National Competency Standards Level-2
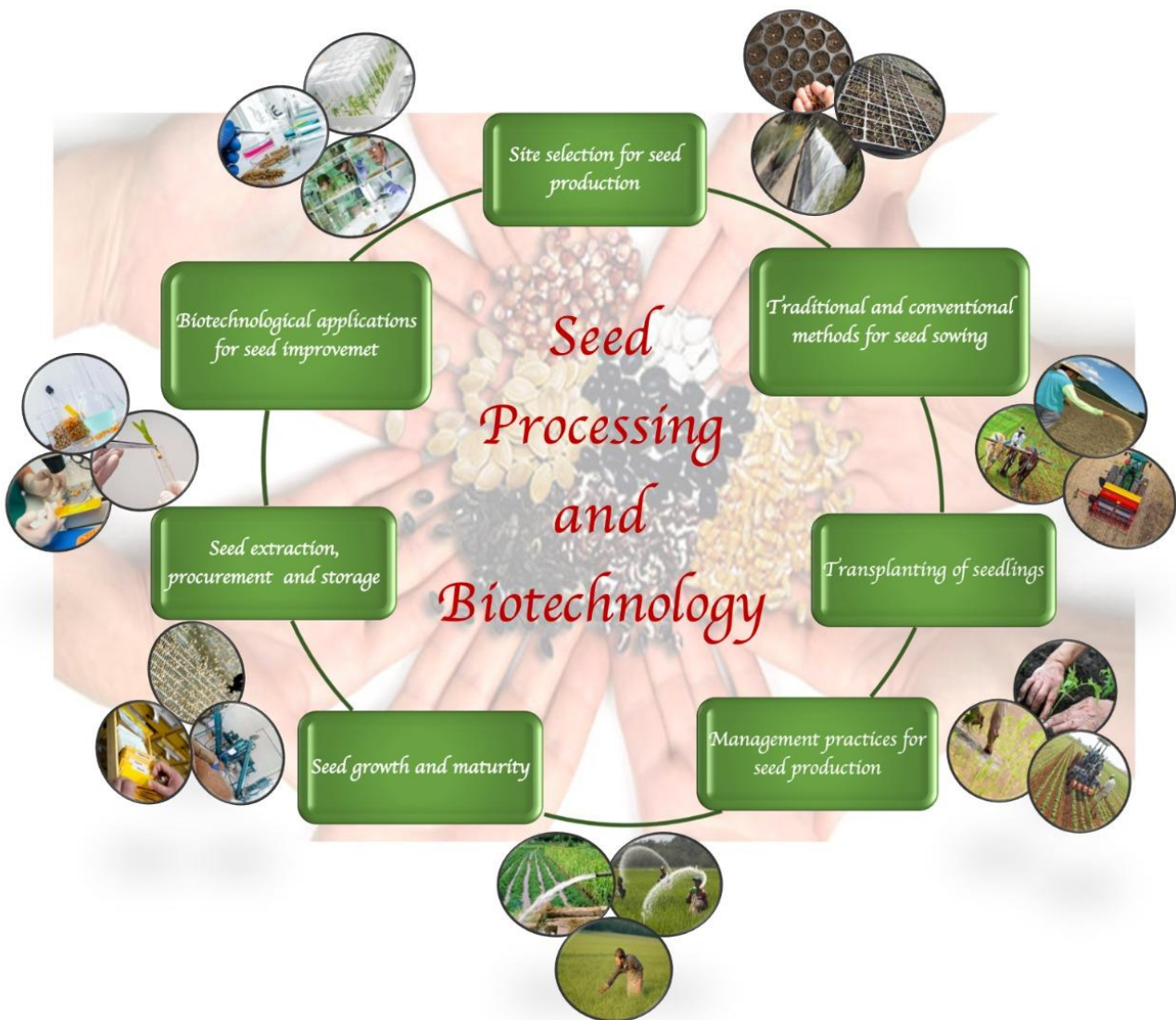
For

"Seed Processing & Biotechnology"

(Field Assistant for Seed Processing)

