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Baseline study/survey on the seed sector of Zambia[1]

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1. **A report on the current status on the seed industry in Zambia. The report provides some highlights on key stakeholders in relation to variety release, seed certification, phytosanitary, plant variety protection, seed imports and exports. It also discusses Zambia's membership to internation organization in relation to seed provision.**

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ACRONOMY

AFSTA	African Seed Trade Association
CBD	Convention on Biological Diversity
CDT	Cotton Development Trust
COMESA	Common Market for Eastern and Southern Africa
DUS	Distinctness, Uniformity and Stability
GART	Golden Valley Agricultural Research Trust
GRZ	Government of the Republic of Zambia
ISTA	International Seed Testing Association
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
MACO	Ministry of Agriculture and Cooperatives
NGO	Non-governmental Organization
NSA	National Seeds Authority
OECD	Organization for Economic Cooperation and development
OPV	Open Pollinated Variety
PBR	Plant Breeder's Rights
PMU	Project Management Unit
PVP	Plant Variety Protection
PQPS	Plant Quarantine and Phytosanitary Services
QDS	Quality Declared Seed
SADC	Southern African Development Community
SCCI	Seed Control and Certification Institute
SFP	Seed Focal Point
SSC	SADC Seed Committee
UNZA	University of Zambia
UPOV	International Union for protection of New Varieties of Plants
VCU	Value for Cultivation and Use
VTRP	Variety Testing, Registration and Protection
Zamseed	Zambia Seed Company
ZARI	Zambia Agriculture Research Institute

EXECUTIVE SUMMARY

1. The seed industry in Zambia includes the active participation by both the private and public sectors. The public sector plays the regulatory and limited technology development.

2. The seed certification Authority is the Seed Control and Certification Institute (SCCI). The Institute is a government department under the Ministry of Agriculture and Cooperatives (MACO) that is responsible for seed quality control. SCCI conducts the testing of varieties, inspections of seed fields and seed trade, sampling, testing and certification of seed lots and facilitation of seed import and exports.

3. SCCI will implement the SADC Technical Agreements on: a) Seed Variety Release; b) Seed Certification and Quality Assurance. The Institute has adequate capacity to implement the two protocols. However, the Regulations to CAP 236 will need to be revised in order align standards with those agreed upon at SACD level.

4. The regulations to CAP 236 will need to be changed as follows: a) Number of years/seasons required for DUS testing be reduced from two to one in order to be compliant to SADC.

5. Validity period of a released varieties is specific in the SADC Agreements but not under the Zambian laws. There will be need for Zambia to insert the SADC validity in her Regulations to the Plant Variety and Seeds Act.

6. It is not specified in the Zambia laws that: a) A SADC variety can be traded in Zambia; b)Seed Certified under the SADC system should be regarded so in Zambia, and; c) SADC pest lists are applicable for enforcement by PQPS in Zambia. These provisions should be inserted in specific regulations through the issuance of a Statutory Instrument.

7. There are some differences in the minimum standards between those for SADC and Zambia. In some cases the minimum standards are similar. Zambia should revise her seed standards and adopt the SADC minimum standards provided for in the Technical Agreement on Seed Certification and Quality Assurance.

8. Zambia will need to change the colour of label for these classes to the SADC one. This will be possible through a Statutory Instrument

9. Zambia needs to include the SADC pest list in her Regulations to CAP 231 through a Statutory Instrument. The country did not have a specific pest list for countries beyond SADC. The pest lists enforced were country specific and differed from one country to another. When the SADC Agreement will be enforced, countries beyond SADC will be subject to the pest list as specified in SADC.

10. The undertaking by the Common Market for Eastern and Southern Africa (COMESA) to harmonize seed regulations will bring economic growth to region. In order to succeed the harmonization in a short time, Seed Coordination Unit should be established at the African seed Trade Association (AFSTA).

11. The SCU should identify a Seed Focal Point (SFP) in each member state to represent a respective country during the harmonization process. The SFP should be drawn from among senior officers coordinating seed provision in each country.

12. Since some SADC members are also members of COMESA, should fully adopt the SADC Agreements on: a) Seed Variety Release, and; b) Seed Certification and Quality Assurance. The Technical Agreement on Quarantine and Phytosanitary measures for Seed should be adopted with changes to the Pest Lists.

13. Zambia has a Plant Breeder's Right Act (no. 18 of 2007). Its enforcement awaits the production of Regulations to the Act. The Act was formulated based on the SADC proposed Protocal on Plant Variety Protection.

14. COMESA should develop a regional Plant Variety Protection Act that should be domesticated by member states. The region should also undertake to apply for membership to UPOV in order to boost agriculture in the region.

15. Although Zambia tests seed varieties following the International Union for protection of New Varieties of Plants (UPOV) Test guidelines and certifies seeds based on principles of the Organization for Economic Cooperation and development (OECD), the country is not a member of the two organizations. However, the country has made contacts to the two organizations on membership. Zambia has been advised on what she needs to do to be compliant and become a member.

16. Zambia is a member of the International Seed Testing Association (ISTA) and its main seed testing laboratory is accredited to the association and issues ISTA seed analysis certificates in facilitating international seed trade.

17. Zambia is a signatory to the Cartagena Protocol on Biosafety to the Convention on Biological Diversity (CBD). This is an international treaty that governs the movements of living modified organisms which results from modern biotechnology from one country to another. Zambia also signed the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). The Treaty provides a legal framework recognizing the need for conservation and sustainable use of plant genetic resources for food and agriculture and a regime for access and benefit sharing.

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1.0 INTRODUCTION

1.1 Background on harmonization of seed regulations in COMESA

Much of the population in the Common Market for Eastern and Southern Africa (COMESA) depends on agriculture for livelihood. In Zambia about two thirds of households are agricultural and agriculture is the most important livelihood strategy by most of the people.

Seed is an important input for crop production because it sets the limit of productivity. The seed contains genes that set up the genetic potential for performance. All other inputs during crop production such as early planting, space planting, fertilisation, irrigation, weeding, etc. are generally meant to facilitate the exploitation of the genetic potential contained in seeds.

In the COMESA, member states differ in the level of development of seed industries. Therefore, those at a lower level can benefit from those that have well developed seed industries in accessing quality seeds. In general member countries can benefit from each through seed trade. However, member states have different seed laws that in most cases cause delay in promoting seed movement among members.

The COMESA member states have decided to harmonize seed regulations and policies in its 19 Member States according to the declaration of COMESA Ministers in Seychelles in March 2008. The African Seed Trade Association (AFSTA) has been mandated to take the lead in this harmonization process according to the contract agreement signed between AFSTA and COMESA on 4th June 2010. In view of this a short-term consultancy to conduct a baseline study/survey on the seed sector of Zambia was undertaken and was guided by Terms of Reference under Appendix 1. This report highlights findings of the study.

1.2 Seed industry in Zambia

The seed provision in Zambia is governed by the Plant Variety and Seeds Act (CAP 236). The Act provides for Seed Control and Certification Institute (SCCI), a department under the Ministry of Agriculture and Cooperatives (MACO), to enforce it. SCCI is also the administrator of the Plant Breeder's Rights Act (no. 18 of 2007) which aims at promoting development of new plant varieties. The duties of SCCI are implemented through the following activities of the Institute: a) Variety testing, registration and protection, b) Seed systems and inspections and; c) Laboratory seed testing. SCCI has an adequate establishment of qualified personnel to professionally carry out these activities.

During the year 2009 a total of 25 new plant varieties were released by various seed companies. Modalities to make the Plant Breeder's Rights (PBR) office operational were developed in readiness for the enforcement of the PBR. Furthermore, a biotechnology laboratory was constructed, equipment procured and some staff who will work in the laboratory were trained in molecular biology. The laboratory will genetically finger print varieties thereby providing additional information for the grant of a PBR.

At least 35,000 ha of seed of various crop varieties are produced annually. About 70 different institutions participated in seed production in 2008. Of the registered seed crops only up to 2% fail field inspections. Carryover seeds are annually estimated at about 10 000 tonnes (at least 70% maize, the staple food crop).

The number of participants in seed delivery was about 900 in 2009. SCCI also carries out capacity building in the seed industry. In 2009 about 10 NGOs and 32 seed growers associations were trained in various aspects of seed technology, an effort aimed at strengthening seed delivery in rural areas.

Seed testing is carried out by SCCI and licensed seed testing laboratories. In 2009 a total 70,691 tonnes were tested by seed laboratories in Zambia. Of this 50,370 tonnes were tested by SCCI laboratories alone. The Zamseed laboratory tested 17,028 tonnes while the Dunavant laboratory tested 3,293 tonnes. The amount of seed that failed certification was 8,916 tonnes (12%, 13% and 20% at SCCI, Zamseed and Dunavant laboratories respectively).

In 2009 about 15,958 tonnes were exported out of Zambia with results declared on the international certified of the International Seed Testing Association (ISTA). A substantial amount was exported to countries that did not demand for ISTA certificates. Only 3,076 tonnes were imported in the country on ISTA certificates. About 95% of seeds exported were those of maize while much of the seed imports were those of potato (49%).

In order to provided the current status of the seed industry in Zambia, a desk study and some personal interviews with key players based in Lusaka was done. Where necessary, interviews by phone were carried out. This report provides highlights on the current status on the seed industry in Zambia in relation to variety release, seed certification, phytosanitary, plant variety protection, seed imports and exports. It also discusses Zambia's membership to international organization in relation to seed provision. The report also points out some weak areas and provide suggestions to strengthen such areas. The document will be a useful reference material especial on harmonization of seed regulations in the SADC and COMESA.

