The Fulbright Program

• The Fulbright Program is the international educational exchange program designed to “increase mutual understanding between the people of the United States and the people of other countries.”

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State Agricultural University of Moldova
www.uasm.md

Faculties (total 9000 students)

- Agronomy
- Horticulture
- Economy
- Accounting
- Veterinary medicine
- Animal Breeding and Biotechnology
- Agricultural Engineering and Transportation
- Cadastre and Law

Faculty of Horticulture (950 students):

- Department of Vegetable
- Department of Pomology
- Department of Plant protection
- Department of Forestry and Public Gardens
- Department of Technology of Wine
- Department of Viticulture

Specialties:
- Horticulture
- Plant protection
- Viticulture and Winemaking
- Forestry and Public Gardens
Department of Forestry and Public Gardens

**Disciplines**
- Silviculture
- Landscape design
- Wildlife Management
- Forest Mensuration
- Dendrology
- Decorative Arboriculture
- Afforestation
- Forest planning
- Seminologia and forest nurseries
- Logging technology

- Founded in 2002
- Staff composed from 4 doctors and 6 senior lecturers
- 50 forest engineers graduated every year
- Research directions: ecological reconstruction of degraded forests, research and conservation of forest biodiversity
- Collaboration with Forest Research Institute, State Forest Service and Botanical Garden
Government

Ministries

- Ministry of Economy
- Ministry of Finance
- Ministry of Justice
- Ministry of Interior
- Ministry of Foreign Affairs and European Integration
- Ministry of Defense
- Ministry of Construction and Regional Development
- Ministry of Agriculture and Food Industry
- Ministry of Transport and Road Infrastructure
- Ministry of Environment
- Ministry of Education
- Ministry of Culture
- Ministry of Labor, Social Protection and Family
- Ministry of Health
- Ministry of Information and Communications Technologies
- Ministry of Youth and Sport

Central administrative authorities

- National Bureau of Statistics
- Land Relations and Cadastre Agency
- Interethnic Relations Bureau
- Border Guard Service
- Agency “Moldsilva”
- Material Reserves Agency
- Tourism Agency
- Center for Combating Economic Crimes and Corruption
Forestry Agency “Moldsilva”

Agency structure

- 16 Forestry Enterprises
- 4 Forestry – Hunting Enterprises
- 4 Natural Reserves
- Forest Research Institute
- State Enterprise for Producing Biologically Active Resources
- Central office: management, directorate of forest security, financial department, marketing department

Forestry staff: 6616 employees

- Technical and engineering staff is 990 employees
- 21 chief forestry engineers
- 23 engineers for forest protection
- 25 engineers for wood resources – raw material
- 22 engineers for forest regeneration
- 81 head of forestry districts
- 76 deputy head of forestry districts
- 192 forestry masters
- 1064 foresters
- 12 specialists in hunting management
- 21 engineers taxators
- 5 engineers forest pathology
- 20 heads of forestry nurseries
- 40 economists
- 209 accountants
- 5 chief engineers in industry
- 58 engineers for wood processing
- 25 engineers for labor protection
- 20 scientists
- 12 specialists in auxiliary economy
Functions of Forest Agency “Moldsilva”

- Extension
- Regeneration
- Conservation
- Ecological reconstruction
- Rational use of forest resources
- Security, protection and development of national forests and wildlife

81 forestry districts and 1063 cantons

Average month salary in the forestry sector during last 15 years represents 50-100 $
Forestry and Land Use in Moldova

Vitalie GULCA

State Agricultural University, Moldova
Pacific Northwest Research Station, USA
Fulbright Scholar Program, CIES
Preface

- Forest in Romanian is named “Pădure”
- Etymology: from Latin *palūs* (“swamp”). Root comparable to Italian *padule*.
- Ethnography: **Palus** people are one group of Native Americans living on the Columbia Plateau in Washington, Oregon and Idaho
- A variant spelling **Palouse**, was the source of name for fertile prairie in Washington, Idaho and Oregon
- **Palus** is also attractive nice village in India known for fertile soil and grape producing land
Overview

1. Why I did this study or what is the problem?
2. Moldova facts
3. Historical survey
4. Land structure
5. Forest area
6. Forest vegetation
7. Forestry
8. Main wildlife species
9. Land and forest issues
10. Barriers
11. Conservation trough wise use, advanced by Theodore Roosevelt and Gifford Pinchot
12. New alternative land use
13. Conclusions
1. Why I did this study or what is the problem?