National Vocational and Technical Training Commission (NAVTTC),

Government of Pakistan

ACKNOWLEDGEMENT

National Vocational and Technical Training Commission (NAVTTC) extends its gratitude and appreciation to many representatives of business, industry, academia, government agencies, Provincial TEVTAs, Sector Skill Councils and trade associations who spared their time and expertise to the development and validation of National Vocational Qualifications (Competency Standards, Curricula, Assessments Packs and related material) for the trade of Seed processing & Biotechnology. This work would not have been possible without the technical support of the personnel of the above said organizations. The core team for Qualification Development of various trades comprised of:

- *Mr. Naeem Siddique, Director General (Skills Standards and Curricula) NAVTTC*

- *Mr. Sikandar Masood, Director (Skills Standards and Curricula), NAVTTC*

- *Mr. Muhammad Ishaq, Deputy Director (Skills Standards and Curricula), NAVTTC*

- *Mr. Muhammad Aasim*, Assistant Director *(Skills Standards and Curricula), NAVTTC*

NAVTTC team under the supervision of Dr. Nasir Khan, Executive Director, NAVTTC, initiated development of CBT & A based qualifications for 200 traditional / hi-tech trades under the Prime Minister "skill for all" Program.

Nobody has been more important in the pursuit of this project than Dr. Nasir Khan, Executive Director, NAVTTC, whose patronage and support remained there throughout the development process. Special thanks to Syed Javed Hassan Chairman NAVTTC who made it happened in this challenging time.

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1. Introduction

Pakistan has a semi-industrialized economy with a well-integrated agriculture sector. The agriculture sector contributes 18.5 percent to the country's GDP. Despite its impressive and continuously growing agricultural production, the country is still facing high levels of food insecurity. The global community, through the Sustainable Development Goals, has committed to achieving a world free of hunger by 2030. This will require the sustained production of about 60 percent more food than at present, food that is both nutritive and innocuous, and produced in ways that do not mutilate the environment. Under most scenarios, there are no surplus land or water resources to deploy to increase agricultural production. In fact, the most sustainable path to this goal is through enhanced productivity in a sustainable way. That means producing more yield with fewer external inputs. To support this, farmers need to use well-adapted crop varieties. A country's seed delivery system is best conceived as a value chain composed of interrelated components – from the development of well-adapted and nutritious crop varieties and their adoption by farmers, through the production and distribution, including sales of quality seeds and planting materials and to on-farm utilization of these inputs by farmers. The effective functioning of the value chain, enabled by the applicable national seed laws, policies, strategies, action plans and regulations, depends largely on the extent to which the stakeholders are able to put into practical use the relevant knowledge and skills required for producing quality seeds and planting materials. Seeds coming from the field after harvest usually contain undesirable materials which must be removed during processing to obtain clean seed suitable for planting. Seed enterprises often acquire specialized equipment for processing their seed, and they need technical guidance on the effective use and maintenance of the various pieces of equipment in order to enhance performance, minimize breakdowns and ensure prolonged machine life. A scientific knowledge of Biotechnology plays a key role in improving quality of seed which will be available to farmers by facilitating them with new ways to combat weeds, insects and other agronomic challenges, and produce more food, feed and fuel to better fulfill customer requirements. Biotechnology helps agriculture sector by following more sustainable approach, both economically and environmentally.

Therefore, the importance of knowledge related to seed processing and biotechnology through the latest techniques makes this diploma more valuable. Market demands for qualified workers are therefore a need of time and can only be addressed by developing specific skills standards in partnership with all stakeholders and industry experts. Recognizing this fact, the National Vocational and Technical Training Commission (NAVTTC) has developed the National Vocational Qualifications Framework (NVQF) for seed processing and biotechnology. These competency standards have been developed by the Qualification Development Committee (QDC) and validated by the

Qualification Validation Committee (QVC) with representation from the country's leading departments, NPSL, FAS, PU Lahore, UVAS, UAF, PCSIR and ARI KPK.