2.0 FINDINGS

2.1 Standards for seed certification

2.1.1 Background information

Superior varieties in qualitative and quantitative traits to existing ones are continuously being developed by plant breeders. Seeds of these varieties need to reach farmers in the desired quantity and quality. In order to provide a reasonable guarantee of the genetic, physiological and physical quality of seeds prior to planting, a seed quality control system is required for supervision of the seed provision from multiplication through to marketing. Seed certification is a legally sanctioned system for quality control of seed provision. It includes field inspection, pre-post control and seed quality tests. The main objective of seed inspection is to maintain and make available to the public high quality seeds and propagating materials.

The certification of seed in Zambia is provided for under the Plant Variety and Seeds Act (CAP 236) and is supported by the Regulations to the Act. The Act provides for Seed Control and Certification Institute to be the seed certification Authority to enforce it. The Institute is a government department under ministry of Agriculture and Cooperatives. SCCI is located about 20km South of Lusaka in Chilanga township. The institute is headed by a Director and the current head is Dr. Catherine Mungoma (E-mail: maize@zamnet.zm ; Tel. +260211278112/236, fax +260278170/836 ; Mobile 0966764822). The Act also provides for the Director of SCCI to be the Controller of Seeds in the country. More information about SCCI can be obtained from the institute's official web site http://www.scci.gov.zm (email: scci@zamnet.zm ; Tel. +260211278236, fax +260278170/836).

2.1.2 Existing seed classes

The production and certification of seeds follows standards set out by the Organization for Economic Cooperation and Development (OECD). The multiplication of seed of a crop variety released in Zambia is registered with SCCI at a fee for the following classes; Pre-basic seed (A), Basic Seed (B), Certified Seed (C1-3, D), Quality Declared Seed (QDS) and Emergency (E), Table 1. Seed crops are inspected during production and are subjected to minimum field standards for each class. A seed crop that fails to meet the standards is rejected from the seed certification scheme.

Table 1a. Seed certification scheme in Zambia for general Seeds and a comparative colour of label between Zambia and SADC

CODE	CLASS	PARENT SEED AND AVAILABILITY	ZAMBIA LABEL	SADC LABEL
A	Pre-basic Seed	Produced from the breeder's parent material under control of the breeder and supervision of the SCCI. More than one generation may be permitted by the Controller of Seeds.	Violet stripe on white	Violet band on white
B	Basic Seed	Produced from Pre-basic Seed and officially inspected. Only one generation permitted.	White	White
C1	Certified Seed, 1st generation	Produced from Basic Seed and officially inspected.	Blue stripe on white	Blue
C2	Certified Seed, 2nd generation	Produced from Certified Seed, 1st generation (or higher class) and officially inspected.	Red stripe on white	Red
C3	Certified Seed, 3rd generation	Produced from Certified Seed, 2nd generation (or higher class) and officially inspected.	Red stripe on white	
D	Certified Seed, 4th generation	Produced from Certified Seed, 3rd generation (or higher class) and officially inspected.	Green stripe on white	
QDS	Quality Declared seed	Produced from Quality Declared or Higher class	Green	Green
E	Emergency class	Only used when a serious shortage of seed (for certification) of compulsory crops occurs. The standards will be set by the Controller of Seeds.	Red	

Table 1b. Seed certification scheme in Zambia for potato seeds

CODE	CLASS	PARENT SEED AND AVAILABILITY	COLOUR OF LABEL
S1(S2,S 3)	Pre-basic Seed	Produced by the breeder under the supervision of SCCI. The maximum number of generations shall not exceed three, as determined by the Controller of Seeds; and such number of generation shall form part of the identification.	Violet stripe on white
SE	Basic Seed	Produced from Pre-basic Seed under the supervision of SCCI. Only one generation permitted.	White
E1	Certified Seed, 1st generation	Produced from Basic Seed and officially inspected.	Blue stripe on white
E2	Certified Seed, 2nd generation	Produced from Certified Seed ,1st generation (or higher class) and officially inspected.	Red stripe on white
A	Certified Seed, 3rd generation	Produced from Certified Seed ,2nd generation (or higher class) and officially inspected.	Red stripe on white
B	Certified Seed, 4th generation	Produced from Certified Seed ,3rd generation (or higher class) and officially inspected.	Green stripe on white

Government of the Republic of Zambia (GRZ) appoints seed inspectors, samplers and analysts who carry out seed quality control services. A licensing scheme is in place for seed quality control personnel which enables seed personnel from both the private and public sectors to participate in seed quality control. SCCI trains and examines candidate inspectors, samplers and analysts. Successful ones are licensed to perform respective seed quality control activities. SCCI also audits private seed testing laboratories to establish competence in carrying out seed testing and certification. A successful laboratory is licensed to test and certify seeds for the local market. All licensees are monitored by SCCI.

Seed growers are registered with SCCI through a seed company or a seed association.
Field crop inspections are carried out for a minimum three times for open pollinated crops and for a minimum five times for hybrids. The seed crops are subjected to field standards which include rotation, isolation and off types and successful seed crops are harvested,

processed and packed in seed lots of maximum size according to seed testing rules by the International Seed Testing Association (ISTA).

Seed lots are sampled and submitted to a seed testing laboratory for testing and certification. Currently there are six government seed testing laboratories (Table 2). Of these, the SCCI main seed testing laboratory (Chilanga) is accredited to ISTA and implements the seed quality assurance system. This laboratory ensures that all other seed testing laboratories in the country test seed according to ISTA rules and adhere to set standards in the Plant Variety and Seeds Act. There two private seed testing laboratories belonging to the Zambia Seed Company (Zamseed) and Dunavant Cotton company (Table 2). These test and certify seeds for the local market.

Table 2: Seed testing laboratories in Zambia

Name	Location	District	Owner
SCCI main	SCCI, Headquarters in Chilanga	Lusaka	GRZ
Msekera	Msekera Agricultural Research Station	Chipata	GRZ
Misamfu	Misamfu Agricultural Research Station	Kasama	GRZ
Mufulira	Copperbelt Technology testing site	Mufulira	GRZ
Mutanda	Mutanda Agricultural Research Station	Solwezi	GRZ
Mongu	Western Province agricultural headquarters	Mongu	GRZ
Zamseed	Zamseed headquarters	Lusaka	Zamseed
Dunavant	Light industrial area	Kabwe	Dunavant

2.1.3 Laboratory Standards for seed lots

A seed crop that meets field standards gets cleared of inspections and is harvested and processed. A seed lot is then sampled for laboratory seed testing. Details of the sampled seed lot are put on the prescribed sampling report which accompanies the seed sample to a seed testing laboratory. Seed testing is conducted according to rules by ISTA.

Seed lots are tested at a fee and results of seed testing are subjected to laboratory minimum standards for purity, germination, moisture and other seeds count for all seed classes except QDS that is only subjected to minimum standards for purity and germination. A seed lot that meets the laboratory standards is certified for sale. Certification of seed for the local market is declared on national certificates while seed quality for seed lots destined for the international market is usually declared on the International ISTA certificate. In situations where the importing country does not demand for an ISTA certificate, nation seed certificates are used.

The certified seeds are put in sealed containers and are labelled with information as directed by SCCI. The label is of a specific colour of a particular seed class (Table 1). Seed selling is done by seed houses who are licensed by SCCI. The CAP 236 provides for those that are not happy with the enforcement of the seed law to appeal to the Minister responsible for Agriculture.

2.1.4 Conformity with regional standards adopted by SADC

The standards for seed certification in Zambia are generally compliant with that of the SADC Technical Agreement on 'Seed Certification and Quality Assurance'. However, Zambia will need to address a few areas to become fully compliant with the SADC Technical Agreement. Find below key provision in the Technical Agreement and a comment of conformity by Zambia (in italic). The SADC Technical Agreement provides for:

i) Each SADC member state to designate a National Seeds Authority (NSA) that will work with Project Management Unit (PMU) and SADC Seed Committee (SSC) in implementing the Agreement and ensuring that rules, directions and standards are observed. *The designated NSA in Zambia is SCCI which will oversee enforcement of the Agreement in the country.*

ii) The NSA will licence, authorize, accredit and register field inspectors, samplers, analysts and laboratories. The NSA will also issue certificates and identity cards to those to work under the SADC system. The NSA will inform the PMU those registered or deregistered. *SCCI is already doing the same in Zambia. However, SCCI should in addition begin to issue certificates and identity cards to all officers (including SCCI personnel) practicing seed quality control in the country.*

iiii) NSA will register seed fields and keep inspection reports. *SCCI is already doing this for Zambia.*

v) NSA will provide SADC seals, labels or formats to companies. *At present SCCI only provides formats and does not give seals or labels which are provided for by respective seed companies. However, SCCI will be able to perform this duty for those who intend to exploit the SADC market. The colour of the SADC label and Zambia's differ slightly for a seed classes C1 and C2. Zambia will need* to change the colour of label for these classes to the SADC one. This will be possible through a *Statutory Instrument*

vi) NSA will issue certificates for each seed lot certified for the system and conduct post control. *SCCI is already doing this for Zambia and will continue doing so for the harmonized seed system. However, for uniformity in post control, SADC should develop a manual to guide member states on how to conduct the same.*

vii) PMU at SADC will also conduct post control of seeds under the system. *This is good because it will take care of situations where the post control test is not done by a member state.*

viii) The NSA will to keep all records on field inspections, seed testing, seed certification and other information issued for the system. *SCCI is already doing this for Zambia and will continue doing so during the implementation of the Technical Agreement.*

