disease management at different stages of the crop) – early symptoms to identify, management practices including integrated management strategies.
	Post-harvest Management	Information on post-harvest handling of the crop – packaging, transportation, storage and processing techniques. It is important to include information on key technologies available for the different aspects of post-harvest management of the crop.

	Market information	Provide information to support marketing of the crop. This should include historical demand and supply information, historical and current prices information for different locations across the country and for key local markets, potential buyers (if available), sale points/ depots, quality demands and packaging standards etc.
	General weather information	Short, seasonal and long term weather information, impact of weather forecast on specific agricultural activities.

2.1.2 Content planning and scoping

Objective: To understand the scale and scope of content required, define final content deliverables and resources required to achieve defined deliverables.

Note: The higher the quality of content provided, the more value it brings to subscribers and the more expensive and complicated it is (balance the trade-off).

Guidelines:

- Define content sub-topics to be covered the categorization as defined in Table 2.
- Organize the selected crops either by region or objective of production (e.g. food crops, cash crops etc.) agro climactic zone (in exceptional cases, consider soil type and rain fed/ irrigation).

Example: Table 4 shows how one can organize crops varieties (v) according to different agro-climactic zones. This table will be used for planning deliverables.

Table 4: Organising Crops according to Agro-climatic Zones

CROP/ ZONE	ARID	SEMI-ARID	TROPICAL
Maize	V14	v14, v3	v7
Rice	V9	v12	n/a
Beans	n/a	v11, v2	v1

2.1.3 Planning Content Deliverables

Follow these steps to establish your deliverables:

a) First, set a clear goal of the service and information to be provided – it must fulfil one of the following:

- Supplement national agricultural extension information systems and structures. This goal is relevant in places where there exist reasonable level of extension or agricultural information services but not extensive in topics, geographical coverage or extension officer to farmer ratios.
- Substitute existing extension and agricultural information systems and structures – this goal is normally for the private sector investing in mobile agriculture information delivery. It is

aimed at providing competition and making the service one of choice for producers.

b) Second, determine the means of content delivery. Commonly, mobile agricultural content is delivered via 3 main channels – SMS/USSD, IVR and Call Centres or a combination of any 2 or all 3 methods. Each channel may require specific formatting style and approach to work effectively.

c) Third, once deliverables for the project are defined, negotiate an agreement between Mobile Network Operator(s) (MNO) and the agriculture content partner. Consideration should be given to the needs of farmers (type of information and frequency of delivery), the capacity of the agricultural content developer (how much and how often can content be created and updated), and the technological constraints of the MNO (available technology and product design needs). The final deliverables need to be quantified in detail and documented in the written agreement between the two partners - see below for an example scope of work.

Table 5: Quantifying Content Deliverables.

CROP					Name of Responsible Organisation		
	Deliverable	**Quantity**	**Format**	**Due Date**	**Creation**	**QA**	**Updates**
Maize	Factsheet	12	Online	1/2/2013	Org 1	Org 3	Org 1
	SMS Tip	122	MS Word	1/2/2013	Org 2	Org 3	Org 2
	IVR Tip	122	MP3	1/2/2013	Org 2	Org 3	Org 2
	Other						

Channels for information delivery

i. Call Centre Channel

Agricultural Call Centres are information centres often equipped with complex telecommunication infrastructure, computers and human resources organised to manage queries raised by farmers often instantly in a local language. Mainly, persons with agricultural technical competency and experience interact with farmers to understand the problem and answer their queries. Call centres may use factsheets and or decision support tools to respond to farmers calling into the centre.

Factsheet Planning – Some organizations may prefer fewer factsheets of longer content or more factsheets with less content. We advocate creating 1 factsheet per crop. Content creators are free to choose the length and number of factsheets. However, factsheets should follow a clear structure and be consistent across board to ensure easy access to information by call centre agents. Factsheets should be structured as per the different production stages outlined in this document under the section "Identifying content topics for selected crops" (**see Appendix 1 for sample factsheet**).

Decision Support Tool – different decision support tools such as coloured pest and disease photo reference manuals and step by step diagnostic manuals should be created for quick referencing and decision making processes at call centres. Decision support tools allow call centre agents to diagnose, analyse and provide solutions to farmers' calling into the centre within a very limited period time.

ii. Automated Channels:

- SMS - Short Message Service (the same as text message). Benefits include being able to store the information and refer back to it.

- USSD - Unstructured Supplementary Service Data: allows users to request information by navigating through a menu. The user will usually receive an SMS with the requested information.

- Outbound voice message/ Outbound dialler (OBD) - users receive a call to their phones, usually with a recorded message (e.g. Tip of the day).

- IVR - Interactive Voice Response is an automated system that interacts with callers, gathers information and routes calls to the appropriate recipient/ information. (For example - "for information on maize, press 1"),

For automated channels, it is important to quantify deliverables (how many agronomic tips per crop and sub category within the chosen crop) and the frequency of delivery or broadcast, where relevant. Table 6 provides an example of how to quantify deliverables:

Table 6: Quantifying Content Deliverables

MAIZE				
Information Category	**Sub-topic within the category**	**Text Channel SMS/USSD (English & Local Language)**	**Voice Channel, OBD/IVR (English & Local Language)**	**Delivery date**
Rice Pre-production	Agro-input dealers in different locations			
	Market potential of the crop			
	Agro-climatic zones and requirements			
	Planting seasons			
Production	Land preparation techniques			
	Planting methods			
	Soil and water management			
	Weed management			
	Harvesting techniques			
	Diseases and pest management			
	Sustainable production techniques			
Post-Harvest	Processing the crop for storage			
	Different storage techniques			
	Packaging requirements			
	Chemical treatment for storage			
Market Information	Previous years price for different locations			
	Going price for current season at different locations			
	Traders and their locations			

Note

Determining how much content is needed and the degree of customization involves a balancing act between identified needs, content availability and the technical requirements/constraints of the MNO. Balancing quantity and quality of content (degree of customization) requires judgement and balance. As content quantity and quality increase (localization, language, crop variety, etc.) so do both costs to generate content and value for the farmer.