2. Purpose of the Qualification

The aim of this qualification is to set high and applicable professional standards for all stake holders in agriculture sector. The basic goals of establishing these credentials are as follows:

1. Equip with the latest Seed processing techniques
2. Improve trainees' professional competences
3. Provide opportunities for recognition of non-formal or informal skills
4. Raise standard and efficacy of scientific training and assessment
5. Improve crop production through the best management skills
6. Enable the existing workforce to learn new technologies and methods
7. Producing a skilled workforce for off-season vegetable production

3. Date of Validation

The level 2 of National qualification on Seed processing & Biotechnology has been validated by the Qualifications Validation Committee (QVC) members on June 21-25, 2021at PITAC, Lahore and will remain valid for ten years i.e., **25 June, 2031**

4. Date of Review

The level 2 of National qualification on Seed processing & Biotechnology has been validated by the Qualifications Validation Committee (QVC) members on June 21-25, 2021at PITAC, Lahore and shall be reviewed after three years i.e., 24-06-2024.

5. Codes of Qualifications

The International Standard Classification of Education (ISCED) is a framework for assembling, compiling and analyzing cross-nationally comparable statistics on education and training. ISCED codes for these qualifications are assigned as follows:

ISCED Classification for Seed Processing & Biotechnology Level 2	
ISCED Code	**Description**
Field Assistant for Seed Processing (Level 2)	
0811SP&B01-A	Follow Safety Rules at Site
001100851-B	Perform Basic Communication Skills
0732SP&B01-C	Perform Basic Computer Applications
0811SP&B01-D	Operate Equipment/Machinery Used in Harvesting
0811SP&B01-E	Maintain Equipment/Machinery Used in Harvesting
0811SP&B01-F	Perform Seed Harvesting
0811SP&B01-G	Perform Threshing of Seed
0811SP&B01-H	Post-Harvest Management of Threshed Seed

6. Members of Qualification Development Committee

The following members participated in the qualification development processon26ᵗʰto30ᵗʰ April 2021at PITAC, Lahore.

S#	Name	Designation
1.	Mr. Awais Waheed	Research Associate, Agronomy Department, AU Rawalpindi.
2.	Dr. Sumaira Maqsood	Assistant Professor – Faculty of Agricultural Sciences, PU Lahore
3.	Mr. Amir Rehman	Assistant Director, KPK Seed Corporation, Peshawar KPK.
4.	Mr. Adnan Zahid	Lecturer – Faculty of Agricultural Sciences, PU Lahore
5.	Ms. Hina Ashraf	PhD Scholar – Faculty of Agricultural Sciences, PU Lahore
6.	Mr. Muhammad Abdul Basit	Fast Agro Chemicals, Lahore
7.	Ms. Noor ul Ain	M.Phil. Scholar, Lahore
8.	Mr. Umair Khan	Plant Breeding & Genetics Expert, Tara Group Lahore
9.	Mr. Muhammad Asif	Master Trainer (Agriculture Sector), Lahore
10.	Mr. Muzammil Usman Khan	Green Lands Pvt Ltd Lahore
11.	Hafiz Muhammad Waqas Amjad	Green Gold Agri Seed Pvt Ltd Lahore
12.	Mr. Muhammad Ahmad	Mercury Seeds Lahore
13.	Ms. Samia Amir Hamza	M.Phil. Scholar, GCU Faisalabad
14.	Engr. Danish Khan	DACUM Facilitator
15.	Mr. Muhammad Ishaq	Deputy Director/ Coordinator –*(Skills Standards and Curricula)* NAVTTC HQ

7. Members of Qualification Validation Committee

The following members participated in the qualification validation processing 12-01-2021 to 16-01-2021at PITAC, Lahore.

