

The analysis of forest rent resulting from the management of the forest returned by the Law 18/1991, within Vama Forest District

Tutors:

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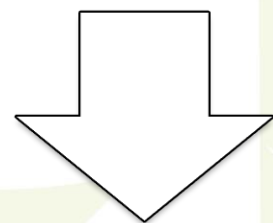
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1. The starting point

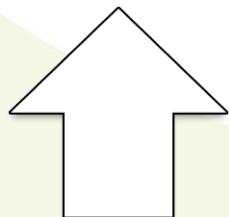
- The Court of Accounts, 2012 – [... ” characterized restitution laws as “fuzzy and lacking vision” generators of conflict and obscure interests,...].
- ***The reasons for the theme-*** Cuts abusive to the private property have had as the main cause the urge to capitalize immediately a resource in the context of such uncertainty and legislative vacuum (Bouriaud, 2007)



Economic interests in the short term is the one that is top priority in the rationale for private owners

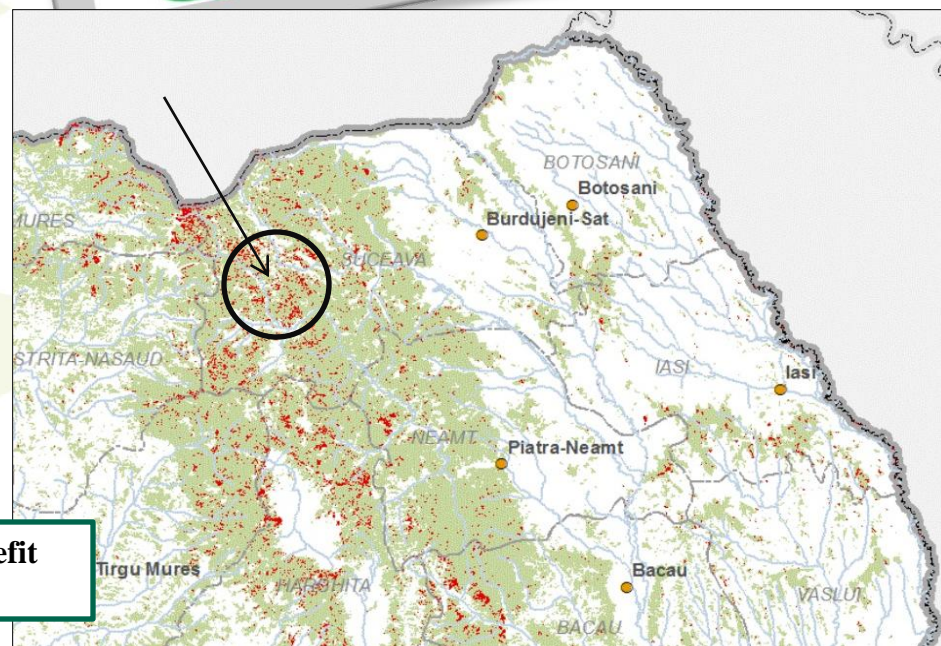


Large part of forests restored by L18 at the national level have been clear cuts or degraded forest (Nichiforel, 2007)



