

# Rule of law, stakeholder participation, and environmental management: Evidence from 143 Biosphere Reserves in 55 countries

Andreas Duit

Dept. of Political Science & Stockholm Resilience Centre

Stockholm University

[andreas.duit@statsvet.su.se](mailto:andreas.duit@statsvet.su.se)

# "The stakeholder express"

- "Stakeholders" are increasingly seen as indispensable actors in policymaking in general and in environmental management in particular.
- Adaptive management and adaptive co-management attribute a pivotal role to stakeholder participation in natural resource management.
- Stakeholder participation is good because:
  - 1) Legitimacy
  - 2) Conflict resolution
  - 3) Local knowledge
  - 4) Access to civil society networks (bridging organizations)

# Two questions

- 1) Causes of stakeholder participation:  
Does rule of law facilitate stakeholder participation?
- 2) Effects of stakeholder participation:  
Does stakeholder participation lead to increased conservation performance?



BRs are designated by UNESCO with the mission of "maintaining and developing ecological and cultural diversity and securing ecosystem services for human wellbeing"

BRs are expected to fulfill three functions:

- 
1. conserving biodiversity
  2. fostering sustainable social and economic development
  3. supporting research, monitoring, and education.

Survey in 2008: 143 BR areas in 55 countries

- Management practises
- Patterns of stakeholder participation

Codigo de Países ISO 3166 – ISO 3166 Country Codes – Codes de pays ISO 3166

<b>ARG – United Arab Emirates, Emirates Arabes Unies, Emiratos Arabes Unidos</b>	<b>BXA 3</b>	<b>CCD – Democratic Republic of Congo, République démocratique du Congo, República Democrática del Congo</b>
<b>ARG – Argentina, Argentine</b>	<b>BXA 4</b>	<b>CCD 1</b>
<b>ARG 1</b>	<b>BXA 5</b>	<b>CCD 2</b>
<b>ARG 2</b>	<b>BXA 6</b>	<b>CCD 3</b>
<b>ARG 3</b>	<b>BXA 7</b>	<b>CCD 4</b>
<b>ARG 4</b>	<b>BXA 8</b>	<b>CCD 5</b>
<b>ARG 5</b>	<b>BXA 9</b>	<b>CCD 6</b>
<b>ARG 6</b>	<b>BXA 10</b>	<b>CCD 7</b>
<b>ARG 7</b>	<b>BXA 11</b>	<b>CCD 8</b>
<b>ARG 8</b>	<b>BXA 12</b>	<b>CCD 9</b>
<b>ARG 9</b>	<b>BXA 13</b>	<b>CCD 10</b>
<b>ARG 10</b>	<b>BXA 14</b>	<b>CCD 11</b>
<b>ARG 11</b>	<b>BXA 15</b>	<b>CCD 12</b>
<b>ARG 12</b>	<b>BXA 16</b>	<b>CCD 13</b>
<b>ARG 13</b>	<b>BXA 17</b>	<b>CCD 14</b>
<b>ARG 14</b>	<b>BXA 18</b>	<b>CCD 15</b>
<b>ARG 15</b>	<b>BXA 19</b>	<b>CCD 16</b>
<b>ARG 16</b>	<b>BXA 20</b>	<b>CCD 17</b>
<b>ARG 17</b>	<b>BXA 21</b>	<b>CCD 18</b>
<b>ARG 18</b>	<b>BXA 22</b>	<b>CCD 19</b>
<b>ARG 19</b>	<b>BXA 23</b>	<b>CCD 20</b>
<b>ARG 20</b>	<b>BXA 24</b>	<b>CCD 21</b>
<b>ARG 21</b>	<b>BXA 25</b>	<b>CCD 22</b>
<b>ARG 22</b>	<b>BXA 26</b>	<b>CCD 23</b>