S#	Name	Designation
1.	Mr. Awais Waheed	Research Associate, Agronomy Department, AU Rawalpindi.
2.	Dr. Sumaira Maqsood	Assistant Professor – Faculty of Agricultural Sciences, PU Lahore
3.	Mr. Amir Rehman	Assistant Director, KPK Seed Corporation, Peshawar KPK.
4.	Mr. Muhammad Abdul Basit	Fast Agro Chemicals, Lahore
5.	Ms. Hina Ashraf	PhD Scholar – Faculty of Agricultural Sciences, PU Lahore
6.	Hafiz Muhammad Waqas Amjad	Green Gold Agri Seed Pvt Ltd Lahore
7.	Ms. Samia Amir Hamza	M.Phil. Scholar, GCU Faisalabad
8.	Mr. Muhammad Hashim	Training and Development Officer, Agrilla Seeds Faisalabad
9.	Mr. Shoukat Ali Rana	PBTE, Representative
10.	Mr. Liaqat Ali Jamhro	Director S-TEVTA
11.	Mr. Mushtaq Ahmad	Dy. Director Training, P-TEVTA Representative
12.	Ms. Hadia Maqsood	Faculty of Agricultural Sciences, PU Lahore
13.	Ms. Noor ul Ain	M.Phil. Scholar, Lahore
14.	Engr. Danish Khan	DACUM Facilitator
15.	Mr. Muhammad Ishaq	Deputy Director/ Coordinator – (Skills Standards and Curricula) NAVTTC HQ

8. Entry Requirements

The entry requirement for this qualification would be SSC.

9. Detail of Competency Standards

Code	Competency Standard	Category	Level	Credit
0811SP&B01-A	Follow Safety Rules at Site	Generic	2	3
001100851-B	Perform Basic Communication Skills	Generic	2	3
0732SP&B01-C	Perform Basic Computer Applications	Generic	2	6
0811SP&B01-D	Operate Equipment/Machinery Used in Harvesting	Technical	2	12
0811SP&B01-E	Maintain Equipment/Machinery Used in Harvesting	Technical	2	6
0811SP&B01-F	Perform Seed Harvesting	Technical	2	15
0811SP&B01-G	Perform Threshing of Seed	Technical	2	9
0811SP&B01-H	Post-Harvest Management of Threshed Seed	Technical	2	6

1. Field Assistant for Seed Processing

CS 0811SP&B01-A: Follow Safety Rules at Site

Overview: This competency standard covers the skills and knowledge required for understanding to follow safety rules at site

Competency Units	Performance Criteria
CU1. Maintain occupational safety and health at workplace	P1. Identify the safety signs and symbols P2. Erect barricades, hoardings, signage in the hazardous areas P3. Maintain housekeeping P4. Report unsafe condition to immediate supervisor (shift person)
CU2. Use Personal Protective and Safety Equipment (PPE)	P1. Identify risk associated with job to be done P2. Select PPE according to job P3. Wear PPE according to job P4. Store PPE at Designated place after use
CU3. Perform communication signals	P1. Identify different types of communication hand signals. P2. Use appropriate hand signals as per situation
CU4. Manually handling of loads	P1. Check the load's weight to be handles P2. Check the availability of broad stable base P3. Lift and place the load with proper posture P4. Lift the load as per given standards

Knowledge & understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of

K1. Safely lifting loads

K2. Types of loads

K3. Basic ergonomics principles

K4. State the load lifting procedures

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Report about health and safety at workplace
- Shift manually load to a designated location.

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
4	Computer system
5	First Aid Box

CS 001100851-B: Perform Basic Communication Skills

Overview: This competency standard covers the skills, knowledge and understanding required to perform basic communication.

Competency Units	Performance Criteria
CU1. Demonstrate the basic communication skills	**P1.** Demonstrate the listening skills **P2.** Demonstrate the reading skills **P3.** Demonstrate the writing skills **P4.** Demonstrate the speaking skills
CU2. Follow Supervisor's instructions	**P1.** Carry out the instructions of the supervisor **P2.** Report to the supervisor as per organizational SOP's given standards

Knowledge & understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of

K1. Communication skills (7Cs of effective communication)

K2. Verbal and non-verbal communication

K3. Reporting techniques

K4. Advance language skills

K5. Indirect communication method

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

➢ Listen to the audio and write down

➢ Note down the instructions given by the supervisor

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1	White board
2	Multimedia
3	Internet

4	Computer system
5	First Aid Box
6	PPES

CS 0732SP&B01- C:Perform Basic Computer Applications

Overview: This competency standard covers the skills, knowledge and understanding required to perform basic computer applications.

