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| | | | **Food and Agriculture Organization of the United Nations** | **Organisation des Nations Unies pour l'alimentation et l'agriculture** | Продовольственная и сельскохозяйственная организация Объединенных Наций | **Organización de las Naciones Unidas para la Alimentación y la Agricultura** |

# COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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| **Intergovernmental Technical Working Group on Forest Genetic Resources** |
| **Second Session** |
| **Rome, 23 - 25 January 2013** |
| ***THE STATE OF THE WORLD'S FOREST GENETIC RESOURCES*** **KEY FINDINGS** |
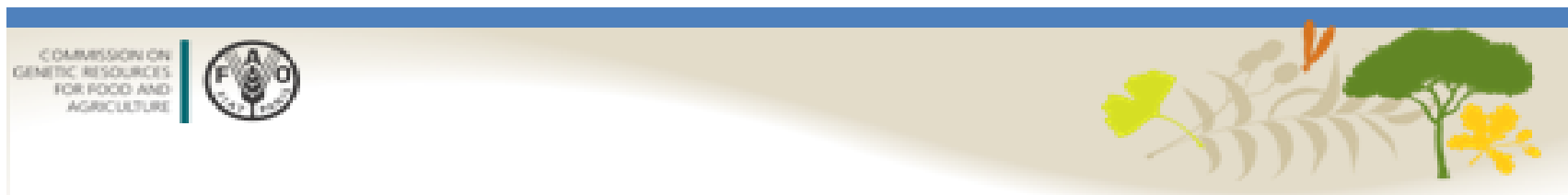
# The State of the World's Forest Genetic Resources

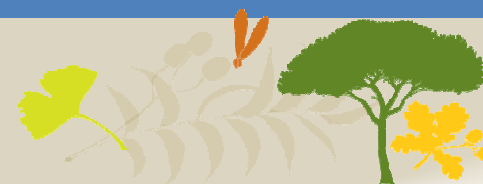# Key Findings

# 1 Overview of Forest Genetic Resources

- ## Key features
  - 80,000 to 100,000 tree species
  - Long-lived, mostly wild species managed in natural ecosystems, natural mechanisms maintaining high levels of genetic variation within species combined with variable native environment: **most genetically diverse organisms**
  - **Dynamic conservation** of genetic diversity and processes
  - Long standing **international coordination/cooperation** (1905 *Pinus sylvestris*, 1960's70's *Eucalyptus spp.*, temperate and tropical conifers, *Tectona grandis*, *Gmelina arborea*, MPTS, *Acacia spp.*, etc)
  - Importance of some spp. used as exotics: eucalypts, casuarinas, teak, pines, acacias, etc.

# 1 Overview of Forest Genetic Resources (2)

- ## Key Findings

    - Country Reports: More than 3,000 priority species (Africa 799, Asia 1046, Europe 212, N. America 55, L. America 765, Near East 112, Pacific 102)

    - More than 2,600 species used for production (Africa 890, Asia 1138, Europe 266, Near East 47, L. America 406, N. America 71, Pacific 280)

    - More than 4,000 species threatened at different levels (Africa 881, Asia 1641, Europe 240, Near East 56, L. America 284, N. America 284, Pacific 32)

# 2 The State of Forest Genetic Resources Management

- **Key findings**
  - **Characterization of genetic diversity**: 39 countries (No. spp.: Africa 88, Asia 304, Europe 151, L. America 101, N. America 28)
  - *In situ* **conservation**: 40 countries (No. spp.: Africa 160, Asia 523, Europe 116, Near East 7, L. America 76, Pacific 8)
  - *Ex situ* **conservation**: 51 countries (No. spp.: Africa 440, Asia 348, Europe 194, Near East 53, L. America 151, N. America 87, Pacific 57)
  - **Provenance trials**: 34 countries (No. spp.: Africa 99, Asia 247, Europe 91, L. America 52, N. America 35, Pacific 44)
  - **Genetic improvement**: 42 countries (No. spp.: Africa 99, Asia 288, Europe 101, L. America 61, N. America 45, Pacific 24)
  - **Reproductive material**: National programs in developing countries

## 2 The State of Forest Genetic Resources Management (2)

- **Main information gaps – issues - needs**
  - **Knowledge** on genetic diversity of most species
  - **Actual status** of genetic diversity and resources of most species
  - **Effectiveness of *in situ* conservation**
  - **Capacity of national seed programs** in developing countries
- **Priorities identified**
  - **Develop knowledge** on genetic diversity for conservation and sustainable use
  - **Assess and monitor** status
  - **National and regional seed programs capacity**