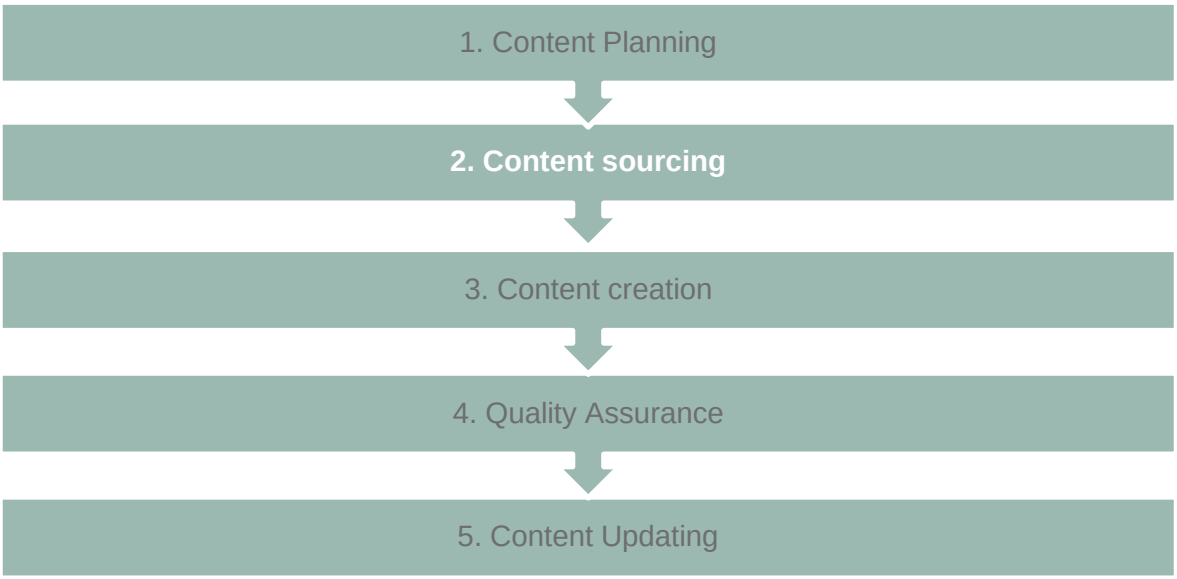
There should be enough content to at least, meet the most common information needs of farmers as determined through the needs assessment. However, where the objective is to also ensure financial sustainability of the service, there is the need to provide a wide variety of information to attract a wide range of farmers and also ensure the service provides enough content to convey value all year-around. This may place increased demands for content which need to be balanced with the capacity of the Agriculture Organization generating the content (365 unique tips per crop per agro climactic zone can quickly multiply to tens of thousands of tips which may not be practical).

Some estimation

Time and resources to create content:

- As a rule of thumb it can be envisaged that one-person month will be required to develop a full set of good quality content (factsheet, tips, etc.) for one crop. In particular, this will be the case at the beginning of the project.
- It may be possible to reduce this period to about half a month, once the content developer has gained considerable experience, or several crops belonging to the same group are covered.

3.1 Content Sourcing



Objective: To identify good and reliable sources of information for Agri VAS content, allocate resources and understand the considerations for different information types.

Content sources are a significant part of content creation. Content sources influence quality, cost, credibility and sustainability of the service. A good degree of caution should be exercised in selecting content sources. Content can be sourced from academic institutions, NGOs, government research organisations and secondary sources such as professional and academic journals. The following guidelines should be considered in selecting sources:

a) General Guidelines:

i) **Relevancy**: Ensure information for content creation is significantly relevant for targeted users. As much as possible, information must be directly related to crops, livestock or general farming activities and conditions of area. As such content sources should be appropriate for the crops and local farming conditions of the farmers. In addition, information from sources must be up-to-date with the latest scientific findings.

ii) **Reliability**: Information sources must be highly reliable and trustworthy either in the academic cycles or in the community of practice or both. Information and materials should be sourced from known and reputable sources such as national and international agricultural institutions (e.g. Ministry of Agriculture departments or agencies, Food and Agriculture Organization of the United Nations, CABI, CIRAD, and Agricultural Universities). Open access sources of such as Wikipedia should be verified and treated with caution. Facts and not opinions should be used in any situation.

iii) **Resource allocation**: Ensuring the highest quality of agricultural information is likely to incur costs. Reasonable budget should be allocated for the purchase of up-to-date handbooks, manuals, journal publications, or website subscriptions. In addition, resources should be made available to engage competent agronomists to organise content in the appropriate format for use in all cases.

iv) **Regulatory Compliance**: information sourced whether within or outside the country of implementation must comply with local laws and regulations such as allowed pesticides, fertilizer application rates, and minimum food production standards locally and internationally. If information is to support the export sector, carefully consider regulations of the different destinations (e.g. regulations of major buying countries such as US, EU, Japan, and Middle East, Russia).

v) **Regulatory Compliance**: information sourced whether within or outside the country of

vi) **Sustainability of content** – greater consideration should be given to continuity of quality and relevant content generation beyond the initial stages of the project. Generation of relevant and quality content continuously will require financial resources and agreement with content developers. A detailed content development plan and budget should be developed at the onset of the project. This will ensure relevant and quality content is available for producers at all times.

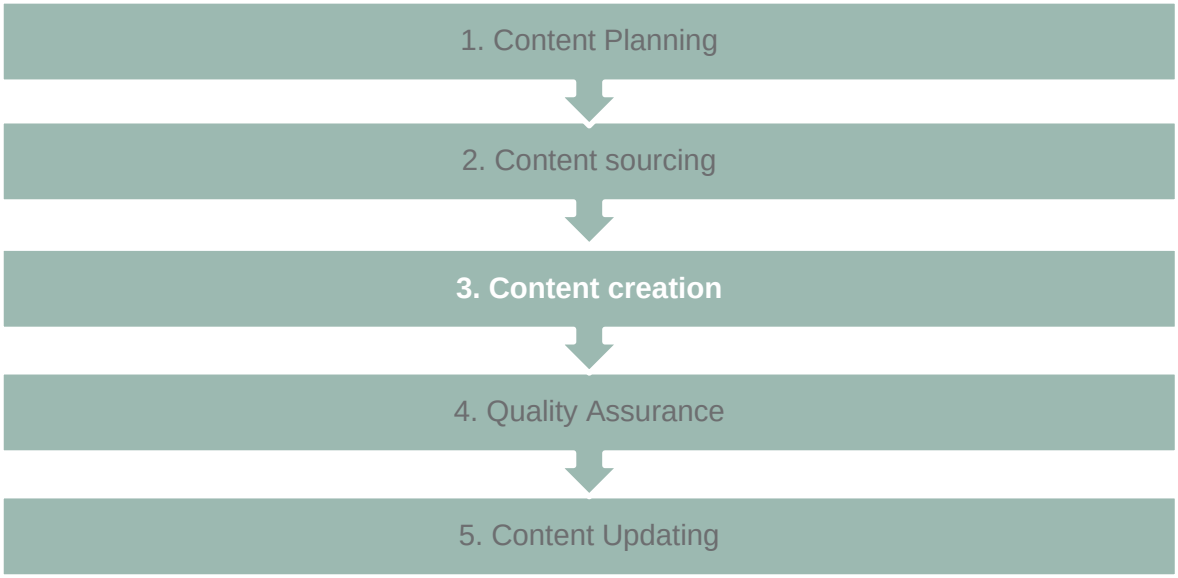
Table 7: Specific Content sourcing guidelines