Competency Units	Performance Criteria
CU1. Perform Basic Configuration of Computer System	**P1.** Connect computer components and peripherals as per requirement **P2.** Install drivers and applications according to the software specification **P3.** Troubleshoot applications to trace and fix faults in a specific application to bring it in a running condition
CU2. Create a document using MS Word	**P1.** Compose a document as per the requirement **P2.** Format Word Document according to given requirements **P3.** Print Word Documents according to requirements
CU3. Create an e-mail account	**P1.** Select email browser **P2.** Go to sign in page **P3.** Add Personal Information **P4.** Enter and confirm password
CU4. Prepare Spreadsheet using MS Excel	**P1.** Create worksheet as per given data **P2.** Format the worksheet according to given criteria **P3.** Apply formulas according to the requirement **P4.** Generate Charts/Graphs according to the given data **P5.** Print Worksheet according to requirements
CU5. Prepare a presentation using MS Power Point	**P1.** Insert slides with different layouts according to requirements of presentation. **P2.** Insert text, tables, images, etc. according to the requirement. **P3.** Apply a set of effects to animate the slide according to requirement. **P4.** Apply slide transitions on slides according to requirement. **P5.** Apply sound effects on objects/text/images according to requirement.

Knowledge & understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of

K1. Different computer components

K2. Operating systems

K3. Hardware and Software

K4. Process of troubleshooting of application software

K5. Internet and E-mail address.

K6. Knowledge of email attachments

K7. Encryption of email address and documents.

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

➤ Create an email account and send an email along with an attachment (document and picture)

➤ Develop a work sheet as per given data

➤ Design a Power Point Presentation

➤ Create document in MS Word

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1	White board
2	Multimedia
3	Internet
4	Computer system
5	First Aid Box
6	PPES

CS 0811SP&B01-D: Operate Equipment/Machinery Used in Harvesting

Overview: This competency standard covers the skillsto get knowledge and understanding to operate equipment/machinery used in harvesting.

Competency Units	Performance Criteria
CU1. Prepare for work	**P1.** Arrange tools and equipment for maintenance of machinery **P2.** Perform pre checks according to SOPs
CU2. Operate Tractor	**P1.** Drive tractor according to SOPs **P2.** Follow health and safety guidelines
CU3. Operate harvesting machinery	**P1.** Arrange tools for required task **P2.** Operate harvesting machines according to SOPs **P3.** Follow health and safety guidelines

Knowledge & understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of

K1. Tractor operations

K2. Basic Agriculture Harvesting operation

K3. Understand operation of implements involved in crop Harvesting

K4. Basic SOPs for each implement mentioned in booklet or defined manual

K5. Health and safety principles involved in operations

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

➢ Operate tractor

➢ Operate harvesting machinery

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Laptops
2.	Projector
3.	Tractor
4.	Power tools
5.	Management and maintenance tools
6.	Harvesting Machinery
7.	First Aid kits
8.	PPEs

CS0811SP&B01-E: Maintain Equipment/ Machinery used in Harvesting

Overview: This competency standard covers the skills and knowledge required to get understanding to maintain equipment/machinery used in harvesting.

Competency Units	Performance Criteria
CU1. Perform Routine checks	**P1.** Prepare history sheet/card for required machinery according to SOPs **P2.** Clean machines according to SOPs **P3.** Maintain records
CU2. Perform troubleshooting	**P1.** Select and arrange tools for required task **P2.** Perform machinery pre checks according to SOPs **P3.** Calibrate basic machines according to SOPs **P4.** Execute troubleshot operations according to work instructions **P5.** Maintain records
CU3. Perform handling of machinery	**P1.** Clean machines before and after use according to instructions **P2.** Place machines in parking area according to SOPs **P3.** Maintain log books according to work instructions **P4.** Maintain records

Knowledge & understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of

K1. Basic SOPs for each implement mentioned in booklet or defined manual

K2. Troubleshooting of machines

K3. Health and safety principles involved in operations

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

➢ Maintain Equipment/ Machinery used in Harvesting

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Laptops
2.	Projector
3.	Tractor
4.	Tillage implements
5.	Power tools
6.	Management and maintenance tools
7.	Harvesting Machinery
8.	First Aid kits
9.	PPEs

CS 0811SP&B01-F: Perform Seed Harvesting

Overview: This competency standard covers the skill and knowledge required to identify seed maturity and harvesting operations.