Long –term economic benefit – Immediately economic benefit

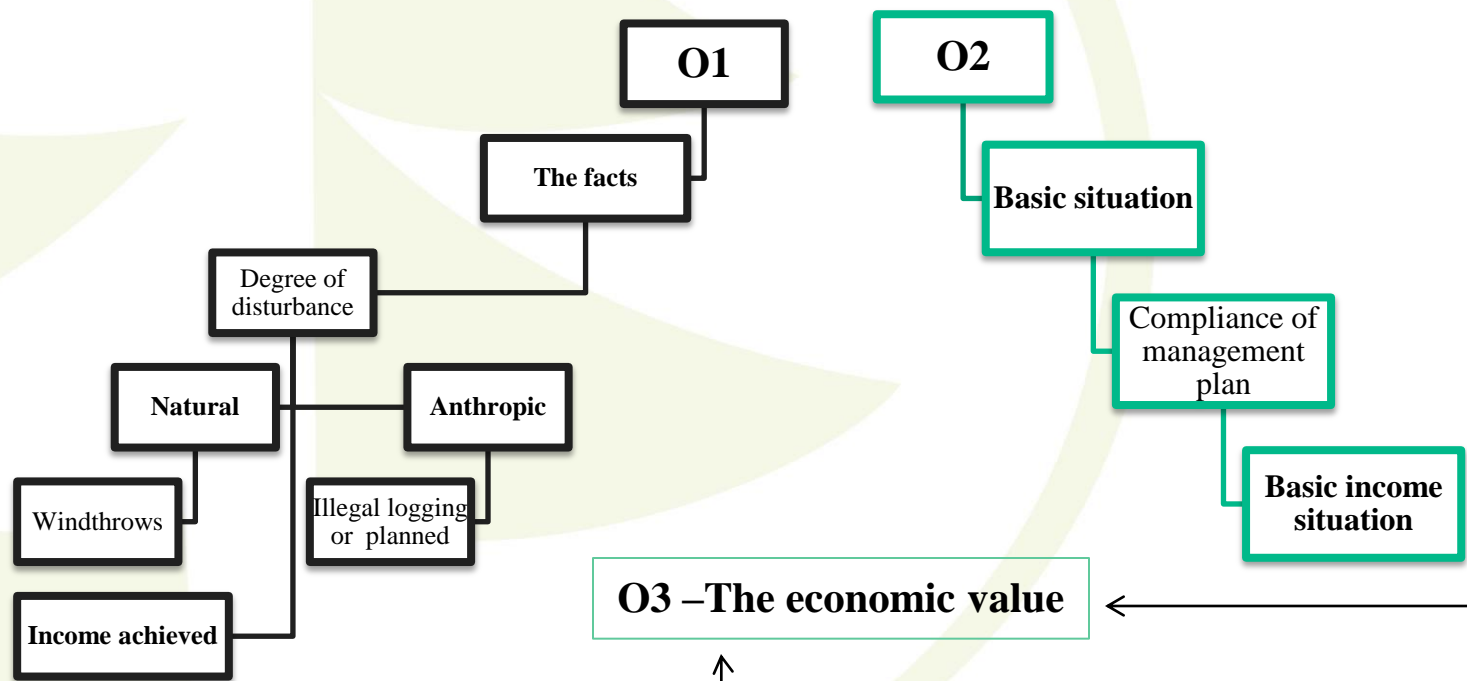
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2. Research objectives

○General aim: Determining economic value up-to-date resulting from the management of forests restituted by L18/1991.

- O1: identifying the forest management situation of forestes restituted by L18/1991;
- O2: identification of the stands' structure at the time of restitution (based on the descriptions of lplots from 1991);
- O3: deterring the updated value through economic rent- seeking behaviors.



3. Methodology

O1- Determination of the actual structure of stands

- Satellite images of 2004
 - 1. Blank areas (%)
 - 2. *Regenerated blank areas*(%)
 - 3. *Species*
 - a. Resinous (code 1)
 - b. Mixed (cod e2)
 - c. Deciduous(code 3)
 - 4. *Stands age*
 - a. Young: 0-20 yrs(code 1)
 - b. Medium: 20-80 yrs (code 2)
 - c. Mature forest: >80 yrs(code 3)
- Satellite images of 2008- only for areas with high disturbances
- Calibration

O2- Identification of the structure of stands at the time of restitution

- Using GIS software (the GIS map fitting-out 2012)
- Databases according to management plan of 1991.

O3- Assessment of the economic value



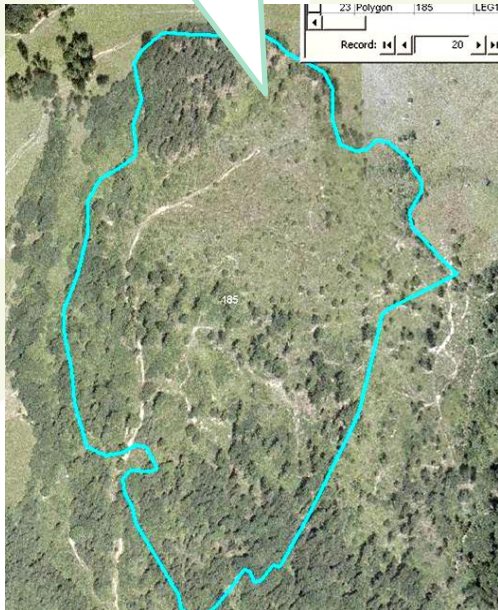
3.1. Methodology – Determination of actual structure of stands