<b>ARG 23</b>	<b>BXA 27</b>	<b>CCD 24</b>
<b>ARG 24</b>	<b>BXA 28</b>	<b>CCD 25</b>
<b>ARG 25</b>	<b>BXA 29</b>	<b>CCD 26</b>
<b>ARG 26</b>	<b>BXA 30</b>	<b>CCD 27</b>
<b>ARG 27</b>	<b>BXA 31</b>	<b>CCD 28</b>
<b>ARG 28</b>	<b>BXA 32</b>	<b>CCD 29</b>
<b>ARG 29</b>	<b>BXA 33</b>	<b>CCD 30</b>
<b>ARG 30</b>	<b>BXA 34</b>	<b>CCD 31</b>
<b>ARG 31</b>	<b>BXA 35</b>	<b>CCD 32</b>
<b>ARG 32</b>	<b>BXA 36</b>	<b>CCD 33</b>
<b>ARG 33</b>	<b>BXA 37</b>	<b>CCD 34</b>
<b>ARG 34</b>	<b>BXA 38</b>	<b>CCD 35</b>
<b>ARG 35</b>	<b>BXA 39</b>	<b>CCD 36</b>
<b>ARG 36</b>	<b>BXA 40</b>	<b>CCD 37</b>
<b>ARG 37</b>	<b>BXA 41</b>	<b>CCD 38</b>
<b>ARG 38</b>	<b>BXA 42</b>	<b>CCD 39</b>
<b>ARG 39</b>	<b>BXA 43</b>	<b>CCD 40</b>
<b>ARG 40</b>	<b>BXA 44</b>	<b>CCD 41</b>
<b>ARG 41</b>	<b>BXA 45</b>	<b>CCD 42</b>
<b>ARG 42</b>	<b>BXA 46</b>	<b>CCD 43</b>
<b>ARG 43</b>	<b>BXA 47</b>	<b>CCD 44</b>
<b>ARG 44</b>	<b>BXA 48</b>	<b>CCD 45</b>
<b>ARG 45</b>	<b>BXA 49</b>	<b>CCD 46</b>
<b>ARG 46</b>	<b>BXA 50</b>	<b>CCD 47</b>
<b>ARG 47</b>	<b>BXA 51</b>	<b>CCD 48</b>
<b>ARG 48</b>	<b>BXA 52</b>	<b>CCD 49</b>
<b>ARG 49</b>	<b>BXA 53</b>	<b>CCD 50</b>
<b>ARG 50</b>	<b>BXA 54</b>	<b>CCD 51</b>
<b>ARG 51</b>	<b>BXA 55</b>	<b>CCD 52</b>
<b>ARG 52</b>	<b>BXA 56</b>	<b>CCD 53</b>
<b>ARG 53</b>	<b>BXA 57</b>	<b>CCD 54</b>
<b>ARG 54</b>	<b>BXA 58</b>	<b>CCD 55</b>
<b>ARG 55</b>	<b>BXA 59</b>	<b>CCD 56</b>
<b>ARG 56</b>	<b>BXA 60</b>	<b>CCD 57</b>
<b>ARG 57</b>	<b>BXA 61</b>	<b>CCD 58</b>
<b>ARG 58</b>	<b>BXA 62</b>	<b>CCD 59</b>
<b>ARG 59</b>	<b>BXA 63</b>	<b>CCD 60</b>
<b>ARG 60</b>	<b>BXA 64</b>	<b>CCD 61</b>
<b>ARG 61</b>	<b>BXA 65</b>	<b>CCD 62</b>
<b>ARG 62</b>	<b>BXA 66</b>	<b>CCD 63</b>
<b>ARG 63</b>	<b>BXA 67</b>	<b>CCD 64</b>
<b>ARG 64</b>	<b>BXA 68</b>	<b>CCD 65</b>
<b>ARG 65</b>	<b>BXA 69</b>	<b>CCD 66</b>
<b>ARG 66</b>	<b>BXA 70</b>	<b>CCD 67</b>
<b>ARG 67</b>	<b>BXA 71</b>	<b>CCD 68</b>
<b>ARG 68</b>	<b>BXA 72</b>	<b>CCD 69</b>
<b>ARG 69</b>	<b>BXA 73</b>	<b>CCD 70</b>
<b>ARG 70</b>	<b>BXA 74</b>	<b>CCD 71</b>
<b>ARG 71</b>	<b>BXA 75</b>	<b>CCD 72</b>
<b>ARG 72</b>	<b>BXA 76</b>	<b>CCD 73</b>
<b>ARG 73</b>	<b>BXA 77</b>	<b>CCD 74</b>
<b>ARG 74</b>	<b>BXA 78</b>	<b>CCD 75</b>
<b>ARG 75</b>	<b>BXA 79</b>	<b>CCD 76</b>
<b>ARG 76</b>	<b>BXA 80</b>	<b>CCD 77</b>
<b>ARG 77</b>	<b>BXA 81</b>	<b>CCD 78</b>
<b>ARG 78</b>	<b>BXA 82</b>	<b>CCD 79</b>
<b>ARG 79</b>	<b>BXA 83</b>	<b>CCD 80</b>
<b>ARG 80</b>	<b>BXA 84</b>	<b>CCD 81</b>
<b>ARG 81</b>	<b>BXA 85</b>	<b>CCD 82</b>
<b>ARG 82</b>	<b>BXA 86</b>	<b>CCD 83</b>
<b>ARG 83</b>	<b>BXA 87</b>	<b>CCD 84</b>
<b>ARG 84</b>	<b>BXA 88</b>	<b>CCD 85</b>
<b>ARG 85</b>	<b>BXA 89</b>	<b>CCD 86</b>
<b>ARG 86</b>	<b>BXA 90</b>	<b>CCD 87</b>
<b>ARG 87</b>	<b>BXA 91</b>	<b>CCD</b>

