



FPI

MRV SYSTEMS SPECIFICALLY DESIGNED FOR MORINGA AGRICULTURE-BASED CLUSTERS (M-ABCs)

Everything in this manual is written in high-level policy language, suitable for governments, UN agencies, donors, investors, carbon markets, ministries, BETP, and the international community.

Monitoring, Reporting & Verification (MRV) Manual for Moringa Agriculture-Based Clusters (M-ABCs)

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1. INTRODUCTION TO MRV

Monitoring, Reporting, and Verification (MRV) is the backbone of climate-smart agriculture and agroforestry.

It provides a **credible, measurable, traceable, and auditable** system of documenting all environmental, production, and carbon-related activities in the M-ABC ecosystem.

MRV ensures that:

- farmers comply with FPI Standards of Service (SoS)
 - clusters maintain international certification
 - carbon sequestration is scientifically validated
 - export products meet SPS, HACCP & EcoCert requirements
 - environmental impact is measurable
 - funding and carbon credit revenues flow into communities
 - donors and ministries trust the system
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2. MRV LEGAL & POLICY BACKGROUND

MRV aligns with:

- **UNFCCC** (United Nations Framework Convention on Climate Change)
- **Paris Agreement Article 13 (Transparency Framework)**
- **IPCC Guidelines for Agriculture, Forestry & Land Use (AFOLU)**
- **ISO 14064 (Carbon Quantification Standards)**
- **EcoCert Organic Certification Standards**
- **EU Regulation 2018/848**
- **FDA/NOP (USA Organic Import Rules)**
- **SADC & AfCFTA SPS Protocols**

This makes FPI's system internationally compliant.

3. MRV IN AGRICULTURE & AGROFORESTRY

In agriculture, MRV measures:

- canopy growth
- tree survival rate
- biomass increase
- soil organic carbon
- water use efficiency
- organic management
- pesticide-free compliance
- climate impacts
- land restoration metrics

In Moringa systems, MRV is especially powerful because:

- Moringa grows fast
- biomass increases rapidly
- carbon sequestration is measurable
- agroforestry improves soil
- trees live 30–43 years
- yields can be calculated with precision

4. MRV REQUIREMENTS FOR M-ABCs

M-ABCs must record:

- GPS coordinates of each farm
- number of trees planted
- tree survival percentage
- annual pruning cycles
- harvest cycles (3–8 annually)

- moisture levels
 - field hygiene
 - traceability batch numbers
 - monthly compliance
 - cluster aggregation figures
 - processing documentation
 - carbon storage data
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5. MRV INDICATORS & MEASUREMENT PROTOCOLS

A. Core MRV Indicators

1. **Tree Population (TP)**
2. **Tree Survival Rate (TSR%)**
3. **Biomass Accumulation (BA)**
4. **Canopy Diameter (CD)**
5. **Soil Organic Carbon (SOC)**
6. **Harvest Yield per Cycle (HYC)**
7. **Annual Leaf Biomass Yield (ALBY)**
8. **Moisture Levels (ML%)**
9. **Irrigation Logs (IL)**
10. **Field Hygiene Status (FHS)**
11. **Agroforestry Diversification Index (ADI)**
12. **Carbon Sequestration Rate (CSR)**

B. Moringa-Specific MRV Indicators

- Moringa Growth Rate Index (M-GRI)
- Pruning Cycle Compliance (PCC)
- Moringa Leaf Integrity Score (MLIS)

- Seed Yield Index (SYI)
 - Leaf Powder Quality Score (LPQS)
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6. MONITORING PROCEDURES

A. Farm-Level Monitoring (FLM)

Monthly monitoring of:

- tree growth
- soil condition
- canopy width
- pest presence
- irrigation quantity
- field hygiene

B. Cluster-Level Monitoring (CLM)

Performed by Cluster Compliance Officers:

- harvest verification
- moisture checks
- GPS compliance
- SoS discipline monitoring

C. District-Level Monitoring (DLM)

Focuses on:

- cluster performance
- environmental compliance
- MRV reporting
- carbon baselines

D. National-Level Monitoring

Led by FPI & HGN:

- national reports
 - carbon inventories
 - export readiness verification
 - annual performance audits
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7. REPORTING PROCEDURES

Daily Reports:

- irrigation
- pruning
- field hygiene

Weekly Reports:

- growth check
- pest check
- leaf quality report

Monthly Reports:

- full MRV form
- yield reports
- moisture results
- GPS compliance

Quarterly Reports:

- carbon sequestration
- cluster compliance
- training attendance
- SoS scoring

8. VERIFICATION PROCEDURES

Internal Verification (IV)

Performed by FPI cluster officers.

District Verification (DV)

Checks data accuracy.

External Verification (EV)

Performed by EcoCert, carbon auditors, government.

Third-Party Verification (TPV)

Required for carbon credits and EU/US markets.