Table 1. Summary with the number and shapes area by UP

UP	Sum of area	Number of polygons
I	415,65	69
II	1,16	2
III	140,44	42
IV	239,76	57
Total	797,02	170

3.1. Methodology – Determination of actual structure

Blank area: 70%
Regenerated blank area:30%
Species: Mixed (code 2)
Stand age: Young(code1)

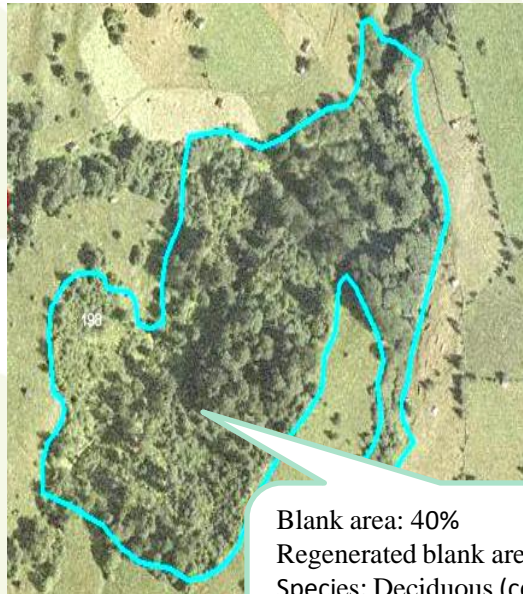


Satellite images of 2004

Blank area: 0%
Regenerated blank area:0%
Species: Mixed (code 2)
Stand age: Young(code1)



Blank area: 40%
Regenerated blank area:40%
Species: Deciduous (code 3)
Stand age: Mature forest (code 3)



3.1. Methodology – Calibration by field inventory

Table 3 Plot inventory area in 2004 (before calibration)

Parcel	Suplot	U.A.	UP	Shape_Leng	Shape_Area	Blank area	Reg_area	Stand age	Species
323	LEG18	323LEG18	4	2924,95	87738,16	8	2	2	3
324	LEG 18	343 LEG 18	4	3378,06	187981,77	10	3	1	0
325	LEG 18	325LEg 18	4	449,61	11804,47	9	5	2	1
328	L18	328L18	4	1132,76	35436,60	10	7	0	0

Table 4 Plot inventory area in 2013 (after calibration)

Parcel	Suplot	U.A.	UP	Shape_Leng	Shape_Area	Blank area	Reg_area	Stand age	Species
323	LEG18	323LEG18	4	2924,95	87738,16	10	9	1	1
324	LEG 18	343 LEG 18	4	3378,06	187981,77	10	10	1	2
325	LEG 18	325LEg 18	4	449,61	11804,47	8	4	2	1
328	L18	328L18	4	1132,76	35436,60	10	8	1	1

3.1. Methodology – Calibration by field inventory



Figure15 Regeneration part of plot 323LEG18, (2013)

3.2. Methodology – Identification of stands' characteristics at the moment of restitution

- Overlapping polygons representing areas returned by Law 18/1991 as GIS in accordance with fitting-out of 2012 over the map from 1991.