[illegible]

Map of Mexico showing the locations of 22 seismic stations. The map includes the Gulf of Mexico, the Pacific Ocean, and the Baja California Peninsula. Stations are marked with numbers 1 through 22. A legend at the bottom identifies the stations by name.

MEX 21	Cumbres de Monterrey
MEX 22	Huasteco
MEX 23	La Involucral
MEX 24	La Primavera
MEX 25	La Seguitira
MEX 26	Laguna Matilla y Delta del Rio San
MEX 27	Los Rios
MEX 28	Matamoros del Carmen
MEX 29	Maricopa Monarca
MEX 30	Panoteros de Ciencia

[illegible]

RUS 20 Tanzania  
 RUS 21 Ushahungu/Kororua  
 RUS 22 Kanyuni  
 RUS 23 Nersiso/Gambara/Koo-Pulizi  
 RUS 24 Vururua  
 RUS 25 Mchomby  
 RUS 26 Commander Islands  
 RUS 27 Darinile  
 RUS 28 Mngondzise Zazile  
 RUS 29 Spiceman Land

[illegible]

USA 25 Three Sisters  
 USA 25 Virgin Islands  
 USA 27 Yellowstone  
 USA 28 Kincaid Prairie  
 USA 29 Niles Ridge  
 USA 30 University of Michigan  
 Station  
 USA 31 Virginia Coast  
 USA 32 Hawaiian Islands  
 USA 33 Isle Royale

**RESERVAS DE BIOSFERA  
TRANSFRONTERIZAS**

**TRANSCENDINARY  
BIOSPHERE RESERVES**

**RESERVES OF BIOSPHERE  
TRANSFRONTIERES**

Bosnia, Burkina Faso, Niger  
Borneo, Burkina Faso, Vietnam  
*(continued)*

in Biology

of the  
World  
and  
National  
Academy of Sciences



# Measuring stakeholder participation:

Four stakeholder categories:

1. Scientists
2. NGOs and volunteers.
3. Local nature administration
4. Local resource users and inhabitants

Two BR functions:

## **1. Decision making:**

1. Representation in BR coordinating team
2. Representation in BR steering committee
3. Involvement in BR goal setting
4. Involved in designing BR projects

## **2. Implementation:**

1. Involved in implementing projects or management measures
2. Involved in day-to-day management of ecosystems
3. Involved in monitoring changes in biodiversity or other changes in the BR ecosystem.

Measuring BR conservation effectiveness:

## **Normalized Difference Vegetation Index**

(NDVI). Change in biomass index between 1996 and 2004 within BR areas (%). Satellite image data.

