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## Introduction

With possible unknown health and safety risks and no regulation on handling practices (Maynard *et al.* 2006; Nel *et al.* 2006; Scheringer 2008; Oberdorster *et al.* 2005), engineered nanomaterials are attracting new research to understand public risk perception and its role in the development of nanotechnology (Kahan 2009). Non-governmental organizations, or interest groups, serve as self-identified representatives of and advocates for the public. As such, they have the potential to effect public perception and the future governance of nanotechnology (Hess 2010). My research will look to answer the first two research questions listed below, so that future research will have a good framework from which to build to be able to answer the broader research questions.

### Primary Research Questions:

1. What issues are these non-governmental organizations (NGO's) concerned about?
2. What actions have these NGO's taken in response to those issues?
3. What impact have NGO's had on regulatory policy and industry practices on engineered nanomaterials on nanotechnology?
4. Why are certain NGO's concerned with nanotechnology as compared to other organizations who are not?

## Methods

To answer the research questions my research team and I first constructed a hypothesized relationship (poster - middle) between the data I collected on the organizations researched and what conclusions future research will look to draw from that data. Then a matrix of organizations and summaries (memo) of data on those organizations was created through internet search tools and organizational references and then catalogued. An example of these memo's is shown below.

### Organization: Greenpeace, UK

Greenpeace is an international action group that is independent in its claimed mission to protect the health and safety of the global environment. The organization proclaims that they exist to be the "voice" for the Earth. The organization began back in 1971 in an effort to "bear-witness" to a US nuclear detonation on a little island off the coast of Alaska, with the success of bringing public awareness and outcry over the event. The organization claims to represent earth and the environment, as well as many of the life forms that naturally inhabit the environment. The organization has a presence in over forty countries world wide and its main headquarters is located in Amsterdam, Netherlands. In general, the organization works towards their goal of a "green and peaceful world - an earth that is ecologically healthy and able to nurture life in all its diversity," by doing research, advocacy and promoting peaceful/non-violent action against governments and corporations that abuse the environment. They also work towards an open forum to drive healthy debate and possibly work out viable solutions as well. The organization main interests and concerns are focused on climate change, oil drilling, deforestation, whaling and massive fishing, nuclear power and weapons, and pollution.

Nanotechnology, though is one of their concerns, is not high on the list of interests Greenpeace works toward. Overall Greenpeace is solely concerned about the environmental health and safety issues surrounding nanotechnology. The organization is concerned with the research and developmental stage in the nanotech life-cycle, and more importantly how the industry prioritizes the environment when developing these technologies. In the long run Greenpeace is more looking at the product end-of-life of the cycle and how nanoparticles will affect the environment. The target of these endeavors is the nanotech industry in general, as they hope to create a moratorium on the industry until viable data can be shown that nanotechnology has no significant impact on the environment or its inhabitants.

Greenpeace claims to have a member base of up to 2.9 million members worldwide. Each office around the world selects a board to run the local office and potential issues. The board then selects one its members to be on the board of trustees for the entire organization. The trustees meet once a year to construct a budget, fix structural issues and converse on which issues have priority. Green peace is a non-profit organization (non-profit 501(c) 3) so their funding comes from charitable donations of their members. They do not allow donations from governments, corporations or political parties.

Activities: (Name, Date - Description)