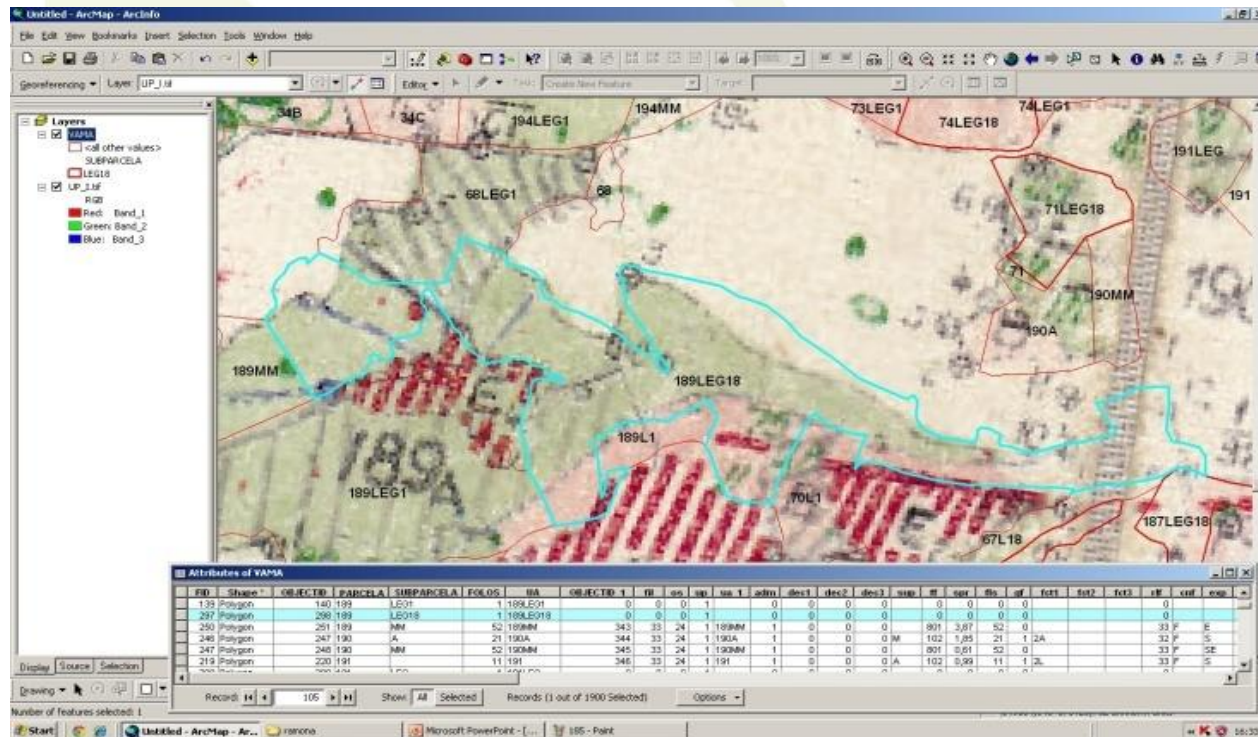
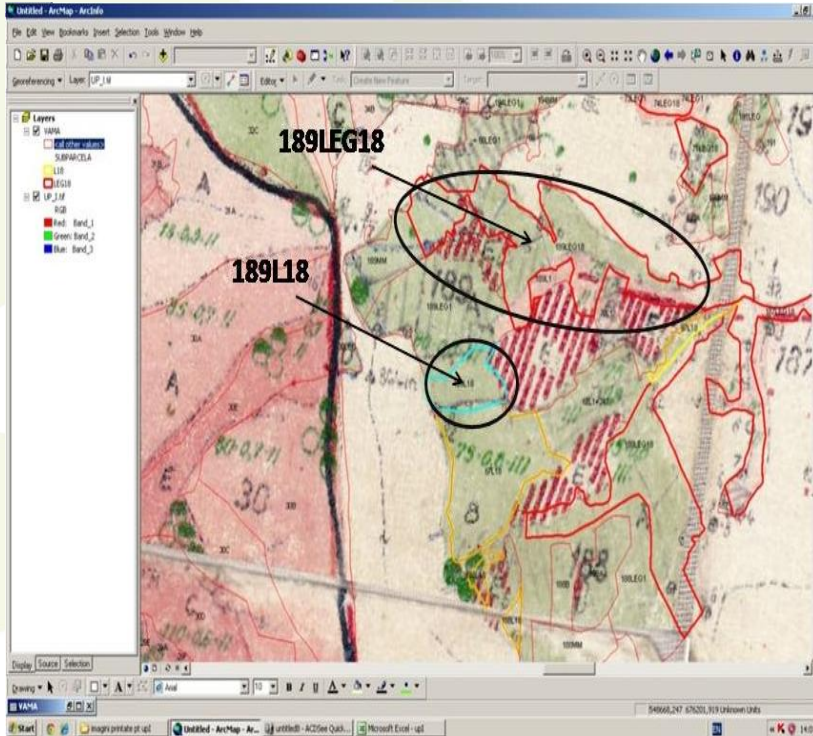