Types of Content	Factors to Consider	Potential Challenges
Weather Information	• Types of information farmers require (short-term -3 day, 5 day or 10 day forecasts, long-term forecasts (monthly and seasonal predictions), temperatures, rainfall patterns, or exceptional events such as strong winds. • Implications of the data information for farmers with regards to crops produced.	• Reliability of the data, especially seasonal weather predictions, can be challenging. • National approval to argument national data with independent weather sources, which are often more reliable in developing countries
Input Information	• Range of inputs to be included. • Type of information to be provided on inputs – to be of relevance and at reasonable cost. • Frequency of information provision	• Reliability of sources of input information • Keeping up-to-date with changes in the input market • Cost of keeping up-to-date information. • Ensuring counterfeits are not included
Information regarding regulations	• Regulations of destination country • Track regulatory changes continuously	• Potential confusion regarding local and international regulations • Meeting requirements of numerous markets • Communicating requirements in commonly understandable language
Production Information	• Good quality sources1 • Cost of good quality information • Timeliness of the information	• Watch out for information overload
Pest & Disease Information	• Formatting and language should be easy to understand and follow • Should contain information on most	• Ensure chemical prescribed are allowed by national regulations • Ensure clarity in when using local

1 For example “Handbook of Agriculture”, published by the Indian Council of Agricultural Research (ICAR) or the “Farm Management Handbook of Kenya”, published by the Kenyan Ministry of Agriculture and supported by GTZ.

	common pests and diseases of the chosen crop • Names of diseases and pest should reflect local understanding	measurement standards
Post-harvest Information	• Provide tested techniques easily available in the area • Focus on quality control • Cost should be considered in recommending of specific methods • Consider national and international food standards	• Watch out for information overload
Gender-relevant information	• Consider key activities undertaken by women • Consider method and language for information dissemination	• Balance information to avoid perpetuating idiosyncrasies • Information relevant to gender should also be useful men farmers who may need it.

3.2 Content Creation



Objective: to create timely, actionable and relevant content for Ari VAS delivery channels

Guidelines:

1. **Content creation approach:** Once the planning process has been completed and reliable information sources have been identified, the content team can move to create content as planned and agreed between partners. A recommended approach to content creation is outlined as follows:

- Begin by aggregating information from various sources into factsheets. Our recommendation is to create a complete factsheet per crop per information category. For example, for maize there would be individual factsheets covering the 5 different information categories outlined in Table 2.

- Factsheets should then be used as the basis for creating tips for SMS/ USSD and the scripts for IVR and OBD. This will ensure consistency across board.

- Factsheets can be used by call centre workers and information may be uploaded to a central content management system (CMS).

2. Formatting content:

- Factsheets: when creating factsheets content should be organized according to the different production categories as indicated in earlier in this document. This will ensure all information is captured and easy access. Copyright rules should be followed and references to sources of information should always be included in factsheets.

- SMS and USSD content:
    - Content prepared for SMS and USSD needs to be actionable. For example when sending weather information via SMS, it should provide some advice alongside the

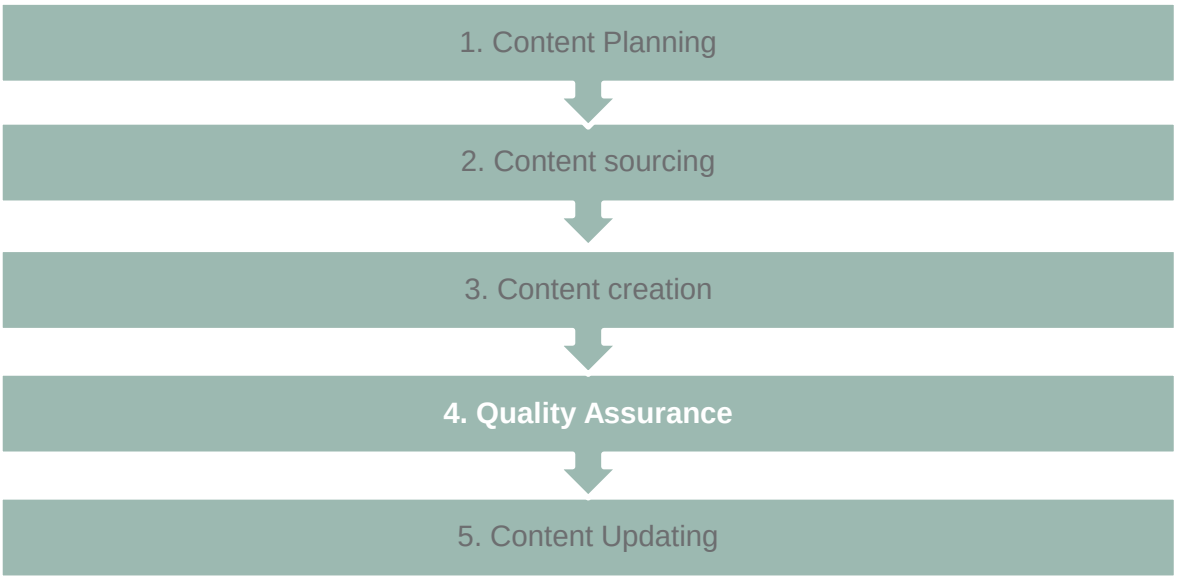
weather forecast for the different crops for which information is provided through the service.
    - As limited information can be provided by SMS and USSD, one suggestion is to include a link to more information at the end of the SMS. For example, a message on Maize could be appended with “For more information on maize call 3455”.

- Voice content: when recording the information for voice channels (IVR and OBD) it is important to use experienced voice artists and consider whether women farmers prefer to listen to information in a woman’s voice.

3. **Testing content**: before launching an Agri VAS the content should be tested with farmers based on the following criteria – findability, readability, comprehensibility and actionability.

Results of content testing should be factored into the document review to improve relevancy for farmers.

3.3 Quality Assurance (QA)



- A robust quality assurance process is an essential element of content development. Quality assurance is necessary throughout the content process: at the stage of choosing valid sources of agricultural information, when content has been aggregated and customised (localised, translated), and once it has been put into the required formats (SMS, voice messages, and factsheets).

- Initial quality assurance of content can be done in house if qualified staff is available. Information should be validated and signed off by someone who is an authority in the field, such as senior staff from an in-country national agricultural research institution, university or an expert committee established to validate and certify content for Agri VAS.