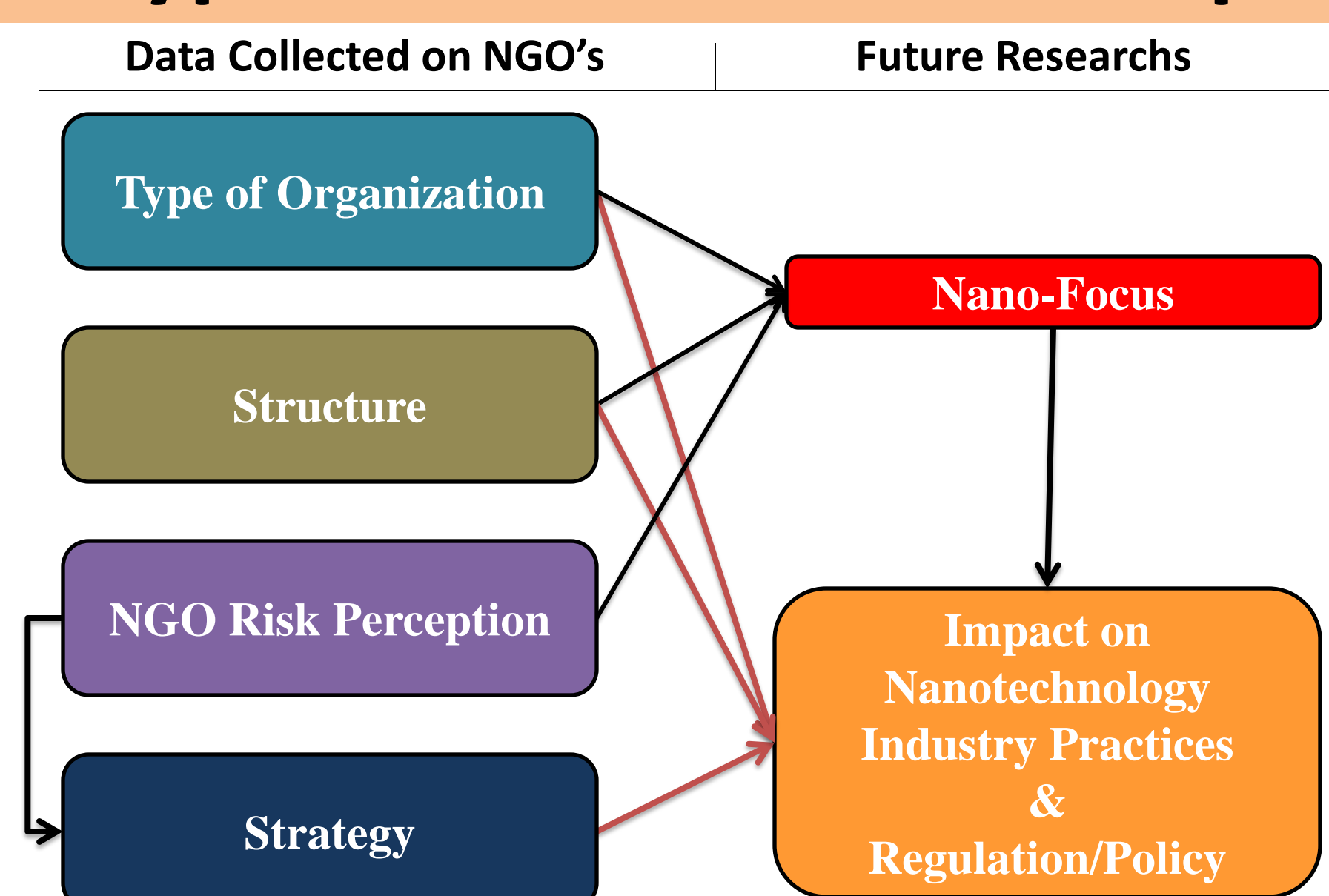
- **Report: Future Technologies, Today's Choices** - July 2003 - Discusses the technical side of nanotechnology, its possible benefits in to diverse areas, the reality [in Greenpeace's point of view] and hype around the technology and possible concerns that stem from the development of the technology.
- **Action: Nano Jury** - May 2005 - Greenpeace puts together a citizen's jury to look at how the public believes nanotechnology should be developed.

<sup>1</sup> Questions: "Greenpeace UK. Greenpeace. Web. 24 June 2011. <http://www.greenpeace.org/uk/about/faq>." <sup>2</sup> Questions: "Greenpeace UK. Greenpeace. Web. 24 June 2011. <http://www.greenpeace.org/uk/about/faq>." <sup>3</sup> Questions: "Greenpeace UK. Greenpeace. Web. 24 June 2011. <http://www.greenpeace.org/uk/about/faq>."

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## Hypothesized Relationship



## Top Ten NGO's

Organization	Description	Funding	Action	Target	Goal
etc group	<b>Erosion, Technology, and Concentration Group</b> •Issues: Consumer Safety & Equitable Dev. •Represent: Public	Donations	Publications	International Governments	Moratorium
GREENPEACE	<b>Greenpeace</b> •Issues: Environmental •Represent: Environment	Members	Publications	Nanotech Industry	Moratorium
EDF ENVIRONMENTAL DEFENSE FUND	<b>Environmental Defense Fund</b> •Issues: Environmental and Consumer H&S •Represent: Environment & Public	Members	Publications & Partnerships	U.S. Government & Industry	Regulatory Change
Friends of the Earth	<b>Friends of the Earth</b> •Issues: Public and Environmental H&S •Represent: Environment & Public	Members	Publications	Government & Industry	More EHS Research
Project on Emerging Nanotech	<b>Project on Emerging Nanotech</b> •Issues: Environmental & Consumer •Represent: Public	Private Org.	Conferences & Publications	U.S. Government	Regulatory Change
INTERNATIONAL CENTER FOR TECHNOLOGY ASSESSMENT	<b>International Center for Technology Assessment</b> •Issues: Ethical and Social •Represent: Public	Members	Petitions	EPA & FDA (Regulatory Agencies)	Moratorium
CRN Center for Responsible Nanotechnology	<b>Center for Responsible Nanotech</b> •Issues: Socioeconomic •Represent: Public	Donations	Publication	Public	Regulatory Change
NRDC NATURAL RESOURCES DEFENSE COUNCIL	<b>Natural Resource Defense Council</b> •Issues: Public and Environmental H&S •Represent: Environment & Public	Members	Publications	Government	Regulatory Change
SOIL ASSOCIATION FARMING STANDARDS	<b>Soil Association</b> •Issues: Consumer H&S •Represent: Public	Donations	Publications & Organic Std.	Food Industry & Farmers	Regulatory Change
SVTC	<b>Silicon Valley Toxics Coalition</b> •Issues: Consumer, Environmental, Occupational Health and Safety •Represent: Public and Environment	Donations	Publications	Nanotech Industry	Regulatory Change