Competency Units	Performance Criteria
CU1. Prepare materials to Identify produce maturity	**P1.** Arrange tools and equipment as per requirements **P2.** Collect information regarding crop maturity according to instructions **P3.** Prepare report **P4.** Maintain records
CU2. Schedule the harvesting operation	**P1.** Collect information regarding weather conditions according to work instructions **P2.** Arrange required resources for harvesting process **P3.** Prepare work plan and submit
CU3. Perform Harvesting	**P1.** Arrange machinery as per crop requirement. **P2.** Perform manual harvesting according to crop requirement **P3.** Perform mechanical harvesting according to set practices. **P4.** Maintain record according to SOPs

Knowledge and Understanding

This competency standard will provide knowledge related to

K1. Maturity indicator parameters

K2. Understand the different physiological stages of crop

K3. Crop growth stages

K4. Standards applied for produce maturity and harvesting

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

➤ Perform harvesting operation

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Note book
2.	Pencil
3.	Gardening tool kit
4.	Refractometer
5.	Sampling and labeling tools
6.	Harvester
7.	Reaper
8.	Sickle
9.	PPEs
10.	Manual Harvester
11.	First aid kit

CS 0811SP&B01-G: Perform Threshing of Seed

Overview: This competency standard covers the skill and knowledge required for threshing of crops.

Competency Units	Performance Criteria
CU1. Prepare for seed threshing	**P1.** Arrange tools and equipment as per requirements **P2.** Collect harvested commodity according to SOPs **P3.** Maintain records
CU2. Schedule the Threshing operation	**P1.** Collect information regarding weather conditions according to work instructions **P2.** Arrange required resources for threshing process **P3.** Prepare work plan and submit
CU3. Execute Threshing Operations	**P1.** Arrange machinery as per crop requirement. **P2.** Perform mechanical threshing according to set practices. **P3.** Perform manual threshing according to crop requirement **P4.** Maintain record according to SOPs

Knowledge and Understanding

This competency standard will provide knowledge related to

K1. Types of Threshing

K2. Machines used for threshing

K3. Operations regarding threshing

K4. Health and safety requirements

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

➤ Perform threshing operations

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Note book

2.	Pencil
3.	Threshers
4.	Tractor
5.	Manual threshing tools
6.	PPEs
7.	First aid kit

CS0811SP&B01-H:Post Harvest Management of Threshed Seed

Overview: This competency standard covers the skills and knowledge required to understand post-harvest handling of threshed seeds.

Competency Units	Performance Criteria
CU1. Handle threshed seed	**P1.** Arrange tools and material for handling **P2.** Store threshed seed according to instructions **P3.** Maintain record as per SOPs
CU2. Perform Sun-drying of Seed	**P1.** Arrange tools and material **P2.** Schedule the sun-drying operation according to environmental condition **P3.** Select appropriate place for sun drying of seeds **P4.** Place seed for Sun drying according to instructions **P5.** Maintain record as per SOPs
CU3. Perform Cleaning of seeds	**P1.** Arrange tools and material **P2.** Remove derbies/dust/trash using graded sieves as per instruction **P3.** Separate light weight material by gentle winnowing method **P4.** Separate damaged seeds **P5.** Pack and label seeds according to instructions **P6.** Maintain record as per SOPs

Knowledge & understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of

K1. Environmental condition required for sun-drying

K2. Cleaning operations

K3. Health and safety requirements

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

➢ Handling the threshed seed

- ➢ Sun drying of seed
- ➢ Cleaning of seeds

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1	Tractor
2	Plastic sheets
3	Sieves
4	Cleaning Brushes
5	First Aid Box
6	PPEs
7	Cleaning Fan
8	Packaging Bags
9	Seed tiers
10	Tray
11	Raker
12	Bin
13	Cutters