- Open access QA processes (for example online wikis) are questionable unless the people validating the content are known and are of reputable authority in the agricultural field. There may also be issues with consistency if using the open access model of QA. Crowd sourcing content is acceptable only if the information is quality assured later.

- To ensure thorough QA is conducted, contractual arrangements need to be considered and budget allocated to the validators.

- It is necessary to have at least three to four people involved in creating content. For example, when creating a factsheet on a particular crop, the roles could be split as follows:
    - Agricultural graduates aggregate content into a draft factsheet
    - Experience Agronomist or Scientist within or outside organisation reviews and edits content for technical accuracy2
    - A credible agricultural institution or a group of experts in the subject area validates and certifies the content as good to go.
    - SMS' and IVR content generated from factsheet will require further validation to ensure information is accurate and not distorted.
    - Content manager (or similar) publishes and uploads the final content to a CMS

2 Editing of the content should ensure technical accuracy as well as understanding by the end user.

- There should be a process in place whereby all people involved in creating content follow strict guidelines around labelling of different versions (e.g. V.01.1, V.01.2, V.01.3). For example, factsheets can have a box at the end of the document to track the reviewing process. Each time a review is completed, the person responsible adds their name and the date before passing it on to the next person in line.

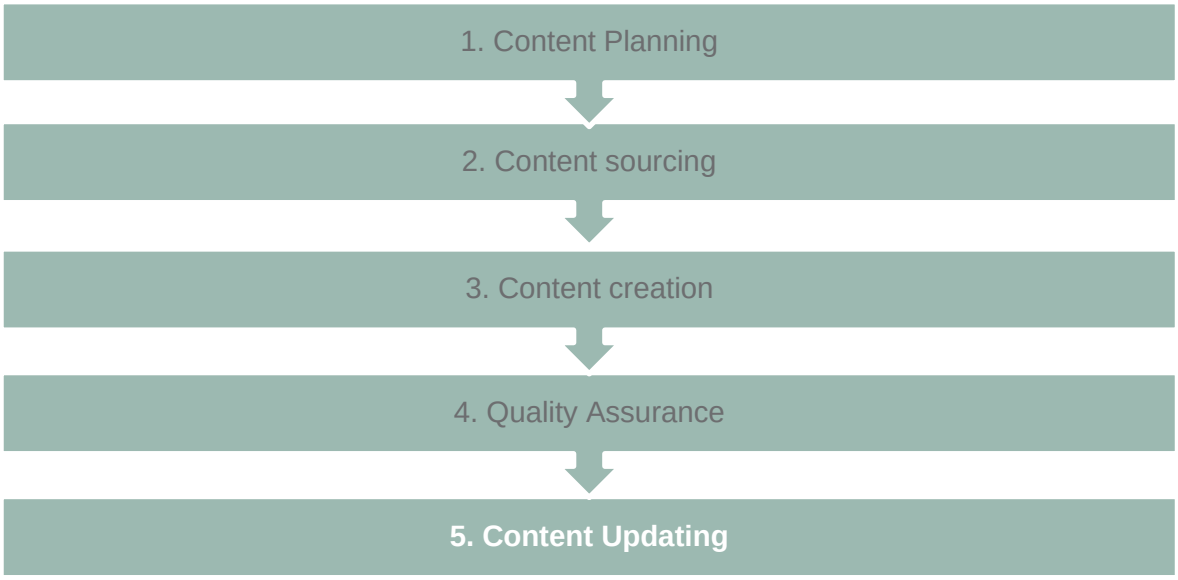
Table 8: Quality Assurance Factors to Consider

Accuracy	Relevancy	Clarity
• Is the information collected from a legitimate source? • Is the information from an unbiased source? • Is the information scientifically correct? • Is the information facts and not opinions? • Does the content reflects the latest scientific findings and is validated by the appropriate institution in the country?3 • If content has been pulled from multiple sources, ensure the pieces of content don't contradict each other. • Is the spelling and grammar accurate? • Does the information adhere to laws and regulations (e.g. Pesticide use, environmental and social laws and standards)? For export crops information must adhere to regulations in destination markets. • In cases where information is translated, is the information still accurate and reflects the original understanding? • Is the translator family with local variations of the language? (E.g. Subtle differences between Kiswahili spoken in Kenya & Tanzania).	• Is the greater part of the information provided reflecting crops or activities of farmers in the target area? • Is the information based on needs of farmers as identified in the needs assessment process? • Is the content relevant to both men and women's information needs based on their typical farming activities? • Is the information timely? (Especially dynamic information e.g. markets, weather). • Is the information actionable? • Is the information relevant for small scale farmers? • Is the information localised enough? (E.g. by agro-ecological zone, sub-region, rain-fed or irrigated areas?4) • Does the content follow the crop calendar?	• Is the information comprehensible to farmers? • Is the content understandable for the end user? e.g. surface measures, monetary measures, weight measures • Contradicting pieces of information are to be avoided (would create confusion for end users) • Avoid jargon and only use acronyms and technical terms if absolutely necessary • For voice recordings, is the voice clear?

3 Is it from the most recent publication?

4 Avoid breaking down into too many sub-categories

3.4 Updating Content



Objective: to ensure content remains up-to-date and reflects feedback from farmers
Guidelines:

1. **Roles**: The role of updating content should be clearly defined at the start.

2. **Update interval** – the interval for updating content schedule should be established to ensure that content is updated regularly and on time.

3. **Phased approach**: Agri VAS would usually launch with information on a limited number of crops. In order to provide a constantly evolving service, a phased approach is recommended whereby other crops and livestock are added after launch.

4. **Farmer feedback loops**: The addition of new crops, livestock and other information types should be based on feedback gathered from farmers and by following the steps under 'farmer needs assessment' section in this document.

5. **Static vs. Dynamic content**: Different content types require updates at different intervals. In the case of dynamic information, market and weather information, updates are required on a daily or weekly basis. Static information for example, planting methods and water management could be updated every six months or yearly, whereas information on banned agro-chemicals should be updated monthly or quarterly.

3) Appendices

APPENDIX 1 - SAMPLE FACTSHEET: RICE PRODUCTION

INTRODUCTION

- Rice is both a cash and food crop that is very important in human health and food security.
- It is the second highest cereal crop produced for food after maize in Tanzania, with the largest production occurring in the regions of Shinyanga, Mwanza and Morogoro.
- Rice production is concentrated in areas with enough water/rainfall and labour to perform important management practices transplanting and weeding.
- Rice is an erect annual plant and differs in height depending on variety and location.