- Society in the 21st century will face serious problems, including depletion of fossil fuels and climate change.
- Moldova is one of the poorest countries in Europe but has some of the richest soil in the world and a few forests.
- Forest, woodland, and grassland ecosystems are not well understood by landowners and have low priority for government.
- Establishing private forests is a challenge but society lost the confidence in them.
2. Moldova facts

- 45°28′ - 48°30′ northern latitude, 26°30′ – 30°05′ eastern longitude
- Highest altitude 1409 feet (429.5 m)
- Annual average temperature 46-50 °F (8–10 °C)
- Precipitation 15 in (380 mm) south – 22 in (560 mm) north
- 3.6 million inhabitants or 308 people per sq mi (119 people per km²)
- Principal resources are people and soil
- Economy depends on fruits, vegetables, wine and tobacco
3. Historical survey of the territory of Moldova

- Roman domination in Dacia (106-271)
- Daco-Roman Continuity (the IV-VI century)
- Old Romanian population (the VI-VIII centuries)
- Medieval epoch: Romanian society in IX-XIII centuries
- Formation of medieval state Moldavia ’80 of XIII century
- The end of XIV-middle of XVI century: Occurred Tatar and Ottoman invasion
- Second half of XVI century – 1812: under Turk domination
- 1812 – 1917: in Russian empire
- 1917-1918: independent
- 1918-1940: part of Romania
- 1940-1941: former Soviet Union
- 1941-1945: second world war
- 1945-1991: former Soviet Union
- Since 1991 independent state
4. Land structure (total area 13067 sq mi or 33846 sq km)

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural</td>
<td>57.60%</td>
</tr>
<tr>
<td>Localities</td>
<td>9.10%</td>
</tr>
<tr>
<td>Pastures</td>
<td>18.64%</td>
</tr>
<tr>
<td>Communications</td>
<td>1.80%</td>
</tr>
<tr>
<td>Forest</td>
<td>11.40%</td>
</tr>
<tr>
<td>Protected area</td>
<td>0.06%</td>
</tr>
<tr>
<td>Water</td>
<td>1.40%</td>
</tr>
<tr>
<td><strong>Total area</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

1680 localities
Winter: average 30-36°F
Spring

Ten days ago 63 F
Now 19 F
Summer

Sometimes > 104°F

Cracked soil

Pasture in summer

Hail is often

White stork – symbol of Moldova

Morus alba

Two months with no rain

Lizard
Autumn

Entrance in the village

Acer platanoides

After ploughing

Stubble field

After burning of stubbles
5. Forest area

- **World** = 30 % (2005, FAO)
- Europe = 30 %
- USA = 33 % (Smith & Darr, 2004)
- Moldova (historical) = 30% (Tudoran)
- Moldova (actual) = 9.6%
- Moldova (strategically) = 15% (2020)
Dynamics of forest cover mi²

- Sources of drinking water: Nistru and Prut rivers, 600 springs, 6600 artesian wells, and about 200 thousand wells
- 82% of rural inhabitants are supplied with water from common or individual wells
- Usually located along the roads, ornately covered wells stand ready to quench the thirst of weary travellers
- In many of the country's villages, the local well is also a place to meet friends and discuss the day's events

N 7.2% forest
Orhei = 17% forest or 0.4 acres/person and 48 water gallons/person/day

C 13.5% forest
Chisinau 122 gallons/person/day

S 6.7% forest
Vulcanesti = 4% forest or 0.2 acres/person and 17 water gallons/person/day
6. Forest vegetation

- North: Oak (*Quercus robur*) with Cherry and Birch
- Centre: Sessile Oak (*Quercus petrea*), Oak (*Quercus robur*), Beech (*Fagus silvatica*) with Hornbeam (*Carpinus betulus*), Ash (*Fraxinus excelsior*), Silver Linden (*Tilia tomentosa*), Norway Maple (*Acer platanoides*)
- South: Downy oak (*Quercus pubescens*) with Blackthorn (*Prunus spinosa*)
- Riparian forests: willow (*Salix sp.*) and poplar (*Populus sp.*)