ix) The NSA will be required to submit seed information annually to PMU on seed activities in a respective country. *At the moment SCCI annually prepares information on seed activities in Zambia. This will continue under the new system and SCCI will be able to submit this information to the PMU at SADC when required.*

x) All SADC member states will participate in the system using available staff and facilities. These must have necessary qualification and capacity. *This is as it should be. seed lots with SADC certificates, seals and labels should be accepted by the whole region. However, SADC should ensure that seed lot certification is done by competent NSA organizations.*

xi) Seed crops specified under the Technical Agreement are groundnuts, pigeon pea, soybeans, cotton [Hybrid (H), Open Pollinated Variety (OPV)], sunflower (H, OP), tobacco, rice, pear millet, beans, sorghum (H, OP), wheat, cowpea and maize (H, OP). *The crops are all prescribed in the Regulations of CAP 236 in Zambia and the country will be able to participate in the system without much delays (Appendix 3).*

xii) The Technical Agreement provides for the following conditions for the production of Quality Declared seeds (QDS): a) A variety must be listed on the SADC Variety Catalogue; b) Seed production must be registered with NSA, and ; c) The NSA will check 10% of the seed crops. *These conditions are similar to the conditions for the production of QDS seeds in Zambia.*

xiv) Seed samples to be drawn by seed personnel authorized under the system will be drawn according to ISTA rules. *Zambia authorizes samplers who meet ISTA standards in drawing official seed samples. This will continue under the system.*

xv) Minimum seed standards for the system are provided for in the Technical Agreement. This includes those for: Isolation, off-types, number of field inspections germination, purity and moisture content (Appendix 2). *There are some differences in the minimum standards between those for SADC and Zambia. In some cases the minimum standards are similar. Zambia should revise her seed standards and adopt the SADC minimum standards provided for in the Technical Agreement.*

xvi) Seed containers shall be sealed and labelled with a SADC label and information to put on the label is as specified in the technical agreement. The NSA will issue seed lot certificates for seeds certified for the system. Minimum information to be put on the certificate is also specified in the Agreement. *These measures are good and SCCI has been enforcing them in Zambia.*

xvii) The minimum training requirements for seed inspector, sampler, analyst for the system will be set by PMU after consulting the SSC. *In Zambia, minimum qualification for Inspector/sampler is Diploma in agriculture or seed technology while that for a seed analyst is certificate in agriculture or seed technology.*

xviii) It is provided in the Agreement that both public and private laboratories can also participate in the system. However at application, the NSA will advise PMU on the capability of the applicant. In order to ensure adherence to set standards, one or two laboratories in SADC will annually do proficiency testing to establish competence. This will include: a) Competency list of species; b) Implementation of a quality assurance system; c) Participation in refereeing test program, and; d) Audit of the laboratory. *These measures are good and will ensure provision of quality seeds and services in the SADC. In enforcing the licensing scheme for seed, SCCI has been carrying out these measures .*

xix) PMU will hold a database of all authorized staff and accredited laboratories under the system. Once a year NSA will prepare and submit to PMU an annual report on activities of the system. PMU will consolidate NSA reports into a SADC report. *SCCI will be able to provide the appropriate information for the same when requested.*

xx) The NSA will charge regular fees for national certification. Such fees will be adequate for seed to enter the SADC system. *Zambia is already charging fees for most of the seed services. This measure will be a continuation to the current situation.*

xxi) PMU in consultation with SSC and NSAs will prepare procedures for appeals taking into account the SADC Trade Protocals. *Provision of appeal provided for by the Plant variety and Seeds Act in Zambia will continue. However, for international seed trade under the system, the provision of appeal under SADC will be respected to help resolve issues and strengthen implementation of the harmonized seed regulations system.*

2.1.5 Future plan of the country for standards for seed certification

Zambia will revise her standards and adopt the SADC standards for crops to be enforced under the SADC seed system. The specific standards to be changed have already been identified. The new regulations will be issued through a Statutory Instrument.

2.1.6 *Additional information for the purpose of the harmonization at COMESA level*

COMESA should put in place a Seed Coordinating Unit (SCU) within AFSTA which should head the harmonization of seed laws in the Sub-region. The SCU should identify a Seed Focal Point (SFP) in each member state to represent a respective country during the harmonization process. The SFP should be drawn from among senior officers coordinating seed provision in each country.

Since some SADC members are also members of COMESA, the SCU should encourage the sub-region to adopt the crops and standards agreed upon for the SADC seed system. This decision should be made by regional forum of SFP (including other COMESA supporters) and endorsed by the political leadership of the sub-region. Similarly a forum for SFP and other supporters should meet, discuss and agree on standards for any additional crop to be enforced under the COMESA seed system.

2.2 Variety evaluation, release and registration

2.2.1 Background information

A variety may be defined as an assemblage of cultivated plants which is clearly distinguished by any characters (morphological, physiological, cytological, chemical or others), and which when reproduced (sexually or asexually), retains its distinguishing characters.

Variety evaluation, release and registration in Zambia is provided for under CAP 236 and its Regulations. The Act provides for SCCI to evaluate the varieties and the Variety Release Committee to release good crop varieties for commercial production in the country. A Variety Testing, Registration and Protection (VTRP) section under SCCI carries out the service. Details of the Institute and its Director have been described above under 2.1. In addition, VTRP section is head by a Chief Seeds Officer, Dr. Francisco Miti (E-mail: franciscomiti@yahoo.co.uk; Tel. +260211278836/236, fax +260278170/836 ; Mobile 0955 999 306).

2.2.2 Variety evaluation, release and registration system

The ultimate of a breeder is that the developed seed variety reaches farmers. However, prior to commercialization of such a variety in Zambia, the candidate variety is evaluated for distinctness, uniformity and stability (DUS) and for value for cultivation and use (VCU). The test for distinctness is used to establish that the new variety differs from those of common knowledge in at least one characteristic for it to be considered for release. Uniformity establishes that the phenotypic expression of the new variety is the same when it is replicated as is the case when grown by different farmers. Stability tests whether the new variety is able to maintain its phenotypic expression even after repeated multiplication over generations. The testing of candidate varieties for VCU assesses its ecological suitability (adaptability) and industrial/farmer acceptance prior to its released.

Evaluation of candidate varieties for DUS and VCU is carried out for at least two seasons. DUS is evaluated under optimal conditions at SCCI (for most crops), Chongwe (for tobacco), and Chanyanya (for rice). Evaluation of candidate varieties under recommended crop management conditions minimizes environmental deviations thereby maximizing its genotypic expression. VCU is evaluated over six locations across Zambia's three agro-ecological regions (two locations/region).

In both DUS and VCU tests, a candidate variety is compared with widely used released varieties and the results are presented to a broad based Variety Release Committee (VRC) that considers the merits and demerits of candidate varieties. Candidate varieties found good are released to the farming community for commercial production. These are registered into the Official Variety Register. The formal release of varieties by the VRC protects farmers from using insufficiently tested new crop varieties that the breeder may attempt to release for professional expediency. Such inferior varieties could lead to low

crop production. The formal release process also establishes ownership of a variety thereby protecting a plant breeder against possible misuse of his/her variety.

2.2.3 Crops in the variety evaluation, release and registration system

Variety evaluation is provided for by the Plant Variety and Seeds Act. The seed crops involved are those prescribed under the Regulations of the Act (Appendix 3). Recently different varieties of the following crops have been evaluated, released and registered for commercial production in Zambia: maize, wheat, sorghum, rice, pearl millet, finger millet, Irish potato, cassava, sweet potato, groundnuts, beans, peas, cowpea, pigeon pea, soybeans, sunflower, green gram, bambara nuts, guar, tobacco and cotton.

Regular applicants for variety evaluation, release and registration have been drawn from both the public and private sectors. Those from the public sectors have included the Zambia Agriculture Research Institute (ZARI), University of Zambia (UNZA), Cotton Development Trust (CDT) and Golden Valley Agricultural Research Trust (GART). While ZARI is a wholly government institution, UNZA, CDT and GART are semi autonomous. Applicants from the private have mainly been seed companies and include among others: SeedCo (Zambia) International, Zambia Seed Company (Zamseed), Pannar, Maize Research Institute (MRI), Monsanto, Pioneer International, Kamano and Premier Seeds.