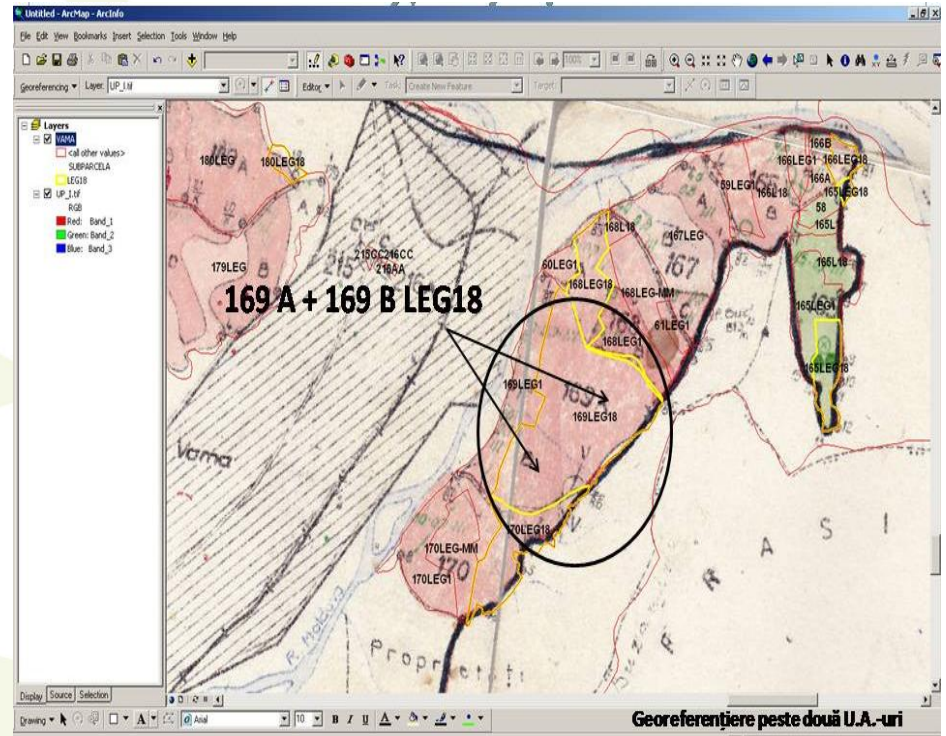