800 stands ranging from 12 to 4000 acres

Average forest age 40 years
6. Forest vegetation - north

Oak (*Quercus robur*) with Cherry and with Birch
6. Forest vegetation - centre

- Sessile Oak (*Quercus petrea*),
- Oak (*Quercus robur*),
- Beech (*Fagus sylvatica*),
- Hornbeam (*Carpinus betulus*),
- Ash (*Fraxinus excelsior*),
- Silver Linden (*Tilia tomentosa*),
- Norway Maple (*Acer platanoides*)
6. Forest vegetation – south

- South: Downy oak (*Quercus pubescens*) with Blackthorn (*Prunus spinosa*)
6. Forest vegetation – riparian

- willow (*Salix sp.*)
- and poplar (*Populus sp.*)
7. Forestry

- The principal directions in the second part of XX century were vegetative regeneration and reforestation with *Robinia pseudoacacia* species

- Forests consist of broad-leaved trees: oaks (43.2 %), acacia (38.1 %), ash (5.1 %), hornbeam (2.9 %), poplar (1.8 %), coniferous (2.2%).

Forest sector brings a profit to the national economy 0.3 to 0.4 percent of the gross domestic product.
Forests belong to the I functional group, having exclusively environment protection functions.

Most forest land (84.1%) is owned by the state, the rest being held by local government (15.7%) and only 0.2% of private owners.
Wood forest products

- The total growing stock is 1241 billion ft³ (35.14 million m³) or 286 ft³ (8.1 m³) per capita
- The wood mass per hectare is 4379 ft³ (124 m³)
- The net annual increment of wood is 117 ft³ (3.3 m³) ha⁻¹
- Total average increment of wood is 39 million ft³ (1.1 million m³) per year.
- The forest sector supplies about 16 million ft³ (450000 m³) of wood mass per year.
8. Main wildlife species

- *Cervus elaphus* (Red deer)
- *Perdix perdix* (Grey partridge)
- *Capreolus capreolus* (Roe deer)
- *Phasianus colchicus* (Pheasant)
- *Lepus europaeus* (European rabbit)
- *Vulpes vulpes* (Red fox)
- *Meles meles* (Badger)
- *Wild boar*
## Carrying capacity factors

<table>
<thead>
<tr>
<th>Category</th>
<th>Abiotic: 260 points</th>
<th>Biotic: 500 points</th>
<th>Hunting: 240 points</th>
<th>Human negative: -500 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>Forest percentage</td>
<td>Fields for food</td>
<td>Pesticides</td>
<td></td>
</tr>
<tr>
<td>Precipitation</td>
<td>Forest composition</td>
<td>Administered food</td>
<td>Pasturing</td>
<td></td>
</tr>
<tr>
<td>Thickness of snow</td>
<td>Firmness</td>
<td>Bathing places</td>
<td>Rover dogs</td>
<td></td>
</tr>
<tr>
<td>Hydrographical network</td>
<td>Forest age</td>
<td>Drinking places</td>
<td>Poaching</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Biomass</td>
<td>Feeding places</td>
<td>Transport</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forest edge</td>
<td>Food storehouses</td>
<td>Human attitude</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Glades</td>
<td>Salt shed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forest area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agricultural lands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pastures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forest belts</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Example with factor Forest age for Red deer’s hunting ground

<table>
<thead>
<tr>
<th>Group of factors</th>
<th>Biotic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum points number</td>
<td>500</td>
</tr>
<tr>
<td>Factor</td>
<td>Forest age</td>
</tr>
<tr>
<td>Amplitude 11-40 years</td>
<td>0-15 points</td>
</tr>
<tr>
<td>Amplitude 41-60 years</td>
<td>16-30 points</td>
</tr>
<tr>
<td>Amplitude 0-10 years</td>
<td>31-45 points</td>
</tr>
<tr>
<td>Amplitude &gt; 60 years</td>
<td>46-60 points</td>
</tr>
</tbody>
</table>
# Establishing of optimal number for principal hunting species

<table>
<thead>
<tr>
<th>Carrying capacity category</th>
<th>Score</th>
<th>Number of hunting animals on the 2500 acre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Red deer</td>
</tr>
<tr>
<td>IV</td>
<td>201</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>350</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>5</td>
</tr>
<tr>
<td>I</td>
<td>801</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>850</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>900</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>950</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>1000</td>
<td>20</td>
</tr>
</tbody>
</table>
Estimation of minimum and maximum optimal number of main hunting animals