2.2.4 Conformity with regional variety evaluation, release and registration adopted by SADC

Zambia is generally compliant with the SADC Technical Agreement on 'Seed Variety Release. However, Zambia will need to address a few areas to be fully compliant with the SADC Technical Agreement. Find below key provision in the Technical Agreement and a comment of conformity by Zambia (in italic). The SADC Technical Agreement provides for:

i) Each SADC member state to designated a NSA that will collaborate with the Project Management Unit (PMU) and SADC Seed Committee (SSC) to implement and operate the System. *The NSA in Zambia is SCCI which will oversee enforcement of the Agreement in the country. Within SCCI the section responsible for Variety Testing, Registration and Protection will operate the system.*

ii) NSA will advise breeders, seed companies and other stakeholders on procedures covering the Agreement. *SCCI has already being doing so. A number of meetings with stakeholders have been held to prepare the country for implementation of the Agreement.*

iii) NSA will organize testing, registration and release of varieties at national level. *SCCI is already doing this for Zambia. Variety testing is carried out by SCCI. However, the Decision to release a variety is made by a broad based Variety Release Committee. Members of the VRC are as prescribed in the Regulations to the Plant Variety and Seeds Act. Crop varieties released by the VRC are registered into the Official Variety Register of Zambia. These may be multiplied for commercial provision in the country.*

iv) NSA will process applications for regional release and submit to SADC. *SCCI has the capacity to verify the quantity and quality data supporting an application for the release of a variety at SADC level.*

v) DUS testing shall be done in the country of application for one year by a competent public or delegated private organization working in accordance with descriptor guidelines developed by the International Union for the Protection of New Plant Varieties (UPOV). *It is a current requirement in Zambia that DUS of candidate varieties is done by SCCI for at least two seasons prior to release. Zambia will adopt the SADC Agreement in order to be compliant with the sub-regional system.*

vii) The candidate variety for release at SADC level must be subjected to VCU tests for at least two seasons in the target agro-ecological region in at least two member countries including that of application. *Zambia is fully complaint on this as VCU tests are carried out for at least two seasons in target agro-ecological regions.*

viii) The VCU tests will cover maturity period, yield, storability, resistance to diseases and pests and others. *SCCI is already carrying out these tests for candidate varieties in Zambia and this will continue under the SADC system.*

ix) VCU testing will be done by the Applicant under the supervision of the NSA or by independent and competent agricultural organization. *VCU in Zambia is already being carried out by the NSA herself making the country fully compliant to the Agreement.*

x) The country of application for DUS testing is responsible for the safe storage of a reference sample of the candidate variety. *SCCI is already doing this for varieties released in Zambia. This will continue under the SADC system.*

xi) Varieties entered in the SADC Variety Catalogue will remain registered in the catalogue for 20 years and the registration may be renewed where necessary. *The Zambian law is silent on validity period for released varieties in the country. There will be need for Zambia to insert the SADC provision in her Regulations to the Plant Variety and Seeds Act.*

xii) SADC will establish a procedure for auditing the system in order to monitor and evaluate the performance of the System. This will include performance of NSAs. *This is a welcome development as it will ensure competence in the variety release process.*

xiii) All SADC member states will participate in the System using staff and facilities that are at their disposal having the necessary qualifications and capacity. *SCCI has a section responsible for Variety Testing Registration and Protection. This section will operate the Agreement. Currently the section has 5 professionals (degree holders), 6 technicians (Diploma in agriculture/seed technology) and 10 support staff. The section establishment is about 50% filled.*

xiv) A new variety will be eligible to enter the SADC Variety Catalogue if it is released in at least two SADC member States. When such a variety is entered into the Catalogue, it can be traded in all SADC countries. However, a member state may apply to SADC to prohibit a SADC variety enter its territory for good reason. *Zambia lacks these provisions*

in her seed law as a basis for a variety to be trade/rejected in Zambia. There is need for the country to provide the provision in the Regulations to the Plant variety and Seeds Act that a variety listed as a SADC variety will considered to released in Zambia.

2.2.5 Future plan of the country for variety evaluation, release and registration;

Zambia plans to revise Regulations to CAP 236 and incorporate provisions of the SADC Technical Agreement on Seed variety Release in order to become fully compliant to procedures set out by the SADC System on variety Release.

2.2.6 Additional information on the variety evaluation, release and registration for the purpose of harmonization at COMESA level

The COMESA sub-region should be drawn into agro-ecological regions which should be adopted by the sub-region. In each member state crop varieties should be released for a defined agro-ecological region. Since some members of COMESA are also members of SADC, the provision of a released variety in at least two countries being eligible to become a regional variety should be adopted by COMESA as well. Therefore the SCU should encourage the region to adopt the principles set out in the SADC Technical Agreement on Seed Variety Release. The SFPs and other supporters should meet, discuss and agree on how COMESA varieties will be released. This decision should be presented to, Permanent Secretaries responsible for Agriculture and endorsed by the political leadership of the sub-region.

2.3 Phytosanitary measures

2.3.1 Background information

Pests and disease causing pathogens may feed or be hosted by plants and/or plant produce thereby interfering with plant growth and usefulness of the produce. They may exist in one country causing serious damages to crop production. The living organisms may multiply and spread quickly to other areas. In order to reduce the spread of pest and disease causing pathogens from any country to Zambia, the Plant Pests and Disease Act (CAP 231) is enforced in Zambia. The Act is enforced by the Plant Quarantine and Phytosanitary Services (PQPS), a section under the Zambia Agriculture Research Institute (ZARI). The institute is one of the departments under the Ministry of Agriculture and Cooperatives. ZARI is headed by a Director, Dr. Richard Kamona (Tel. 260-211-278130/590; Fax. 260-211-278130; Email Richard kamona@yahoo.com or zaridirector@zari.gov.zm) and has its headquarters at Mt. Makulu Central Research Station in Chilanga, about 20km south of Lusaka. In matters of Phytosanitary, the Director is assisted by the PQPS Unit which is headed by Mr. Allan Sakala (Tel. 260-211-278141; Mobile 260-966761829; -Fax. 260-211-278130; Email mwati1lango@yahoo.com.

2.3.2 Phytosanitary measures and quarantine pest list for the country;

The Plant Pests and Disease Act provides for establishment of control measures for crop specific pests and disease causing pathogens that should be avoided when plant or plant product are imported into Zambia. A person who wishes to import seeds (applicant), first secures the Notice to Import Seed from SCCI and requests for a Plant Import Permit from ZARI. Equipped with these two documents, the applicant may secure an Import Permit from the Department of Marketing at MACO headquarters in Mulungushi House, Lusaka. The applicant then sends the three documents to the exporting country. The exporting country ensures that phytosanitary requirements for Zambia are met and this is declared so by a competent authority in the respective country prior to exportation of the seeds. Upon arrival of the seeds in Zambia, plant health inspectors check for conformity with the requirements which were specified on the Plant Import Permit. The imported goods are cleared when the requirements are found to have been met.

For Export, an applicant may obtains an ISTA seed analysis certificate that declares the quality of seeds to be exported. Where the importing country does not specify the need for an ISTA certificate, some applicants skip this step and a national seed certificate is used instead. The applicant then applies for a Phytosanitary Certificate from ZARI. Using control requirements for pests and diseases by the importing country, an applicant ensures that the seed lot to be exported is free of the specified pests and diseases. This is declared so on a Phytosanitary Certificate. In Zambia, Plant Health Inspectors also inspect seed crops for pests and diseases during seed production. This enables ZARI to declare that the seed lot was produced from a seed crop field that was free of the specified pests and diseases.

2.3.3 Check conformity with regional phytosanitary measures in SADC

The purpose of the SADC harmonized Quarantine and Phytosanitary Measures for seeds is to enhance safer and faster movement of seed through establishment of common Quarantine and Phytosanitary Measures for seed in the SADC region. Two lists were agreed upon at SADC level: a) A SADC list of pests which require control when seed is trade between SADC Member States, and; b) A SADC list of pests which require control when seeds are traded into a SADC country from outside the region. Details on conformity and differences on the SADC pest list from that enforced in Zambia are provided in Appendix 4 and 5. The pest lists for Zambia differs in some cases to those of SADC. Zambia needs to include the SADC pest list in her Regulations to CAP 231 through a Statutory Instrument. The country did not have a specific pest list for countries beyond SADC. The pest lists enforced were country specific and differed from one country to another. When the SADC Agreement will be enforced, countries beyond SADC will be subject to the pest list as specified in SADC.

2.3.4 Future plan of the country for phytosanitary measures

Zambia hopes to simplify the enforcement of phytosanitary measures for seed in the country. There are discussions within MACO suggesting that the Notice to Import Seed and the Plant Import Permit should be issued on one prescribed form and by one office. This will reduce the time it takes to obtain the Import Permit. There also plans to put under one roof all those involved in processing requests for agricultural import or export.

2.3.5 Additional information on the phytosanitary measure necessary for the purpose of harmonization at COMESA level

COMESA is a large grouping consisting of different agro-ecological environments and weather conditions. Dangerous pests and disease causing pathogens in one region may not be a factor in another region. Therefore, COMESA should be defined according to agro-ecological regions. The region should identify pests and disease causing pathogens that should be controlled. Similar agro-ecological regions should have similar crop specific restrictions on pests and disease causing pathogens.

When new pests and diseases arise within COMESA, bilateral agreements can be arranged to control the spread of pests and diseases. This requires members to have adequate personnel that can identify dangerous pests and diseases as well as analyzing the risks of such vices. Therefore, COMESA should undertake to train personnel from plant protection authorities of member states, in pest risk analysis and identification of pests and diseases.

2.4 Plant Variety Protection

2.4.1 Background information

The Plant Variety Protection (PVP), also known as 'Plant Breeder's Right (PBR)' is an exclusive right granted to the breeder of a new variety to exploit that variety. The PBR provide breeders with the opportunity to receive a reasonable return to their investments. This is an incentive to continue their breeding and recognition of the moral right for their efforts. The Protection also benefit farmers who access new technologies (high yielding, disease resistant, etc) leading to high productivity and quality of products. The main objective of PVP is to encourage the development of new varieties of plants and provide a system of accessing the knowledge for the benefit of the society.

In Zambia, plant variety protection is enshrined in the PBR Act (No. 18 of 2007). Seed Control and Certification Institute is the designated authority responsible for the administration of the legislation. The Act provides for appointment of a Registrar at SCCI to lead the enforcement of the PBR legislation in Zambia. The Registrar is yet to be appointed and preparations for the enforcement are lead by the Director of SCCI who is supported by the Variety Testing, Registration and Protection (VTRP) section under

SCCI. Details of SCCI and its Director have been described above (2.1). Similarly details of the head of VTRP were provided for under 2.2.1 above.