There are two main ecologies for production in Tanzania:

Upland rice or dry land rice 	Cultivated on steep hillsides like other cereals - maize, wheat and barley.
Lowland rice 	Grown on lowland areas and sometimes flooded with water. More than 90 per cent of the world's production takes place in lowland areas. Lowland rice is not a water plant, but tolerates wet or aquatic environment.

A) PRODUCTION INFORMATION

Crop Calendar

Agro Ecological Zone (AEZ)	Land Prep Start	Land Prep Finish	Planting Start	Planting Finish	Field Management Start	Field Management Finish	Harvesting Start	Harvesting Finish
Central Plateau (Plains)	October	November	November	December	December	January	February	March
Coastal Plains	January	January	January	February	February	May	May	June
High Plains and Plateau	October	October	November	November	December	January	February	April
Ufipa Plateau	October	November	November	December	December	January	February	March
Volcanoes and Rift	October	November	November	December	December	January	February	March

depressions								
Western Highlands	October	November	November	December	December	January	February	March

Site selection

- For lowland rice select a field that is flat to prevent water loss.
- A gentle slope between 0 % and 1% is important to ensure proper drainage.
- A field with a steep slope will allow water to quickly runoff the land.
- The low land rice requires more water with high amount of rainfall (1250mm or more) while the upland rice requires less amount of water, (approximately 700mm or more per annum can be enough to produce the expected yield) .

Land preparation

A number of important steps are required to prepare a field for rice cultivation. Following these steps will help promote healthy rice with high yields.

Land preparation step	Description	Timing
1. Land Clearing	Removing debris from the land	Approximately 1 month prior to the start of the rains
2. Tillage	Preparing the soil for planting	Soon after land clearing but if the soil is hard you should wait until rain start
3. Harrowing	Flooding the land and mixing the soil to create a muddy base	15 days before planting
4. Leveling	Flattening the land to create a suitable area for water distribution	Soon after harrowing

Seed preparation

For both direct seeding and nurseries, follow all seed preparation steps: seed selection, seed treatment, seed cleaning, and seed soaking.

For the highest yield potential, use good quality seeds. Good quality seed can increase yields by 5-20%.

Variety	Year of release	Owner(s)	Maintainer and seed source	Optimal altitude range (ASL)	Duration to maturity (days)	Yield (Tons/ha)	Special attributes
1. Supa	Before 1950s	ARI KATRIN	ARI KATRIN	0-400	125-130	1.5-3.5	Moderately resistant to rice yellow mottle virus (RYMV) and sheath rot
2. IR 54*	1980's	ARI KATRIN	ARI KATRIN	400-600	121-134	4.0-7.0	Moderately resistant to blight and sheath rot
13.NERICA 4	2009	ARI KATRIN	ARI KATRIN	Upland rice	95-100	3.0-5.0	Upland rice
15. WAB 450-12-2BLB-DV4	2009	ARI KATRIN	ARI KATRIN	Upland rice	95-100	3.0-5.0	Upland rice

B) PLANTING/SOWING

- Sow rice direct to the field or transplanted from the nursery.
- For direct sowing, broadcasting is the common method.
- Nurseries allow seeds to germinate in a controlled environment before the seedlings are transplanted to the main field.
- It is strongly encouraged to use nurseries for the proper management of seedling during the early stages.
- Nurseries allow for close supervision during the critical phase of plant development and can save farmers time and money.

Nursery preparation

- The rice nursery bed need be located in a well-drained field with fertile, loamy soil near the irrigation source.
- A 500m2 nursery produces seedlings sufficient for 1ha field. Beds 1-1.5 m wide and long should be made depending upon the slope and structure of soil. Raised beds are ideal if the soil is clayey.

Steps for nursery preparation

- Determine the area required for the nursery: One-twentieth part (i.e. 500 sq. meters per hectare) of the field will be enough and till the land two weeks before flooding and planting.
- Divide the plot into beds of 1-1.25 meter width and of any convenient length with bunds of 10-15 cm height.
- Provide irrigation and drainage channels between the beds. Keep 40-50 cm path between two beds,

Planting and Spacing

Transplant the seedlings when they are 3-4 weeks old or when they are 18-20cm tall, depending on sunlight, temperature and variety. Before transplanting, follow the steps below:

- Irrigate the nursery before transplanting to simplify seedling uprooting.
- Pull below the stem to avoid damaging the seedling
- Pack the seedlings in small bunches to simplify transportation and transplanting
- Only the healthier seedling should be selected

Characteristics of a good seedling are:

- Uniform height
- Short and upright leaves with no pest or diseases infections

Spacing

Field spacing depends on the variety but the general one is 20 cm row to row and 10 cm plant to plant or 20 by 20 cm.

Chemical fertilizer

Apply nitrogenous fertilizer like Urea, CAN or NPK to the irrigated land after transplanting. Apply fertilizer after every weeding.

Organic fertilizer

Add organic fertilizer before tillage (7 – 10 tone / acre) to improve the soil fertility.

Direct planting

- Farmers are strongly encouraged to use the nursery method instead of direct planting.
- Direct planting is the traditional way of broadcasting seeds in the field.
- In direct seeding field, activities are reduced. Yield may however decrease due to weeds and pests.
- Direct seeding also costs more due to the need of additional fertilizer, pesticide and seeds.

C) FIELD MANAGEMENT

Irrigation

Rice, especially lowland varieties, requires a significant quantity of water. A water depth of 3-5cm must be maintained. Main type of irrigation used in Tanzania is flooding irrigation.
Proper water management facilitates good tillering of the crop, increases efficiency of nitrogen use by plants and helps to reduce weed population.

Maintain 2-5 cm water throughout the growing season. Drain out water before topdressing with nitrogen fertilizer and let in water 24 hours later.

Weed Management

Weeding is by hand, chemicals or special tools designed for weeding in paddy fields. Weed as early as possible to avoid competition for nutrients.

COMMON RICE HERBICIDES	GROWTH STAGE OF RICE	GROWTH STAGE OF WEEDS	RATES		WEEDS CONTROLLED	SOME RESISTANT WEEDS
			Active ingredient kg/ha	Commercial product (litre/ha)		
PAR AQUAT	After land preparation and just before rice seeding	Seedling stage to full development	0.6	3	Most broadleaves	Imperata, Cynodon, Cyperus
GLYPHOSATE	After land preparation and 2–3 weeks before rice seeding	Seedling stage to full development	2	6	Most weeds comprising sedges and grasses with rhizomes	None

Fertilization

Fertizilier Phase	Timing	Instructions
1. Three week stage	Three weeks after transplanting from the nursery.	Apply one-third (60-80 kg nitrogen/ha), Phosphorus (60 kg P2O5/ha) and potash (40 kg K2O/ha).