9. CARBON MEASUREMENT & CALCULATION

MRV calculates:

- CO₂ equivalent stored per tree
- annual carbon absorption
- carbon per hectare
- carbon per cluster
- eligibility for carbon revenue

Moringa sequestration range:

- **20–40 tons CO₂/ha/year (agroforestry system)**
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10. TRACEABILITY INTEGRATION

Each batch includes:

- QR Code (QRC)
- Batch ID (BID)
- Cluster Code (CC)

- Farmer ID (FID)
 - GPS Coordinates (GPS-F)
 - Moisture Level (ML%)
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11. DATA MANAGEMENT

Digital systems include:

- cluster dashboards
 - national MRV database (N-MRVD)
 - SoS ranking engine
 - farmer performance reports
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12. ROLES & RESPONSIBILITIES

Farmer

Collects farm data.

Cluster Compliance Officer (CCO)

Aggregates and verifies.

District MRV Officer (DMO)

Validates compliance.

National MRV Secretariat (N-MRVS)

Compiles national reports.

External Auditors

Verify export and carbon accuracy.

13. MRV & EXPORT MARKETS

MRV ensures compliance with:

1. SPS — Sanitary & Phytosanitary Standards

Protects **human, animal, and plant health** by ensuring food is safe and free from diseases during production and export.

2. HACCP — Hazard Analysis & Critical Control Points

A global food safety system that prevents contamination during **processing, packaging, and manufacturing**.

3. ISO — International Standards Organization

Sets international standards for **quality, food safety, and management systems**, including ISO 22000.

4. EcoCert

A global organic certification body ensuring crops and products are **chemical-free, organically grown, and sustainably processed**.

5. FDA/NOP (USA)

U.S. regulations for **food safety and organic imports**, ensuring all Moringa entering the USA is **safe, traceable, and certified organic**.

6. EU 2018/848 — EU Organic Regulation

The law governing **organic imports into Europe**, ensuring strict compliance with EU organic farming and processing standards.

14. MRV & CLIMATE FINANCING

MRV makes Moringa eligible for:

- Carbon credits
- Green Climate Fund (GCF)
- Climate-Smart Agriculture grants
- Donor funding
- UNDP climate financing

15. NON-COMPLIANCE REMEDIES

- retraining
- penalties
- SoS credit deductions
- sales suspension
- cluster temporary removal

16. MRV TEMPLATES & REGISTERS

Templates are provided in Section 2.

17. YEARLY MRV AUDITS

Annual cluster audits confirm:

- export readiness
- carbon accuracy
- compliance levels
- cluster performance

18. CLUSTER, DISTRICT & NATIONAL FORMAT

Standardised forms provided below.

19. Quality Assurance (QA) and Quality Control (QC)

Includes:

- cross-checks and verification controls
- moisture testing
- contamination screening

20. ANNEXES

Glossary

SECTION 2 — THE FOLLOWING MRV TEMPLATES SHALL BE MADE FOR FARMERS

A. Daily Farm Log (MRV-DFL)

- Date
- Farmer ID
- Cluster ID
- Irrigation quantity
- Field hygiene
- Pests observed
- Notes

B. Weekly Monitoring Form (MRV-WMF)

- Tree height
- Canopy measurement
- Irrigation status
- Leaf colour
- Soil moisture

C. Monthly MRV Report (MRV-MMR)

- Tree survival %
- Yield
- Dry weight
- Moisture %
- Traceability batch ID
- Training attended

- SoS compliance score

D. Carbon Monitoring Sheet (MRV-CMS)

- Trees counted
- Biomass weight
- Canopy size
- Moringa Carbon Index (MCI)

E. Cluster Aggregation Template (MRV-CAT)

- Farmer batches
 - Weighing
 - Moisture test
 - Quality score
 - Cluster verification
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SECTION 3 — WEBSITE PAGE: MRV PAGE (WEB-READY)

MRV — Monitoring, Reporting & Verification

Ensuring Transparency, Climate Integrity & Export Compliance in All M-ABCs

MRV ensures that all Moringa Agriculture-Based Clusters (M-ABCs) meet global standards for:

- climate reporting
 - carbon measurement
 - export certification
 - traceability
 - compliance
 - sustainability
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What MRV Measures

- Tree growth
- Biomass
- Soil carbon
- Water use
- Pest-free status
- Organic integrity
- Carbon sequestration
- Traceability

Visit:

👉 [Moringa Agriculture-Based Clusters \(M-ABCs\)](#)

👉 [Moringa Agroforestry Page \(MAP\)](#)

Why MRV Matters

MRV guarantees:

- market trust
 - investor confidence
 - donor reporting
 - carbon credit eligibility
 - export compliance
 - climate transparency
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MRV Tools & Systems

- GPS mapping
- QR traceability
- Batch IDs

- Cluster logs
 - Carbon calculators
 - National MRV dashboard
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SECTION 4 — MRV SYSTEMS SPECIFICALLY DESIGNED FOR MORINGA CLUSTERS (M-ABCs)

M-ABC MRV System Includes:

1. **Moringa Growth Monitoring Index (MGMI)**
2. **Moringa Carbon Index (MCI)**
3. **Moringa Biomass Measurement Protocol (MBMP)**
4. **Leaf Quality Scoring Matrix (LQSM)**
5. **Moisture Regulation Protocol (MRP)**
6. **Tree Survival Tracking System (TSTS)**
7. **Cluster Carbon Ledger (CCL)**
8. **Farmer Performance Scorecard (FPS)**

All systems integrate into the **National MRV Secretariat Dashboard (N-MRVS-D)**.