2.4.2 Plant Variety Protection system

The Director of SCCI is most likely to be appointed as the Registrar of the PBR. She will be assisted by the Variety Testing, Registration and Protection section for the day to day running of the office. The procedure of the enforcement of the Plant Breeder's Rights in Zambia will be as follows:

- A breeder submits an application for PBR to the Registrar who stamps and signs the application. This date is called application day (when registrar stamps the application).
- A Plant Examiner evaluates the application to: a) Establish novelty; b) Check on the accompanying documents. These include: Technical questionnaire, Power of Attorney (appointment of a local agent), Letter of Assignment of right by breeder to employer, Colour pictures for e.g. flowers, check that applications fees are paid

- When an application is successful a file will be opened and Filling Date inserted (Date when application is completed – usually date when fees are paid). The PBR office will then inform the applicant of the status of application and advise on the next steps. At this stage an applicant may apply for Provisional Protection at a fee.
- PBR office will then prepare a government Gazette to make public the application and invite objections. When an application is objected, a tribunal will be set to hear the objection.
- If no objection is received or objection is not successful the PBR office arranges to conduct DUS trials: This will be done within Zambia for most agricultural crops. DUS is done mainly in Chilnga which is located in the most agricultural region in Zambia. Other sites for DUS are Chanyanya (rice) and Chongwe (tobacco). The PBR office may opt to purchase DUS report. This is most likely to done for flower, fruit trees and some vegetables.
- In order to purchase a DUS report, the PBR office will contact the relevant authority (a UPOV members) for a DUS report and will request that the quotation for the DUS Report should be sent to the applicant but the Report should be sent to SCCI after payment by the applicant.

The PBR will be granted when the following conditions are met with respect to a candidate variety: a) New (Not commercialized before); b) Distinct (can be identified from the rest or those being commercialized); c) Uniform in the expression of the characteristics; d) Stable variety does not change in the major characteristics after repeated propagation; e) Variety Denomination the proposed name is simple, easy to remember and not confuse customers; f) Formalities of application and grant are completed, and; g) Fees are paid as prescribed (Table 3)

Table 3. Prescribed fees for Plant Breeders Rights Act in Zambia

S/No	Description	Rate (US$)
1.	Application for a grant of PBR	200
2.	Application for a Provisional Protection	300
3.	Technical evaluation of a variety	600
4.	Annual maintenance fees	200
5.	Purchase of a report from a testing authority in another country	320
6.	Replacement of lost or destroyed certificate	80
7.	Claim of priority from a preceding application outside Zambia	20
8.	Change of denomination	80
9.	Reinstatement of an abandoned application on petition	80
10.	Surcharge for late payment	60
11.	Application for a compulsory license	70
12.	Application for extension of the period of a grant	100
13.	Inspection of register and documents	20
14.	Duplicate page of register or documents	10
15.	Grant for Plant Breeders Rights certificate	240
16.	Application for extension of the time limit	10
17.	Transfer publication fees	80

2.4.3 Conformity with regional Plant Variety Protection proposal in SADC;

The PBR Act (No. 18 of 2007) generally conforms to the Plant Variety Protection proposal for the SADC. The Zambia Act was formulated at the same time the SADC Plant Variety Protection proposal was being written and borrowed a lot of clauses from it.

2.4.4 Future plan of the country for Plant Variety Protection;

In order to operationalise the PBR Act, Regulations to the Act were prepared and submitted to Authorities for legislation. The process of making law the Regulations to the PBR Act through a Statutory Instrument is near completion. The country also await the formal appointment of the Registrar to lead the enforcement of the PBR Act.

In order to strengthen further the quality of decisions to grant PBR, there are plans to strengthen DUS testing. A working manual for DUS will be developed and staff under the VTRP section will be trained in use of the manual and in carrying out the DUS test.

2.4.5 Additional information on the Plant Variety Protection for the purpose of harmonization at COMESA level.

The COMESA sub-region should pursue developing a single Plant Variety Protection (PVP) legislation which member states should domesticate. Since a COMESA variety will be trade in the whole region, PVP protection should also cover the whole sub-region. The protection of plant varieties will attract a lot of investment in crop improvement in the region from both local and beyond. In order to build more confidence in the protection of plant varieties in COMESA, membership to UPOV will be important.

Although membership to UPOV may be seen as expensive, its benefits outweigh disadvantages. The region stands to benefit a lot from the membership to UPOV. The region should pursue a COMESA membership to UPOV as opposed to every COMESA country applying to become a member alone. With one PVP legislation, COMESA can apply as a block and obtain one membership. This has advantages: a) It is less laborious as only one application is made. Not every country has to go through the process of application; b) It is cheaper because only one membership and annual fees are paid as opposed to every member state paying the fees; c) Enforcement of the PVP legislation in the sub-region will be made easier since every country will be following the same legislation.

2.5 Seed import/export documentation and procedures

2.5.1 Background information

Importation or exportation of seed is important when one country lacks it due to a number of reasons. For example, country ‘A’ may lack a variety of superior characteristics that can bring a lot of benefits to the local people. When such a variety is exported from country ‘A’ to be country ‘B’ both countries benefit - Country ‘A’ benefits from sales of the technology while country ‘B’ benefits from outputs of the technology.

In Zambia three institutions are responsible for processing of seed import. The requests are initially handled by Seed Control and Certification Institute (SCCI) before the Zambia Agriculture Research Institute (ZARI) and the Department of Marketing at MACO headquarters play their roles too. SCCI is headed by a Director whose details were described under 2.1 above. At SCCI all the three technical sections of SCCI are involved in the processing of seed imports as follows: a) Variety Testing, Registration and Protection: Advises on eligibility of the variety to be allowed in Zambia; b) Seed Systems and Inspections: Confirms the genetic purity and quantities of seed varieties, and; c) Seed testing: Confirms seed quality following laboratory tests.

The Plant Quarantine and Phytosanitary Services (PQPS) under ZARI issues a Plant Import Permit (phytosanitary certificates for exports). The contact details for the Director of ZARI and the head of PQPS is as described above (2.3).

Import Permit (export permit for exports) is issued by the Department of Marketing at MACO headquarters. The department is located on the ground floor of Mulungushi House in Lusaka. The Director is Mr Green Mbozi (Tel. 260-211-250417). The unit that issues the Import/Export Permit is called Trade and Entreprenuership Unit which is headed by Anayawa Mutemwa: Principal Economist - Trade and Entrepreneurship (Mobile: +260 979 257 495; anayawamutemwa@yahoo.co.uk). This unit falls under Agribusiness Section which is headed by Hagrieves Sitwala Sikwebele – Chief Agribusiness Officer (+260 977 784 252)

2.5.2 Seed import and export procedures

Seed Import procedures in Zambia are as described low under steps 1-3:
Step 1: An applicant wishing to import seed completes a prescribed from: Notice to Import Seed (obtainable from SCCI) and submits the same to SCCI. Upon receipt of the Notice, SCCI checks on the seed stock levels of the crop in the country to determine the merits of the request. When the notice is approved by SCCI, it implies that the seed can be imported subject to other provisions in Zambia laws.

Step 2. The applicant then secures a Plant Import Permit that notifies the exporting country that the seeds should be free of certain pests and diseases. The Plant Import Permit is obtained from the Zambia Agriculture Research Institute (ZARI) of MACO. The Director of the Institute is Dr. Richard Kamona and his contact details were provided for under 2.3. In carrying out this exercise, the Director is assisted by the sector on PQPS whose section head is Mr. Allan Sakala (contact details were provided under 2.3)

Step 3. Equipped with the Notice to Import Seed and Plant Import Permit, the applicant may secure the Import Permit from the Department of Marketing at MACO headquarters. The director of the Department is Mr. Green Mbozi and is assisted by the Agribusiness Section which is responsible for issuance of Import and Export Permits. This section is headed by - Hagrieves SItwala Sikwebele, Chief Agribusiness Officer (+260977 7 84 252). The unit under this section that issues the Import/Export Permit is called Trade and Entreprenuership Unit which is headed by Anayawa Mutemwa: Principal Economist - Trade and Entrepreneurship (Mobile: +260 979 257 495; anayawamutemwa@yahoo.co.uk).

In case of exports, an applicant who intends to export seeds may obtain an ISTA seed analysis certificate from SCCI. The certificate declares the quality levels of the seed lot. National seed certificates are use for some importing countries that do not specify the need for an ISTA certificate. The applicant then obtains a phytosanitary certificate from ZARI that declares that the seed lot is free of pests and diseases specified under

documentations of the Import Permit of a respective country. The applicant then obtains the Export permit from the Department of marketing at Mulungushi House in Lusaka.

Last year (2009) about 15,958 tones were exported out of Zambia with results declared on the international certificate of ISTA. Only 3,076 tones were imported in the country with seed quality levels declared on ISTA certificates. About 95% of seeds exported were those of maize while much of the seed imports were those of potato (49%).

2.5.3 Conformity with regional seed import and export procedures and documentation in SADC;

Procedures for handling seed import and export were not part of the Technical Agreements agreed upon at SADC level. However, SADC countries agreed on certain measures that will facilitate importation and exportation of seed targeting the SADC market. For example crop specific pest lists were agreed upon to lessen delays in facilitation of seed exports and Imports.

A country specific working manual was developed to smoothen the handling of seed import and export in the SADC region. The Zambian manual has discussed by stakeholders in an effort to make it usable by the Zambia Authorities. It guides applicant, SCCI, ZARI and the Department of marketing in how to process applications for import or export of seed. The manual does not depart for the existing practice but has put together the whole procedure for the importation and exportation of seed. However, the final version of the manual is still being awaited by authorities involved in facilitating import and export of seeds.