D) HARVESTING

It is best to harvest rice soon after maturity to avoid loses. Late harvesting causes rice to over dry. As a result, rice falls off the plant in the field thereby reducing yield. Also, over drying causes broken rice during milling further reducing yield. Early harvesting also prevents losses through falling, damage by birds, rodents, termites, thieves and fire. Birds can cause losses of 10-20%. Early harvested rice results in good rice during processing and low losses.

Maturity indices

- Bending of the panicle
- 70%-80% of the rice change colour from green to yellow or brown depending on the type of rice.
- The last leave colour change from green to grey.

Preparation before harvesting

Perform field scouting to check whether the crop is mature. Normally rice matures and ready to harvest in 2.5 to 5 months depending on the variety. Grain moisture content should be 22-28%. Stop to irrigate 7 to 10 days before harvesting.

The following equipment/tools/means can be used for harvesting and transportation:

Harvesting equipment/tools	Mats, slatted floor, threshing machine, Sickles, Knives, harvester machines.
Packaging materials	Sisal or jute bags, plastic containers
Transportation	Tractor trailer, wheelbarrow and Lorries

Harvesting methods

Hand and machines harvesting. Hand harvesting is by far the most widely used method in Tanzania.

Hand Harvesting

Cut the stem at the base using a knife or sickle (ratoon). By using this method, one person can harvest one acre in a maximum of 7 days.

Machine harvesting

Different types of machines are available for harvesting rice. Many machines can harvest 1ha in 2-15hrs. There are some machines, which can only cut rice, and others can cut, thresh and winnow. Harvesting by machine is used mainly in large-scale production.

Transportation

Transport the crop from the field immediately after harvesting to avoid loss due to birds, termites or rotting due to high moisture content. Rice can be transported from the field to the market or warehouses by head, wheelbarrow, bicycle, drought animals, tractors and cars.

E) POST HARVEST MANAGEMENT

Drying

There are two steps in drying rice.

1. **Panicle spreading** - Panicles are spread on a sheet on a ground or in a clean field for one or two days depending on the sunshine availability and the thickness of the pile. It is advised to spread the panicles in thin layers because thicker panicle piles will take more time to dry. The goal of this step is to dry the rice to simplify threshing process. This is done soon after harvesting

2. **Dying after threshing** - After threshing, the rice seeds obtained are then spread on a clean sheet on the ground or on a clean dry floor with the aim of reducing moisture content up to 14%.

Measurement of moisture content

1. **Biting of the rice grain** - this method is widely used in Tanzania.
   Well-dried rice is very hard to break when bite.

2. **Using moisture meter** - This instrument will show 14% for well-dried rice.

Threshing

By hand: Rice panicles are spread on a sheet or clean floor and bitten using sticks until rice grain are detached from the panicles.

By machine: There are different types of specialized machines for threshing rice. These machines are driven by hand, engine or electric motor. Machine driven by hand can thresh 30-50kg/hr. machine driven by engine or electric motor can thresh 500-2000kg/hr.

Winnowing

Perform winnowing to remove all unwanted materials such as panicles, empty shell, stones and stacks. There are two types of winnowing:

1. By hand – Winnowing by hand is done by using a flat woven basket known as ungo in Swahili and the wind. This method can clean approximately 2-3Kg, very small amount of rice at one time. It is time consuming and laborious. Care must be taken to avoid losing seed during the hand winnowing process.

   Wind also can simplify winnowing process by cleaning large amount of rice at once. This can be done by lifting up the rice in a woven basket and throwing down slowly against the wind direction blowing at high speed, which will take away all debris and empty shells to get clear rice.

2. By machine - Machines used for rice threshing are driven by hand, engine or electric motor.

- Some of machine perform thresh and winnowing at the same time
- They are not laborious and reduces loss
- Hand driven machine can clean 30-50kg/hr and those driven by engine or electric motor 500-2000kg/hr

Packing

Pack well dried rice in clean containers. Store in cool, dry place in order to avoid rotting. Stack sacks/bags on pallets when available.

Milled rice is susceptible to pest attack. To keep milled rice safe from pests, store it in an airtight container.

F) Bibliography

1. FAO. Crop calendar - An information tool for seed security. [Online]
http://www.fao.org/agriculture/seed/cropcalendar/welcome.do.

2. Tanzania Official Seed Multiplication Institute (TOSCI). (2012).Certified Rice Seeds for Tanzania.

APPENDIX 2 – SAMPLE SMS TIPS: RICE

Crop Production Stage	Content Category	Tip name	Tip English
1. Land Preparation	Seed varieties	Seed selection	Rice seed should be resistant to insect pest, diseases, and winds. It is advised to use certified seed. Basal fertilizer should be used for producing good seedling. Farmers are advised to buy certified seeds from agrovet shops. Example supa, kahogo red, rufiji and saro 5.
1. Land Preparation	Land preparation	Land preparation	Tillage and flooding should be done at least 15 days before planting to kill all pests that can destroy seedlings. Tillage reduces weeds, increase soil aeration, water percolation, root penetration and incorporates crop residues into the soil. When tilling, care should be taken to avoid destruction of the soil structure. Tillage should be 10 to 15 cm deep. A tractor/power tiller can be used to simplify the work.
1. Land Preparation	Crop calendar	Central Plateau (Plains)	Land preparation: October-November, Planting: November-December, field management: December-January, harvesting: February-March and post harvesting: Mach-September
1. Land Preparation	Crop calendar	Inland Sediments	Land preparation: December-May, Planting: January-June, field management: February-September, harvesting: April-October and post harvesting: October-November
1. Land Preparation	Crop calendar	Alluvial Flats	Land preparation: January-October, Planting: July-November, field management: August-March, harvesting: October-April and post harvesting: April-December
2. Planting	Nursery establishment, management & transplanting	Nursery Establishment	Two weeks before flooding and planting make a raised bed. Then one week before planting make a well mixed mud for planting. A raised bed should have a width of 1.5m and a length of your choice according to the seeds available. Width of this size eases the nursery management activities. One day before transplanting remove water from the nursery to strengthen the upper part of the soil and avoid seeds going very deep.
2. Planting	Nursery establishment, management & transplanting	Nursery Management	One day before planting remove water from the nursery in order to strengthen the upper part of the soil and avoid seeds going very deep. Few days after planting, irrigate the nursery to assure enough moisture content which should not exceed at least 1cm to 3cm. One day before transplanting, add some water in a nursery from 3cm depth to 10cm to simplify uprooting and planting
2. Planting	Seed varieties	Seed preparation	Soaking rice seeds is optional according to farmers' requirements. Soaking seeds in clean water encourages the seeds to absorb water required for germination. Soak the rice seeds for 4 days consecutively in order to speed up the germination process. Water should be changed after every 12 hours to remove toxic materials and allow air circulation in the seeds. This will prevent seed rotting.