Figure19 Polygon detail by GIS tools

3.2. Methodology – Identification of stands' characteristics at the moment of restitution



Map detalii by GIS tools with different marks respecting L18 of a parcel of UP I



Map detail by GIS tools with an overlapped polygon over two U.A.

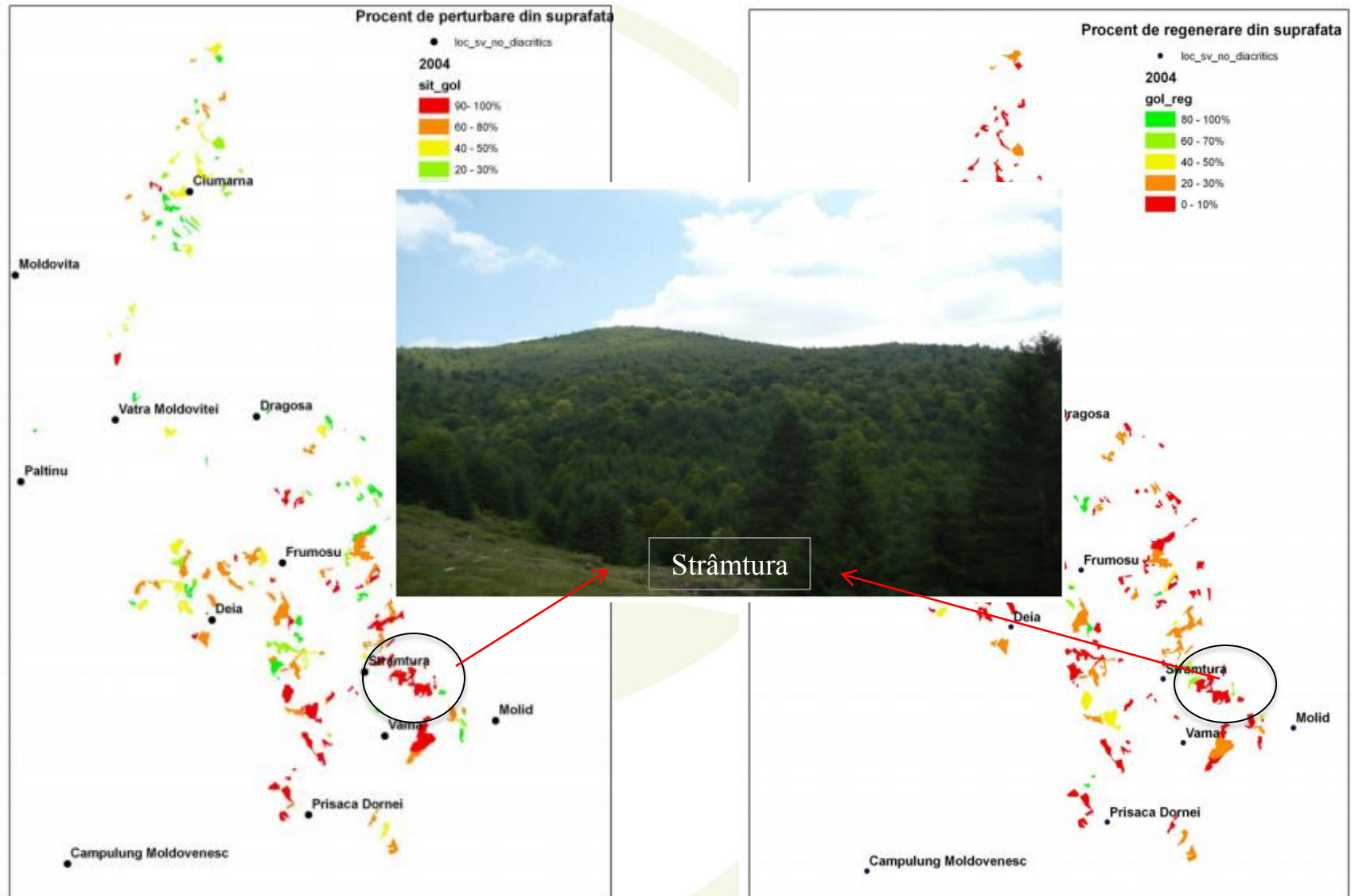
Georeferențiere peste două U.A.-uri

4. Results of detailed rules for the management of stands restituted to Law 18/1991

Code (blank area)	Regenerated area(%)	Sum of area(ha)	Polygon number
0	0	85,80	39
1	10	20,38	2
2	20	23,23	9
3	30	46,55	10
4	40	82,10	15
5	50	51,75	9
6	60	113,20	15
7	70	89,79	16
8	80	48,71	7
9	90	87,87	18
Degraded forest		251,47 (31,55%)	41
10	100	147,64 (18,5)	30
Sum of Total		797,02	170

Cod (blank area)	Regenerated blank area (%)	Sum of area(ha)	Polygon number
0	0	191,07	74
1	10	206,40	36
No regeneration		397,47 (49,9%)	110
2	20	113,42	17
3	30	158,48	15
4	40	58,73	8
5	50	21,55	5
6	60	8,67	2
7	70	18,86	4
8	80	15,26	5
9	90	1,17	1
10	100	3,41	3
Regeneration		19,84 (2,48%)	9
Sum of Total		797,02	170

4. Results of detailed rules for the management of stands restituted to Law 18/1991



4.2. Analysis of stands situation at the time of restitution

- Sorting polygons by functional groups, SUP, distribution of the stands age and proposed work according to management plan.
- Their situation in 1991 was:

Table 11 Analysis of stands situation by functional groups

Functional group	Sum of area/ha	Polygon number
1-1g	485.99	113
1-2a	312.09	67
1-2h	0.98	1
Sum of Total	799.05	181

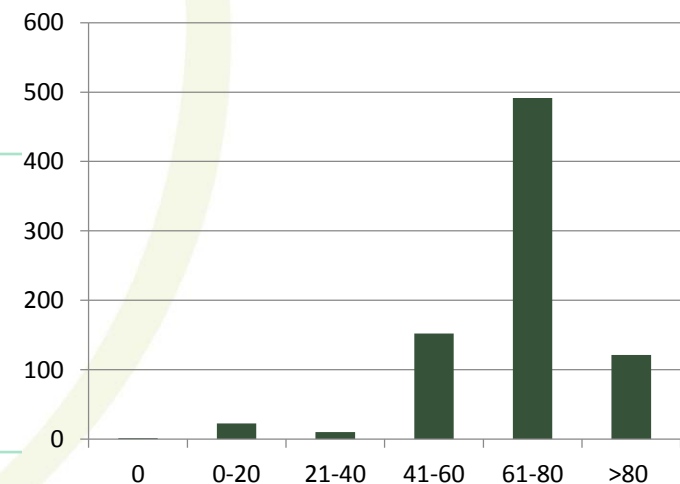
Table 12 Analysis of stands situation by subplots (SUP)