2.5.4 Future plan of the country for seed import and export;

Zambia plans promote further seed imports and exports by reducing restrictions. The amount of paper works required in processing seed imports or exports will be reduced. There are also plans to put under one roof all those involved in processing seed imports and exports.

2.5.5 Additional information on seed import and export procedures and documentation for the purpose of harmonization at COMESA level.

COMESA is a large grouping and standardization of procedures and documentation will require capacity building of personnel involved at each level. This should include capacity building of seed certification authorities, plant protection authorities and those who issue Import Permits. In order to control pests and disease causing pathogens, COMESA should be divided into agro-ecological regions. Similar agro-ecological regions should have similar crop specific restrictions.

2.6 Membership to International Organizations

2.6.1 Organization for Economic Cooperation and development

The Organization for Economic Cooperation and development (OECD) is an international organization that helps tackle the economic, social and governance challenges of the global economy. OECD was created in 1961 and has grown to become the main reference for the certification and standardization of certain agricultural commodities and inputs. The work of the Organization in this area focuses on the creation of common criteria in order to facilitate international trade. The OECD Schemes for the Varietal Certification of Seed Moving in International Trade promote the use of agriculture seed of consistently high quality. Certified seeds are produced and officially controlled according to common harmonized procedures.

In certifying seeds Zambia follows the OECD standards. However, the country is not yet a member of OECD. Zambia contacted the OECD office for membership in 2007 and OECD reviewed Zambia's seed certification scheme which was described as generally satisfactory. The organization advised Zambia then to make a formal application for membership. Zambia has not yet applied for membership to the organization. However, there is now an increasing demand from some stakeholders for Zambia to become a member. The enforcement of plant breeder's Rights will attract more investors who may need to exploit markets that prefer those that are formally OECD compliant. This will motivate more stakeholders into demanding for Zambia's membership to OECD. In the meantime the seed certification Authority (SCCI) has been preparing to submit a formal application to OECD for membership

2.6.2 International Seed testing Association

The International Seed testing Association (ISTA) was established in 1924 with the aim of developing and publishing standard procedures in seed testing. To day ISTA is a world body that stands for uniformity in seed testing. ISTA establishes standard procedures for sampling and testing of seeds to promote uniformity in the testing of seeds that move in international trade. The Association has generally been accepted as a competent professional body on matters of seed testing. Zambia is a member of ISTA and currently occupies the African seat on the Executive Committee of the Association.

Zambia's main seed testing laboratory based at SCCI headquarters in Chilanga is accredited to ISTA. This enables the institute to issue international seed analysis certificates of ISTA and therefore facilitate international seed trade.

2.6.3 Cartagena Protocal on the Convention on Biological Diversity

The Cartagena Protocol on Biosafety to the Convention on Biological Diversity (CBD) is an international treaty that governs the movements of living modified organisms which results from modern biotechnology from one country to another. The Protocal was adopted on 29 January 2000 as a supplementary agreement to the Convention on

Biological Diversity and entered into force on 11 September 2003. Zambia signed the Protocal on 27th April 2004.

The protocol establishes an advance informed agreement procedure in order to ensure that countries are provided with the appropriate information to make informed decisions prior to agreeing to the importation of such organisms into their territory. This protocol also establishes a biosafety clearing house to facilitate the exchange of information on living organisms and to assist countries in the implementation of the Protocal.

2.6.4 International Union for the Protection of New Varieties of Plants

The International Union for the Protection of New Varieties of Plants (UPOV) is an intergovernmental organization which was established by the International Convention for the Protection of New Varieties of Plants. The Convention was adopted in Paris in 1961 and it was revised in 1972, 1978 and 1991. The objective of the Convention is for the protection of new varieties of plants by an intellectual property right. It provides a sui generis form of intellectual property protection which has been specifically adapted for the process of plant breeding and has been developed with the aim of encouraging breeders to develop new varieties of plants.

In order to establish ownership and identity of a variety, SCCI carries out the test for Distinctness, Uniformity and Stability (DUS). The uniqueness of varieties being applied for release is evaluated in comparison to those of common knowledge. This ensures that only novel, uniform and stable varieties are released for commercial production in Zambia. The test is done in accordance with the Test Guidelines of the International Union for protection of New Varieties of Plants (UPOV).

Zambia is not a member of UPOV but has contacted the office for membership. UPOV has advised Zambia to make a few changes to the principle PBR Act (No. 18 of 2007) in order to become fully compliant. Zambia and UPOV are yet to finalize on this before the same is submitted to the legislature. Meanwhile Zambia will offer PBR based on the existing law of the land.

2.6.5 International Treaty on Plant Genetic Resources for Food and Agriculture

Zambia is a party to the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) that entered into force on 29th June 2004. The Treaty provides a legal framework recognizing the need for conservation and sustainable use of plant genetic resources for food and agriculture and a regime for access and benefit sharing. The Global Plan of Action on conservation and sustainable use of plant genetic resources is an important component of the Treaty. All contracting parties to the Treaty including Zambia cooperate during periodic reassessment of the state of the world's plant genetic resources for food and Agriculture.

3.0 CONCLUSIONS

i) Zambia has a developing seed industry which that produces adequate seeds for the local market and exports the excess seed.

ii) SCCI is the seed certification Authority in Zambia and actively participated the the formulation of SADC Technical Agreements on: Seed Variety Release; Seed Certification and Quality Assurance; and Quarantine and Phytosanitary Measures for Seed.

iii) Zambia is generally compliant to Technical Agreements agreed at SADC level. However, the country will need to align herself to SADC standards, practice and pest lists to become fully compliant.

iv) COMESA should establish a Seed Coordination Unit within AFSTA to spearhead the harmonization of seed regulations in the region.

v) Since some countries are members of both COMESA and SADC, COMESA should adopt SADC protocols already agreed on. However, the region should revisit the pest list because COMESA has even wider agro-ecological differences than within SADC.

vi) COMESA should develop a regional Plant Variety Protection Act that should be domesticated by member states. The region should also undertake to apply for membership to UPOV in order to boost agriculture in the region.

4.0 APPENDICES

Appendix 1: Terms of Reference

1- Services Required

The overall task is to conduct a baseline study/survey on Zambia seed sector to be used for the rationalization and harmonization of the seed regulations and policies in the COMESA Member States, which especially covers the areas listed below on point A to F. This study also should give general background information on the seed sector including seed statistics (production and import/export), availability and status of seed infrastructure, and assessment of capacity of the country to implement requirements about the five areas mentioned below on point A to F i.e. In another word, identify the potential weaknesses to implement effectively the forthcoming harmonized seed legislation.

A. Standards for seed certification

Give the following among others:

- *Background information and body, which is responsible for seed certification including the name and contact addresses of the head of this body;*
- *Existing seed classes (Breeders, Pre-basic, foundation/basic, certified, etc.)*
- *Standards for the crops handled (moisture content, germination rates, disease, etc.) and process for seed certification including necessary documentation;*
- *Check conformity with regional standards adopted by SADC;*
- *Provide seed related information at national level:*
- *Institutions and organizations involved in the national seed sector,*
- *The annual supply status of seed;*
- *Area of registered seed crop*
- *Sources of parent material..*
- *Future plan of the country for standards for seed certification;*
- *Any additional information on standards for the seed certification that is necessary for the purpose of the harmonization at COMESA level.*
  Database of seed growers by district, ward, crop varieties, gender.
  Identify seed houses.
  Identify agrodealers.
  Training conducted/provide to community seed producers so far.

B. Variety evaluation, release and registration

- *Background information and body, which is responsible for variety evaluation, release and registration including the name and contact addresses of the head of this body;*
- *Variety evaluation, release and registration system/process including the number of years required*
- *Crops included in the variety evaluation, release and registration system/process and necessary documentation;*
- *Check conformity with regional variety evaluation, release and registration adopted by SADC;*
- *Future plan of the country for variety evaluation, release and registration;*

- *Any additional information on the variety evaluation, release and registration that is necessary for the purpose of harmonization at COMESA level.*

C. Phytosanitary measures

- *Background information and body, which is responsible for phytosanitary measures including the name and contact addresses of the head of this body;*
- *Phytosanitary measures including the overall process, necessary documentation, and quarantine pest list for the country;*
- *Check conformity with regional phytosanitary measures in SADC if there is harmonized quarantine pest list or any other harmonized standards on phytosanitary measures;*
- *Future plan of the country for phytosanitary measures;*
- *Any additional information on the phytosanitary measures that is necessary for the purpose of harmonization at COMESA level.*

D. Plant Variety Protection (Intellectual Property Rights)

- *Background information and body, which is responsible for Plant Variety Protection including the name and contact addresses of the head of this body;*
- *Plant Variety Protection system in the country including the overall process for running the Plant Variety Protection and necessary documentation;*
- *Submit copies of legislation:*
- *Number of entries in Plant Variety Protection register;*
- *Check conformity with proposed regional Plant Variety Protection in SADC;*
- *Future plan of the country for Plant Variety Protection;*
- *Any additional information on the Plant Variety Protection that is necessary for the purpose of harmonization at COMESA level.*

E. Seed import/export documentation and procedures

- *Background information and body, which is responsible for seed import and export;*
- *Seed import and export procedures and documentation including the name and contact addresses of the head of this body;*
- *Check conformity with regional seed import and export procedures and documentation in SADC;*
- *Future plan of the country for seed import and export;*
- *Any additional information on seed import and export procedures and documentation that is necessary for the purpose of harmonization at COMESA level.*

F. Membership to International Organization

- OECD
- ISTA
- Catagena Protocol/CBD
- Etc.