2. Planting	Direct seeding	Direct seeding	Rice seeds can be broadcasted direct to the field but farmers are not advised to use this method because it is difficult to get the required plant spacing. This method reduces the planting workload but decreases production because it is difficult to control weeds under congested plants.
2. Planting	Fertilizer	Organic fertilizer	Organic fertilizer like manure and compost gives enough nutrients to plants but also make good soil structure for easy water percolation and air circulation. Approximately 5 tons of compost or manure is enough for 1 acre. 3 months before tillage spread the organic fertilizer in the entire field but it is recommended to add more of it as required during the growth.
2. Planting	Fertilizer (top-dressing)	Industrial Fertilizer (Chemical fertilizer)	It is advised to apply industrial fertilizer in the entire field but also in a nursery when required. In the field it can be applied 3 times in different growing stages: 1. three weeks from transplanting, 2. during tillering stage and 3. milking stage. Reduce water in the field before applying industrial fertilizer to avoid high loss of nutrients. The recommended chemical fertilizers are UREA, CAN, and SA
2. Planting	Spacing	Transplanting/Spacing	Plant spacing for rice is use 20cm between rows and 20cm between plants. The planting depth should be 3cm for easily root penetration. Prepare sunken beds to allow water lodging. The amount of water should be 2 to 5cm deep all over the growing period. High amount of water results in tall and weak plants
2. Planting	Site selection (soil requirements)	Site selection	For rice, the field should be flatland to avoid loss of water. Gently slope is important for drainage; slope should not be more than 10 . Lowland rice requires water logged and heavy rainfall. Upland rice is specialized for areas with rainfall of 700 mm or more.
3. Field Management	Irrigation	Irrigation	Lowland rice requires a large amount of water so it is important to supplement water by different types of irrigation. Most farmers use flood irrigation and the water depth should be 3-5cm for the entire growing season. There are also other types of irrigation which can be used in rice such as sprinkler irrigation.
3. Field Management	Weeds	Weed management	Proper land preparation is the most important step for weed management. Weeding should be done within the first 30 days from the day of planting. This can be done by uprooting all weeds by hand or spray herbicides.
4. Harvesting	Maturity indices	Rice maturity indices	A mature rice plant will start to bend and the seeds will start changing colour from green to yellow. The older leaves changes from green to gold.
4. Harvesting	Harvesting Methods (tools)	Harvesting methods	Harvesting is done by hand or machine. By hand, rice stem is cut using a knife. By using this method one person can harvest one acre in a maximum of 7 days. By machine, the capacity depends on the size of the machine, example combine harvester can harvest 1-2 ha per hour, it can harvest and thresh 30 to 40 bags in the same time.
4. Harvesting	Drying	Drying	After harvesting, expose rice to the sun by spreading it on different drying materials or direct to the floor to dry and reduce its moisture content approximately from 28% to 14%
4. Harvesting	Harvesting Preparation	Preparation before harvesting	About 7 to 10 days before harvesting, remove water from the rice field. In normal circumstances rice matures within two to five months from planting. As soon as the rice dries it should be harvested although the leaves may still be green. Delayed harvesting results in quantity, quality and weight reduction.
4. Harvesting	Winnowing	Winnowing/Cleaning	After threshing, winnowing must be done to remove all unwanted materials such as panicles, empty shell, stones and stacks. Winnowing improves quality and is therefore very important before packaging

			and transportation.
5. Post-Harvest Handling	Threshing	Threshing	Rice panicles are spread on a sheet on the ground or clean floor. Then use a stick to beat until all rice grains are detached from the stem. It is advised to make sure that the place is very clean and free from sand, stones or other debris that might result in getting low quality rice. Well dried rice simplifies threshing because it is easily removed from the stem.
5. Post-Harvest Handling	Packing	Packing	Pack rice in sacks without mixing with storage insecticides because it is not common for insects to attack rice in the store.
5. Post-Harvest Handling	Transportation	Transportation	Rice should be transported soon after packing from the field to the storage area or market to avoid damage which may be caused by birds, termites or rot due to high moisture content. It can be transported by head, tractor trailers, draught animals or bicycle.
5. Post-Harvest Handling	Storage	Storage	It is very important to make sure that rice is stored in a dry place with no moisture content. If the store has moisture then this condition is favourable for seed germination as a result a farmer can lose all the stored rice. The sucks should be arranged on wooden materials, not directly on the floor.
6. Pest & Disease	Disease	Brown spot (Helminthosporium horizae)	Symptoms of brown spot diseases are oval spots the size of sesame seed on the leaves, the centre of the spot is grey to whitish grey. The margins are dark brown surrounded by light yellow halos. The pathogen can attack all plants except the roots, forming blackish brown lesions. The disease can be controlled by eliminating straws after harvesting, treat seeds with fungicides but also by using resistant varieties.
Pest & Disease	Disease	Bacterial blight	Bacterial blight enters the plant through wounds. Irrigation water can carry the disease from one field to another. Symptoms are early lesion show water soaked stripes on the leaf margins. The lesions enlarge and turn yellow within a few days. It may advance and cover the whole leaf which will eventually turn white. Management are to construct efficient drainage system, use resistance varieties and to remove the straw after harvest.
6. Pest & Disease	Destructive Pests	African armyworm	The armyworm caterpillar is light green with whitish yellow stripes. Forecasting is a fundamental in the management of the pest. If primary outbreaks can be successfully forecasted, farmers can be warned through the extension service and radio to check their field in time so that they can do timely control. small infestation can be controlled by using systemic herbicide such as Endosulfan and Dursban
6. Pest & Disease	Destructive Pests	Quelea quelea birds	The seasonal movement and breeding of quelea quelea are closely tied to movement of rain fronts and subsequent production of grass seed. They damage rice at milk and dough stages. The integrated pest management strategies are breeding colony surveys, roost surveys, bird scaring, use of tolerant varieties, chemical and mechanical control.