## **Self-assessed effectiveness in biodiversity conservation.**

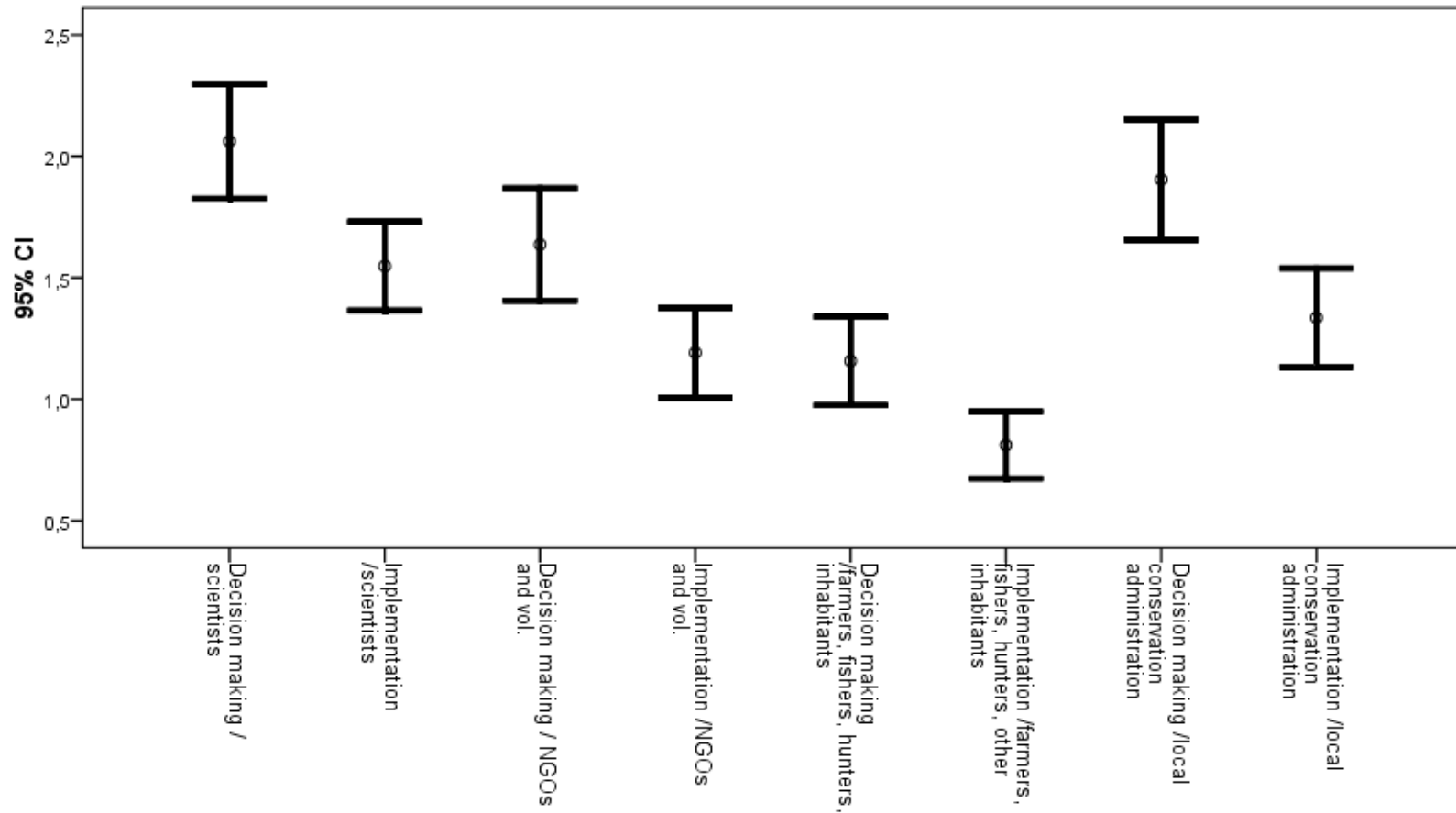
Survey data. Regression factor scores from BR managers' ratings of seven different aspects of BR performance.

# Measuring rule of law

**1.Property rights index.** Legal protection of ownership rights 0 = lowest protection, 100 highest protection.(Heritage Foundation: data year 2002).