Appendix 2: A comparison of seed certification standards between SADC and Zambia. The shaded ones denotes different standards between SADC and Zambia

i) Isolation (m)

	B-SADC	B-Zambia (ZM)		C-SADC	C- Zambia
Groundnuts	10	10		5	5
Pigeon pea	400	None		200	None
Soybean	10	10		5	5
Cotton H	500	400		400	200
Cotton OP	100	400		100	200
Sunflower OP	1000	2000		800	1500
Sunflower H	3000	2000		1500	1500
Tobacco	800	500		400	400
Rice	5	10		5	5
Pear millet	400	300 (A=400)		200	200
Beans	10	50		5	25
Sorghum OP	400	400		350	400
Sorghum H	750	400		500	400
Wheat	10	15		5	10
Cowpea	10	10		5	5
Maize OP	400	400		200	200
Maize H	400	400		350	200

ii) Maximum % of off-types (based on 1000 plants) - ZM: <u>Maximum number</u> of off-types (based on 1000 plants or 10 m^2)

	B-SADC	B- Zambia		C-SADC	C- Zambia
Groundnuts	0.2	1 (0.1)		0.2	2 (0.2)
Pigeon pea	0.1	None		0.3	None
Soybean	0.2	1 in 10m^2 (0.25)		0.5	2 in 10m^2 (0.5)
Cotton H	0.2	2 (0.2)		0.3	2 (0.2)
Cotton OP	0.2	2 (0.2)		0.3	2 (0.2)
Sunflower OP	0.2	10 (1.0)		0.5	20 (2.0)
Sunflower H	0.2	10 (1.0)		0.5	20 (2.0)
Tobacco	0.2	2 (0.2)		0.5	2 (0.2)
Rice	0.2	5 in 10m^2 (0.2)		0.3	10 in 10m^2 (0.4)
Pear millet	0.5	5 (0.5)		0.5	10 (1.0)
Beans	0.1	1 (0.1)		0.2	2 (0.2)
Sorghum OP	0.2	2 (0.2)		0.5	5 (0.5)
Sorghum H	0.2	2 (0.2)		0.5	5 (0.5)
Wheat	0.1	5 in 10m^2 (0.15)		0.3	10 in 10m^2 (0.3)
Cowpea	0.2	1 (0.1)		0.5	2 (0.2
Maize OP	0.5	1 (0.1)		1.0	3 (0.3)
Maize H	0.1	1 (0.1)		0.3	3 (0.3)

iii) Minimum number of inspections: For Zambia - these are not in the regulations

	B-SADC	B- Zambia		C-SADC	C- Zambia
Groundnuts	3			3	
Pigeon pea	3			3	
Soybean	3			3	
Cotton H	3			3	
Cotton OP	3			3	
Sunflower OP	3			3	
Sunflower H	5			5	
Tobacco	3			3	
Rice	3			3	
Pear millet	3			3	
Beans	3			3	
Sorghum OP	4			3	
Sorghum H	5			5	
Wheat	3			3	
Cowpea	3			3	
Maize OP	4			3	
Maize H	5			5	

iv) Minimum Germination %

	B-SADC	B- Zambia		C-SADC	C- Zambia
Groundnuts	75	80		75	75
Pigeon pea	75	None		80	None
Soybean	70	80		70	75
Cotton H	70	75		75	75
Cotton OP	70	75		75	75
Sunflower OP	75	90		85	85
Sunflower H	80	90		80	85
Tobacco	85	90		85	90
Rice	80	85		80	85
Pear millet	75	90		80	85
Beans	70	80		75	75
Sorghum OP	80	90		80	85
Sorghum H	80	90		80	85
Wheat	85	90		85	85
Cowpea	75	80		75	75
Maize OP	90	80		90	80
Maize H	70	90		90	90

v) Minimum % pure seed (by weight)

	B-SADC	B-Zambia		C-SADC	C- Zambia
Groundnuts	98.0	98.0		98.0	97.0
Pigeon pea	99.0	None		98.0	None
Soybean	99.0	99.0		98.0	99.0
Cotton H	99.0	99.0		98.0	98.0
Cotton OP	99.0	99.0		98.0	98.0
Sunflower OP	98.0	98.0		98.0	98.0
Sunflower H	98.0	98.0		98.0	98.0
Tobacco	99.0	99.0		99.0	99.0
Rice	98.0	99.0		98.0	99.0
Pear millet	98.0	99.0		98.0	99.0
Beans	99.0	99.0		99.0	99.0

Sorghum OP	99.0	99.0		98.0	98.0
Sorghum H	99.0	99.0		98.0	98.0
Wheat	99.0	98.0		99.0	97.0
Cowpea	99.0	99.0		98.0	98.0
Maize OP	99.0	99.0		99.0	99.0
Maize H	99.0	99.0		99.0	99.0

vi) Moisture %

	B-SADC	B- Zambia			
Groundnuts	9.0	14.0			
Pigeon pea	13.0	None			
Soybean	12.0	14.0			
Cotton H	10.0	10.0			
Cotton OP	10.0	10.0			
Sunflower OP	10.0	12.0			
Sunflower H	10.0	12.0			
Tobacco	8.0	8.0			
Rice	12.5	11.0			
Pear millet	11.0	11.0			
Beans	13.0	14.0			
Sorghum OP	12.0	12.5			
Sorghum H	12.0	12.5			
Wheat	13.0	11.0			
Cowpea	13.0	14.0			
Maize OP	13.0	11.0			
Maize H	13.0	13.5			

Appendix 3. Prescribe seed crops in Zambia

CEREALS:

Barley	*Hordeum vulgare L. sensu lato*
Maize	*Zea mays L.*
Millet (Finger)	*Eleusine coracana (L.) Gaertn.*
Millet (Pearl)	*Pennisetum typhoides (Burm. f.) Stapf et C.E. Hubb*
Oats	*Avena sativa L.*
Rice	*Oryza sativa L.*
Rye	*Secale cereale L.*
Sorghum	*Sorghum bicolor (L.) Moench*
Triticale	*X Triticosecale Wittm*
Wheat	*Triticum aestivum L. emend. Fiori et Paol.*

FIBER CROPS:

Cotton	*Gossypium L. spp.*
Flax	*Linum usitatissimum L.*
Kenaf	*Hibiscus cannabinus L.*

HERBAGE GRASSES:

Columbus grass	*Cenchrus ciliaris L.*
Buffel grass	*Sorghum almum L. Parodi*
Guinea grass	*Panicum maximum jacq.*
Paspalum grass	*Paspalum spp.*
Rhodes grass	*Chloris gayana Kunth*
Rye grass	*Lolium perenne L.*
Setaria grass	*Setaria italica (L.) Beauv.*
Teff grass	*Eragrotstis tef Trotter*
Weeping love grass	*Eragrostis curvula (Schrad.) Nees*

HERBAGE LEGUMES:

Centro	*Centrosema pubescens Benth.*
Clover	*Trifolium spp.*
Glycine	*Glycine javanica L.*
Greenleaf desmodium	*Desmodium intortum (Mill.) Urban.*
Leucaena	*Leucaena leucocephala (Lam.) de Wit*
Lucerne	*Medicago sativa L.*
Silverleaf desmodium	*Desmodium uncinatum (jacq.) DC.*
Siratro	*Macroptilium atropurpureum (DC.) Urban.*
Stylo	*Stylosanthes guianensis (Aubl.) Sw.*
Sunnhemp	*Crotalaria juncea L.*

OIL CROPS:

Castor bean	*Ricinus communis L.*
Groundnut	*Arachis hypogaea L.*
Linseed	*Linum usitatissimum L.*
Oilseed rape	*Brassica napus L. var. oleifera Mertg.*
Safflower	*Carthamus tinctorius L.*
Sesame	*Sesamum indicum L.*
Sunflower	*Helianthus annuus L.*
Jatropha	*Jatropha curcas L.*

PULSES:

Bean (including Bush, Pole, French, Haricot)	*Phaseolus vulgaris L.*
Broad beans	*Vicia faba L.*
Chick pea	*Cicer arietinum L.*
Common vetch	*Vicia sativa L. (incl. Vicia angustifolia Reichard)*
Cowpea	*Vigna unguiculata (L.) Walp.*

Dolichos bean	*Dolichos lablab L.*
Peas (including Garden, Field, Sugar)	*Pisum sativum L. sensu lato*
Pigeon pea	*Cajanus cajan (L.) Huth*
Soyabean	*Glycine max (L.) Merr.*
Velvet bean	*Mucuna deeringiana (Bort) Merr.*

ROOT CROPS:

Beets (including Mangel, Sugar, Spinach)	*Beta vulgaris L.*
Irish Potato (tuber)	*Solanum tuberosum L.*
Swede	*Brassica napus L. var. napobrassica (L.) Reichb.*
Turnip	*Brassica rapa L.*
Sweet Potatoe	*Ipomea batatas*
Cassava	*Manihot esculenta Grantz*
Yam	*Dioscorea spp*

STIMULANT CROPS:

Tobacco	*Nicotiana tabacum L.*
Coffee	*Coffea spp.*

VEGETABLES:

Amaranth	*Amaranthus spp.*
Bean (including Bush, Pole, French, Haricot)	*Phaseolus vulgaris L.*
	Vicia faba L.
Broad beans	*Beta vulgaris L.*
Beets (including Mangel, Sugar, Spinach)	*Brassica oleracea convar. botrytis (L.) Alef. Var.*
Broccoli	*cymosa Duch.*
	Brassica oleracea lonvar. olarecea var.
Brussels sprouts	*gemmifera DC.*
Cabbage	*Brassica oleracea L.*
Carrot	*Daucus carota L.*
Cauliflower	*Brassica oleracea lonvar. botrytis (L.) Alef.*
	var.botrytis L.
Celery	*Apium graveolens L.*
Chinese cabbage	*Brassica pekinensis (Lour). Rupr. (including*
	Brassica chinensis L.)
Cucumber (including gherkins)	*Cucumis sativus L.*
Dill	*Anethum graveolens L.*
Eggplant	*Solanum melongena L.*
Endive	*Cichorium endivia L.*
Impwa	*Solanum macrocarpum L.*
Kale	*Brassica oleracea covar. acephala (DC.) Alef.*
	var. medullosa Thell + var. viridis L.
Kohlrabi	*Brassica oleracea convar. acephala (DC.) Alef.*
	var. Gongylodes
Leek	*Allium porrum L.*
Lettuce	*Lactuca sativa L.*
Lusakasaka	*Corchrus tridens L.*
Muskmelon	*Cucumis melo L.*
Okra	*Hibiscus esculentus L.*
Onion	*Allium cepa L.*
Parsley	*Petroselinum crispum (P. Mill.) Nym. ex A.W.*
	Hill
Parsnip	*Pastinaca sativa L.*
Peas	*Pisum sativum L. sensu lato*
Pepper	*Capsicum annuum L.*
Potato	*Solanum tuberosum L.*
Pumpkin	*Cucurbita pepo L.*

Radish	*Raphanus sativus L.*
Rape	*Brassica napus L.*
Rhubarb	*Rheum rhaponiticum L.*
Spinach	*Spinacea oleracea L.*
Cats whiskers (Suntha)	*Cleome gynandra L.*
Swede	*Brassica napus var. napobrassica*
Sweet corn	*Zea mays L. var. saccharatum*
Swiss chard	*Beta vulgaris var. vulgaris*
Squash	*Cucurbita moschata (Duch) Duch ex. Poir.*
Tomato	*Lycopersicon lycopersicum (L.) Karst. Ex Farw.*
Turnip	*Brassica rapa L.*
Water melon	*Citrullus lanatus (Thunb) Matsum et Nakai*
Balck jjack	*Bidens Pilosa*

HERBS

Sweet worm wood	*Artemisia (annua) spp*
Moringa	*Moringer alifera*

Appendix 4. SADC Quarantine and Phytosanitary Measures for Seeds: Harmonized list of pests that require control when seeds of important crops are traded between SADC countries.

CROP	PEST/PATHOGEN	ZAMBIA
Zea mays L. (maize)	*Peronosclerospora phillipensis* *Cochliobolus heterostrophus*	*a) Peronosclerospora phillipinensis* (b) *Peronosclerospora sachari* (c) *Pseudomonas syringae* pv. *Coronafaciens* (d) *Clavibacter michiganensis* sp. *Nebraskensis* (e) *Sclerophthora macrospora* *(f) Claviceps gigantean* *(g)* Sugarcane mosaic virus (h) Barley Yellow Dwarf Virus
Brassica (cabbage)	Tobacco rattle virus	None
Triticum spp. (wheat)	*Tilletia indica*	(a) *Tilletia indica* (b) *Tilletia laevis* (c) *Tilletia tritici* (d) *Ditylenchus africanus* (e) *Ditylenchus dipsaci* (f) *Heterodera avenae*
Allium spp. (onion)	Tomato black ring virus *Ditylenchus dipsaci* Tobacco rattle virus	None
Phaseolus spp. (bean)	Bean mosaic virus Tomato black ring virus *Ditylenchus dipsaci*	(a) *Chalara elegans* (b) *Gibberella avenacea* (c) *Rhodococcus fascians* (d) *Ditylenchus dipsaci* (e) *Cirsium arvense* (f) *Papaver rhoeas* (g) Tomato black ring nepovirus
Vigna spp. (cowpea)	Peanut stripe virus	a) *Chalara elegans* (b) *Choanephora cucurbitarum* (c) *Cirsium arvense* (d) *Papaver rhoeas*
Helianthus spp. (sunflower)	Tobacco ringspot virus	None
Capsicum spp. (pepper)	Pepper mild mottle virus	None
Lycopersicum esculentum (tomato)	Tobacco ringspot virus Tomato black ring virus	None
Nicotiana spp. (tobacco)	Tobacco ringspot virus *Ralstonia solanacearum*	*(a) Chalara elegans* *(b) Gibberella avenacea* *(c) Raphanus raphanistrum* *(d) Rhodococcus fascians* *(e) Peronospora tabacina* *(f) Digitaria sanguinalis* *(g) Lepidium draba*
Pisum spp. (pea)	Pea seed borne mosaic virus *Ditylenchus dipsaci* *Phoma pinodella*	None

Manihot esculenta (cassava)	*Mononychellus tanajoa* East African cassava mosaic virus Cassava brown streak virus African cassava mosaic virus *Ralstonia solanacearum* race 3 biovar 4 Sweet potato mild mottle virus Sweet potato feathery mottle virus *Aphelenchoides besseyi* *Aphelenchoides ritzemabosi* *Ditylenchus destructor* *Radopholus similis*	None
Oryzae sativa (rice)	*Aphelenchoides besseyi* *Balansia oryzea-sativae* Sclerophtora macrospora *Tilletia barclayana* *Xanthomonas campestris* pv. oryzae *Xanthomonas oryzae* pv. oryzae *Xanthomonas campestris* pv. Oryzicola	Acidovorax avenae subsp. Avenae
Solanum tuberosum (potato)	Potato spindle tuber viroid Andean potato latent virus Andean potato mottle virus *Globodera rostochiensis* *Ralstonia solanacearum* *Clavibacter michiganensis* subsp michiganensis *Globodera rostochiensis* *Synchytrium endobioticum*	None
Arachis spp. (groundnut)	None	(a) *Glomerella cinguilata* (b) *Didymosphaeria arachidicola*
Glycine spp. (soybean)	None	(a) *Chalara elegans* (b) *Colletotrichum cocodes* (c) *Peronospora mashurica* (d) Tomato Spotted Wilt Virus
Gossypium spp. (cotton)	None	None
Sorghum spp. (sorghum)	None	a) *Parthenium hysterophorus* (Parthenium weed) (b) *Ambrosia artemisiifolia* (Annual ragweed) (c) *Polygonum aviculare* (Hogweed) (d) *Sorghum halepense* (Aleppo grass)

NB: The shaded green denotes similar pest lists between SADC and Zambia

Appendix 5. SADC Quarantine and Phytosanitary Measures for Seeds: Harmonized list of pests that require control when seeds of important crops are moved to a SADC country from a country outside the SADC region.

CROP	PEST/PATHOGEN	ZAMBIA
Zea mays L. (maize)	*Cephalosporium maydis*	The crop pest list is country specific.
	Peronosclerospora phillipensis	
	Erwinia stewartii	
	Cochliobolus heterostrophus	
Brassica (cabbage)	Tobacco rattle virus	
Triticum spp. (wheat)	*Tilletia indica*	
	Tilletia controversa	
	Anguina tritici	
Allium spp. (onion)	Tomato black ring virus	
	Ditylenchus dipsaci	
	Tobacco rattle virus	
Phaseolus spp. (bean)	*Curtobacterium flaccumfaciens* f.sp.	
	Bean mosaic virus	
	Pea early browning virus	
	Ditylenchus dipsaci	
	Tomato black ring virus	
	Cowpea severe mosaic virus	
Arachis spp. (groundnut)	*Aphelenchoides arachidis*	
	Peanut clump virus	
	Peanut mottle virus	
Vigna spp. (cowpea)	Southern bean mosaic virus (Sobemo virus)	
	Curtobacterium flaccumfaciens f.sp.	
	Urd Bean leaf crinkle virus	
	Peanut stripe potyvirus	
Helianthus spp. (sunflower)	Tobacco ringspot virus	
	Diaporthe helianthi (Phomopsis)	
Capsicum spp. (pepper)	Tomato bushy stunt virus	
	Tomato ringspot virus	
	Pepper mild mottle virus	
Lycopersicum esculentum (tomato)	*Fusarium oxysporum* f.sp. Licopersici race 3	
	Tomato ringspot virus	
	Potato spindle tuber viroid	
	Tobacco ringspot virus	
	Tomato black ring virus	
Lolium spp. (ryegrass)	*Tilletia controversa*	
Nicotiana spp. (tobacco)	*Peronospora hyoscyami* f. sp. Tabacina	
	Tobacco ringspot virus	
	Ralstonia solanacearum	
	Tomato ringspot virus	

Appendix 6. List of persons spoken to

1. Mable Simwanza (Mrs), Chief Seeds Officer, Seed certification - SCCI
2. Catherine Mungoma (Dr), Director, SCCI
3. Richard Chanda, Senior Seeds Officer, VTRP – SCCI
4. Allan Sakala, Head PQPS, ZARI
5. Mable Mudenda, PQPS, ZARI
6. Kenny Msiska, PQPS, ZARI
7. Andrew Phiri, National Plant Genetic Resource Centre, ZARI
8. Mr. Mundia, Marketing Department, MACO
9. Mr. Anayawa Mutemwa: Principal Economist - Trade and Entrepreneurship

Appendix 7. References

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