<table>
<thead>
<tr>
<th>Species</th>
<th>Suitable habitat surface, ha</th>
<th>Optimal number</th>
<th>Actual number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>IV carrying capacity</td>
<td>I carrying capacity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000 ha</td>
<td>Total</td>
</tr>
<tr>
<td>Red deer</td>
<td>150000</td>
<td>1</td>
<td>150</td>
</tr>
<tr>
<td>Roe deer</td>
<td>325000</td>
<td>12</td>
<td>3900</td>
</tr>
<tr>
<td>Wild boar</td>
<td>325000</td>
<td>4</td>
<td>1300</td>
</tr>
<tr>
<td>Hare</td>
<td>2800000</td>
<td>20</td>
<td>56000</td>
</tr>
<tr>
<td>Pheasant</td>
<td>325000</td>
<td>140</td>
<td>45500</td>
</tr>
</tbody>
</table>
Wildlife paradoxes since the middle of XX century

* Simultaneity of wildlife restoration and extinction.
* Reintroduction of red deer and drainage of marshes that provoked disappearance of mink, otter and other species.
* During 1970-1980 period wolf disappeared completely, however stray dogs instead occupied wolf’s niche and now even of the people one. Hence instead of 100 wolfs we have more 100000 dogs.
9. Land and forest issues (to plant 320 thousand acres by 2020)

- **Forest Code:** Private property right over forests are admitted in the case of plantation of private lands.

- **Aforestation** (solving the problems with illegal pasturing and logging)

- **With a goal to maintain the pastures people pluck out saplings**

- **Strategy SFM:** All new forests should be transferred to the state.

- **Land code:** Private forests can be planted on lands with low productivity.

- **Now pasture – 20 years ago forest**

- **15% country area**
  - Public

- **57% country area**
  - Private

- **Diary products – important food for rural people**

- **15%**

- **Agricultural land not allowed for aforestation**

- **9.6%**
Issue as a consequence:

- Otherwise rural people migrated to the cities and other countries caused by the low salary.
- The brain drain of young and qualified persons slows down the resolution of both, social and economical problems.

- Rural people own eroded soils.
- State owns degraded forests.
- Villages own poor pastures.
10. Barriers

Main export and one of the best in Europe

Priorities

Poorest country of Europe

Lower percentage and lowest quality in Europe
Unbalanced proportion between priorities:

- For the different national branches
- Private and state forests
- Salary and investments in forestry and other economic branches
- Allocated time for different disciplines at forest speciality
Other aspects of our life
11. Conservation through wise use, advanced by Theodore Roosevelt and Gifford Pinchot in 1910

- Wildlife, forests, rangelands, and other similar resources were conceived to be renewable, and
- Therefore could be perpetuated if managed on the basis of scientific information.
- Care of this resources was recognized as a public responsibility, and
- The ownership of wildlife as a public trust.
12. New alternative land use

- A combination between patches of up to 0.1 ha on private land as in India, switched focus to farm and community forestry as in Philippines and increasing involvement of the private sector as in China.

- New alternative of land use based on forest resources could diversify and greatly improve the economy.

- Developing a bioenergy program based on forest biomass and reforestation of private agricultural lands.
13. Conclusions

• Increasing the value of forests will help lead an economic transformation for both agriculture and forestry.

• Development of a sustainable forest management program could result in economic independence and security for future generations.

• Fragmentation of agricultural lands by small patches of private forests could become the main bridge between the past and future, poverty and economical stability.

• Hence lack of oil, coal, and gas in Moldova should be balanced by soil, agriculture and forestry through the sustainable development.

• Respect of private property, trust in god and state, honesty, love to the nature and peace, passion for the travels, diligence and respect to the laws, tendency for harmony in life are the principal fulcrums of prosperity in many countries.
Field trip in peninsula Crimea, Ukraine, 2008
Crimea, Ukraine, 2008
Methodical practice in Gomel, Byelorussia, 2009, Forest Research Institute, Gomel
Visiting experimental plot, Byelorussia, 2009, experimental plantation of Karelian birch
Forest engineers graduated in 2009
Exhibition in Gomel, Belorussia
Dr. Eriko ITO from Forestry and Forest Products Research Institute (FFPRI), Japan offered a lecture for State Agricultural University, Moldova, 2009
Colors and traditions in Moldova
Research interests

• Sustaining productivity of lands from wood and other goods;
• Forest and wildlife management;
• Village sustainable development;
• Forest and wildlife legislation;
• Forest bioenergy;
• Hunting tourism;
• Forest education;
• Geography.
Thank you for your attention