SUP	Sum of area /ha	Polygon number
A	469.68	106
G	38.39	9
M	290.98	66
Sum of Total	799.05	181

Table 16 Analysis of stand situation respecting the proposed work according to management plan of 1991

Proposed work	Sum of area/ha	Polygon number
Commercial thinning + Pre-commercial thinning	41,1	10
Sanitary cutting	680.24	150
Afforestation + Cultural care	42,63	12
Progressive cutting	10,03	4
Uneven age structure	21.05	5
Sum of Total	799.05	181

Histogram stands by age classes



4.3. Estimation of volumes extracted from surfaces returned by the Law 18/1991

Volume estimation as possible to extract in the period 1991-2004 in accordance with the provisions of management plan = **14.152 mc**

- Average harvested volume by hectare = 17mc/ha/13 years
- Average annual harvested volume = 1,4mc/year/ha
- Harvest intensity = 4,2%

Scenario 1: If he had extracted a corresponding volume average current increase (13 years) = **78.966 mc**

- Average annual harvested volume = **5,6mc/year/ha**
- Harvest intensity **23% of the capital of 1991 harvest**

Scenario 2: Identified condition of stands were full harvest result in 1994 = **193.178 mc**

- Integral harvest in 1994 -volume extracted 13 times higher than the amount legally planned
- Average harvests = 241 mc/ha
- Harvest intensity = 58,3% to the existing stock timber in 1991

Scenario 3: identified condition of stands were full harvest result in 2004 = **238.650mc**

- Integral harvest in 2004– volume extracted 17 times higher than the amount legally planned
- Average harvests = 298 mc/ha
- Harvest intensity = 72% to the existing stock timber in 1991

Scenario 4: identified condition of stands were full harvest result in 2014= **373.627mc**

- Average harvests= 342mc/ha
- Harvest intensity = 89% to the existing stock timber in 1991

4.4. Estimation of economic rent resulting from stands management

Table 22 Calculation of market value at the time of harvest

Year		Volume as possible to extract	The market value of a cubic meter of timber			Value at the time of logging
Scenario 2	1994	179.026	Valoarea pe piata in 1994	5	USD/m ³	895.130 USD
Scenario 3	2004	224.497	Valoarea pe piata in 2004	25	USD/m ³	5.612.425 USD
Scenario 4	2014	252.803	Valoarea pe piata in 2014	45	USD/m ³	11.376.135 USD

Table 23 Calculating the Net present value

Year of harvest	Initial amount	Capitalization rate	Number of years	Actulized value(2014)	
	V ₀	K (%)	n	V _n	
1994	895.130	5	20	2.375.046	USD
2004	5.612.425	5	10	9.142.049	USD

Table 24: The value of rent lost through the management of private forests

Differnces	Loss of rent
Potential market value in 2014- Discounted value of income from 1994	9.001.089 USD
Potential market value in 2014 - Discounted value of income from 2004	2.234.086 USD

6. Conclusions

- On a methodological level
 - Good accuracy for estimating the degree of disturbance and reclaimed forest regeneration depending on the degree of updating of satellite images (anthropic or natural)
 - Working time much reduced for the determination of stands conditions compared with their analysis on-the-spot
- On a private property management level
 - The stands classified within 60-100 years age have as proposed works – sanitary cutting (in 85% of stands) with an average harvested volume legal area 1,4 mc/year/ha – immediate profitability low
 - Volume substantially greater than 73,000 cubic meters/13 years in the scenario of logging at the current average increases: could swing profitability and the legality of activities of private owners
 - **The economic rent resulting from logging the private forests in the first decade after the restitution has proved to be negative because of the growth of the wood price at a higher rate than the rate of capitalization**