## Findings

1. **Number of Non-Governmental Organization's Found:**
  - a. 80 NGO's Found
    - i. 30 committing resources to nanotechnology issues
    - ii. 50 Allied organizations
2. **What issues are these non-governmental organizations (NGO's) concerned about?**
  - a. Primarily Environmental and Public Health and Safety Issue
3. **What actions have these NGO's taken in response to those issues?**
  - a. Publications
    - i. Regulatory Change
      1. Moratorium
      2. Safer Industry Practices
      3. More Environmental Health and Safety Funding

## Future Research

Future research will look to answer:

1. What impact has NGO's had on regulatory policy and industry practices?
2. Why do NGO's care about nanotech?

## Other NGO's

1. Acción Ecológica
2. African Centre for Biosafety
3. Allied Workers' Associations
4. American Federation of Labor and Congress of Industrial Organizations
5. Bakery, Confectionery, Tobacco Workers and Grain Millers International Union
6. Beyond Pesticides
7. Biological Farmers of Australia
8. Brazilian Research Network in Nanotechnology, Society and Environment
9. California for GE Free Agriculture
10. Canadian Environmental Law Association
11. Center for Biological Diversity
12. Center for Cognitive Liberty & Ethics
13. Center for Community Action and Environmental Justice
14. Center for Environmental Health
15. Center for Food Safety
16. Center for Genetics and Society
17. Center for the Study of Responsive Law
18. Clean Production Action
19. Corporate Europe Observatory
20. Corporate Watch
21. Ecological Club Eremurus
22. Econexus
23. Edmonds Institute
24. Education
25. Environmental Research Foundation
26. Farmers Link
27. Forum for Biotechnology and Food Security
28. Foundation on Future Farming
29. Foundation Science Citoyennes
30. Gaia Foundation
31. GeneEthics Network
32. Genewatch
33. GRAIN
34. Health and Environment Alliance
35. Henry Doubleday Research Association
36. India Institute for Critical Action-Centre in Movement
37. Indigenous People's Biodiversity Network
38. Institute for Agriculture and Trade Policy
39. Institute for Bioethics, Culture and Disability
40. Institute for Molecular Manufacturing
41. Institute for Social Ecology
42. Institute for Sustainable Development
43. International Council on Nanotechnology
44. International Network of Engineers and Scientists
45. International Society of Doctors for the Environment
46. International Trade Union Confederation
47. International Union of Food and Agricultural Workers
48. International Union of Food, Agricultural, Hotel, Restaurant, Catering, Tobacco and
49. Intrnational Risk Governance Council
50. Lok Sanjh Foundation
51. Loka Institute
52. Meridian Institute
53. Nanotechweb
54. National Farmers Union
55. National Toxics Network
56. Oakland Institute
57. Pakistan Dehqan Assembly
58. Polaris Institute
59. Practical Action
60. Public Employees for Environmental Responsibility
61. Quechua Ayamara Association for Sustainable Livelihoods
62. Research Foundation for Science, Technology and Ecology
63. Science and Environmental Health Network
64. Sciencecorp
65. Sunshine Project
66. Tebtebba Foundation - Indigenous Peoples' International Centre for Policy Research and United Steel Workers
67. The Nanotechnology Group Inc.
68. Third World Network
69. Vivagora (

## Discussion

Research results from this preliminary examination of NGOs engaged in nanotechnology issues provide a basis on which to understand the impact of NGOs on:

1. Emergent regulation of the nanotechnology industry
2. Funding for environmental health and safety (EH&S) research
3. Industry voluntary practices

Future research will involve a more in-depth examination of NGO actions and their potential outcomes.

Further research will also examine why NGOs care about nanotechnology-related issues as opposed to other issues. To approach this research objective, researchers will compare the nano-related NGOs identified in this preliminary study to NGOs that are comparable but are not concerned about nanotechnology-related issues. By making this comparison, researchers will gain a better understanding of NGO risk perception.

NGO's risk perception and actions with regard to nanotechnology are important, because NGOs are uniquely positioned to influence policymakers and the public. Such influence has implications for the future development of nanotechnology.

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