## 3 Trends Affecting the Forest Sector and their Implications on Forest Genetic Resources

- **Key findings**
  - Forest loss and degradation
  - Ecosystem restoration
  - Decentralised/local management and development
  - Climate change

- **Main gaps/issues/needs**
  - Indicators for monitoring genetic diversity
  - Reproductive material and technology adapted to ecosystem restoration - Capacity
  - Strategies and technologies adapted to local management – Capacity
  - Strategies for adaptation

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## 3 Trends Affecting the Forest Sector and their Implications on Forest Genetic Resources (2)

- **Priorities identified**
  - Development of indicators
  - Select and develop plant material and methods, and build capacity for restoration of ecosystems
  - Develop strategies and methods, build capacity for conservation and sustainable use at local level
  - Review/update conservation strategies in the context of climate change (ex: role of *ex situ*)
  - Integrate climate change into policy, programs and regulations (ex: seed movement)

# 4-5 Institutional and Policy Framework - Capacities

- **Key findings**
  - Numerous and diverse institutions involved in FGR at national level - Capacity often inadequate
  - Active regional cooperation: networks, strategies, programs
  - Forest reproductive material regulations/schemes in place at national, regional and international levels
  - Few Information systems on FGR

- **Main gaps/issues/needs**
  - National coordination often inadequate or lacking
  - Still very few regional strategies and programs
  - Constraints to movement of genetic material
  - Inadequate capacity and training in many countries

# 4-5 Institutional and Policy Framework – Capacities (2)

- **Priorities identified**
  - Coordinate FGR activities and integrate them in broader national strategies ad programs (forestry, biodiversity, food security, poverty reduction, etc)
  - Development and implementation of regional strategies and programs for conservation of FGR
  - Develop and improve information systems on FGR for conservation and sustainable use at national, regional and global levels
  - Strengthen research and training programs to produce knowledge and capacity necessary for conservation and sustainable use of FGR
  - Improve germplasm movement for research and development

## 6 Status of Knowledge – Current and Emerging Technologies

- **Key findings**
  - Knowledge of FGR is considered inadequate by authors of most country reports
  - Among the 80 – 100,000 tree species, a small proportion has been studied to describe genetic parameters (less than 1%)
  - A few species are very well studied and genetically characterised, mainly temperate conifers and Eucalyptus
  - Quantitative genetic knowledge has led to significant productivity gains in a small number of tree species that have high value as plantation timber
  - Genomic knowledge of forest trees lags behind that of model herbaceous species, but the entire genome of several tree species has been  or is in the process of being sequenced and novel approaches have been developed to link markers to important traits. Genomic or marker assisted selection is close to being realised

# 6 Status of Knowledge – Current and Emerging Technologies

- **Priorities identified**
  - Develop research to get knowledge and information on genetic diversity of priority species used in different management systems
  - Assess and develop use emerging technologies to support the conservation and sustainable use of FGR
  - (New role for *ex situ* conservation?):
    - Improve knowledge/assessment of tolerance to dehydration, storage behavior of seeds. Develop post-harvest technology for proper seed conservation and handling
    - Strategy/protocole

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## 7 Needs, Challenges and Required Responses for the Future

**Key findings and required responses are presented under Item 4**
**Priority Areas for Action**

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# Structure and organization of the strategic priorities

| 3 levels of implementation suggested | Priority area 1: Improving the availability of, and access to, information regarding FGR | Priority area 2: In situ and ex situ conservation of FGR | Priority area 3: Sustainable use and management of FGR | Priority area 4: Policies, institutions and capacity building |
|---|---|---|---|---|
| **National** | SP 1. | SP 5. | SP 10. | SP 15. |
| | SP 2. | SP 6.. | SP 11. | SP 16. |
| | | SP 7. | SP 12. | SP 17. |
| | | SP 8. | SP 13. | SP 18. |
| **Regional** | | SP 9. | | SP 19. |
| | | | | SP 20. |
| **Global** | SP 3. | | SP 14. | SP 21. |
| | SP 4. | | | SP 22. |
| | | | | SP 23. |
| | 4 | 5 | 5 | 9 |

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# THANK YOU