**2.Political rights index.** Associational and Organizational Rights, 0 (lowest) -12 (highest). Freedom House, data year 2005

# Patterns of stakeholder participation





# Rule of law and stakeholder participation: rates of participation in **decision making** activities

	Scientists	NGOs	Locals	Local admin.
BR age	-.017	-.019	<b>-.036***</b>	-.018
BR size (log)	-.066	.112	-.029	.005
Pristine / cultural landscape	-.116	-.304	-.035	<b>-.674**</b>
HDI index	-2.307	-.254	<b>-1.902*</b>	-.566
Population density	-.001	.000	-.001	-.001
Property rights	.016	-.002	<b>.014*</b>	-.007
Political rights	<b>-.108*</b>	.091	-.037	-.081
Chi <sup>2</sup>	10.57	15.28*	25.02**	24.02**
R <sup>2</sup>	.07	.10	.15	.15

Table shows seemingly unrelated regression coefficients.  $p > .05 = *$ ,  $p > .01 = **$ ,  $p > .001 = ***$ . N =136

# Rule of law and stakeholder participation: rates of participation in **implementation** activities

	Scientists	NGOs	Locals	Local admin.
BR age	-.002	-.017	-.017	-.011
BR size (log)	-.040	.010	.004	-.078
Pristine / cultural landscape	-.075	-.354	-.240	<b>-.537*</b>
HDI index	.611	-.597	.214	-.506
Population density	.001	-.004	-.001	-.001
Property rights	.002	8.410	.003	-.001
Political rights	-.045	<b>.105**</b>	<b>-.061*</b>	-.013
Chi <sup>2</sup>	4.73	19.77**	16.57*	8.72
R <sup>2</sup>	.03	.12	.10	.06

Table shows seemingly unrelated regression coefficients.  $p > .05 = *$ ,  $p > .01 = **$ ,  $p > .001 = ***$ . N =136

# Rule of law: Summary

- Overall **weak effect** of rule of law on stakeholder participation
- **Property rights** seem to influence participation of locals in BR decision making procedures.
- **Political rights** have a positive effect on NGO participation in implementation activities, but a negative effect on the participation of scientists in decision making and locals in implementation.

# Rule of law and stakeholder participation in BR decision making: effects on conservation effectiveness

	NDVI change 1996-2004 (%)	Self-assessment of BR managers
Scientists	-.103	<b>.248**</b>
NGOs	.116	<b>-.228**</b>
Locals	-.692	.017
Local admin.	.845	-.028
BR age	-.047	.015
BR size (log)	-.778	-.007
Pristine / cultural landscape	-2.229	.384
HDI index	6.443	.995
Population density	-.015	-.009
Property rights	<b>-.148*</b>	-.008
Political rights	<b>1.117**</b>	.021
R <sup>2</sup>	.21	.22
N	105	115

Table shows OLS regression coefficients.  $p > .05 = *$ ,  $p > .01 = **$ ,  $p > .001 = ***$

# Rule of law and stakeholder participation in BR implementation: effects on conservation effectiveness

	NDVI change 1996-2004 (%)	Self-assessment by BR managers
Scientists	<b>-1.244*</b>	<b>.338***</b>
NGOs	1.358	<b>-.294**</b>
Locals	<b>1.759*</b>	.053
Local admin.	.304	-.012
BR age	.012	.101
BR size (log)	<b>-.860*</b>	-.027
Pristine / cultural landscape	-1.848	.390
HDI index	7.982	-.103
Population density	-.012	-.001
Property rights	<b>-.169**</b>	-.002
Political rights	<b>1.061**</b>	.017
R <sup>2</sup>	.27	.25
N	105	115

Table shows OLS regression coefficients.  $p > .05 = *$ ,  $p > .01 = **$ ,  $p > .001 = ***$



# Stakeholder participation and conservation effectiveness: summary

- **No agreement** between self-assessment and NDVI models.
- **No effects** of stakeholder participation in decision making on biomass change.
- Positive biomass change is associated with **higher rates of local stakeholder participation** in implementation, but also **negatively linked** to scientist's participation.
- Self-assessed conservation effectiveness is associated with a **higher rate of scientist participation** and a **lower rate of NGO participation** in both decision-making and implementation.

# Conclusion

Does rule of law facilitate stakeholder participation?

- Probably not.

Does stakeholder participation lead to increased conservation performance?

- Yes, but the strongest effect are from participation of local stakeholders on the implementation side.