APPENDIX 3 - SAMPLE IVR TIPS: MAIZE

Crop Name	Crop Cycle	Content Category	IVR Content
Maize	1. Pre-production information	Varieties	The choice of maize variety is determined by farmers' objectives, the length of the growing season, elevation, agro-climatic zone. Recommended varieties for the **Southern Zone** are ICW , Staha, Tuxpeño, Kito, and Katumani**. Southern Highland Zone** H6141, H6302 , H632 , UCA , Kilima , Kito2, TMV13 and TMV2 , **Northern Zone:** Ilonga Composite (ICW), Staha, Tuxpeño, Kito, Katumani, Kilima/Kilima ST , H632, H6302 and H614, **Central Zone:** TMV-1, Staha, Tuxpeno, Kito, Kilima, CG4141, H614 and H6302, **lake Zone:** Staha, Tuxpeño, Kito, and Katumani, Kilima, Kito, Ukiriguru Composite A and hybrids. **Eastern Zone:** consisted of early maturing materials (Kito, Kito-St, Katumani, Katumani-St); medium maturing materials (TMV1); and full-season materials (Staha, ICW, CH1, CH3). The recommended full-season maize materials for the intermediate zone were Kilima, Kilima-St, TMV1
	1. Pre-production information	Pre-production information	Prepare the field early by hoe or tractor ploughing at least at 15cm to 20cm depth. You can make ridges at 60cm apart for maize planting. Seeds are planted on ridges to avoid water logging in heavy rainy periods. Sufficient drains are provided to drain off excess water during rainy periods. Apply non selective systemic herbicide such as round-up to kill perennial weeds early enough prior to planting. Harrow the field to break soil clods for easy planting and emergency of the seeds.
	2. Production -Soil, water and Nutrition	Soil and water	The soil should be fertile, loose textured, with good water holding capacity. Avoid water logging and sandy soils for maize cultivation. Irrigate when planting during the dry season after assessing soil moisture content. Amount of water required during irrigation in maize depends on the type of irrigation and type of soil. Clayey soils do not need much water compared to sandy soils.
	2. Production -Soil, water and Nutrition	Soil and water	Maize has high demand for nutrients, particularly nitrogen (N), phosphorus (P), and potassium (K). These nutrients may be obtained through applications of farm yard manure (FYM) and/or inorganic fertilizer. Fertilizers recommended for Southern Tanzania include urea, calcium ammonium nitrate (CAN), or sulphate of ammonia (SA). In the high altitude and intermediate high rainfall zones where moisture is reliable, use of inorganic fertilizer results in higher yields. In the intermediate low rainfall and coastal zones, response to fertilizer depends on sufficient moisture. The recommended fertilizer rate for Southern Tanzania is about 20 kg N/ha and 20 kg P2O5/ha. Place fertilizer 5 cm below the depth of the seed and about 5 cm to the side at the time of planting. This is accomplished by digging a single hole beside each seed, placing fertilizer in the hole, and covering it with soil. Alternatively, a continuous furrow is made along the length of the planting row. Fertilizer is placed in the furrow and covered with soil. The seed is then placed and properly covered with soil.
	3. Pest and Disease	Common rust	The disease is recognised by the abundant oval-elongated, red-brown pustules of up to 2 mm long, which erupt through both leaf surfaces in scattered groups. The pustules contain numerous powdery spores that can be spread long distances by wind. The only practical control measure is resistant hybrids.
	3. Pest and	Leaf blight	Long spots bending at the end appears on the lower older leaves. The spots increases in size as the

	Disease		plant grows. As time goes on the spots infest the whole leaf and may cause leaves to turn brown. It occurs mostly in higher lands with cool temperature. Control by planting resistant or tolerant varieties, Eliminating volunteer maize plants and Early planting. **Note:** Control with fungicides is not economical.
	3. Pest and Disease	Maize streak disease	This is a viral disease transmitted by small green grasshoppers. Yellow and white strips appear on leaves and plant is stunted. Early planting reduces this problem. The best control is to use resistant varieties such as STAHA, TMV-1 - SR, Kilima ST-SR, UCA-ST, Kito-ST, Kilima- ST, Stuka-M1, Stuka 1. Lishe H2, & Lishe 1 and early planting
	3. Pest and Disease	Maize stalk borer	Damag is not easily noticed at early stages. Holes and droping can be seen on leaves, stalk and cobs. These are controlled by applying a pinch of dust or granules of an insecticide such as Endosulphan 4% dust, at 5 kg/ha; Cymbush dust 1% at 2.5 kg/ha, or Sumicombi 1.8% at 5 kg/ha. Once the damage is assessed to be economic, apply insecticide to all plants in the field when plants already 7 leaves.
	3. Pest and Disease	Army worms	**Spodoptera exempta** are soft body insect, length up to 5 cm, green colour which is approaching to black. Occur seasonally in groups and causing high damage to crops. These pests are controlled at the national level through aerial spraying of insecticide. Hand sprayers and ultra-low volume applicators (ULVA) may also be used for local control. Chemicals such as Fenvalerate 7EC at 2 L/ha, Malathion 50EC at 1.25 L/ha, and Cypermethrin 25EC at 0.5 L/ha may be used.
	4.Post Harvest Management (pest)	Angoumois (Sistrotoga cereallela)	Symptoms: Flour dust from internal feeding can spill from the grain once the grain moth has emerged. Management: Methods of reducing humidity in grain stores such as plastering the walls with mud can reduce or help minimize infestation levels. Periodic inspection and removal of infestations can be effective especially if the grain is closely packed so that infestations are limited to the outermost layers.
	4.Post Harvest Management (pest)	Large grain borers	**Large grain borers:** Symptoms : Maize seeds will appear with holes and large quantities of dust. Management: Store hygiene, timely harvesting, Store only clean produce, Store the grain in a suitable container, Use brick stones to construct the granaries as wood and grass would encourage breeding and multiplication of the larger grain borer

APPENDIX 4 - Agri VAS CONTENT TESTING CRITERIA

Basic Criteria		Specific questions for each criteria	Ranking (1=low; 5=highest)				
			1	2	3	4	5
Findable (Can the farmer find the content?		Are farmers able to find content without any support?					
		Ability to navigate all sections of content on the platform?					
		How easy it is to access links to other sections of the content?					
		How long does it take for the farmer to find information on the platform?					
		How easy it is to find relevant information?					
Readable (Can the Farmer read the content?)		To what extent is the farmer literate?					
		To what extent does the farmer understand the language (s) in which content is delivered?					
		To what extent is the farmer able to read information provided?					
		How easy it is for the farmer to read content provided?					
Understandable (Does the farmer understand the message as intended?)		Does the farmer understand the information?					
		How well is the farmer able to give a direct summary of the action required?					
		Does the farmer understand the context of the information provided?					
		Is the farmer familiar with; and also understands terminologies used?					
		How well does the understanding of the farmer match that of the content developer?					
Actionable (Is the farmer able to take action, and in line with original intention?)		To what degree is the farmer able to act on the information?					
		To what extent are actions of the farmer in line with the intended action?					
		On average, how many sampled actions are accurate?					