Gordon Brent Ingram, side stream environmental design, Vancouver presentation to the Qatar University Environmental Studies Center, Doha November 28, 2013

Expanding & Diversifying Environmental Research: Needs for Urbanizing Coastal Regions Exporting Fossil Fuels
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Thanks very much to the Office of the Associate Vice President for Administration and other offices of Qatar University for arranging this visit to Doha!
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This presentation is a response to two questions in a October 23, 2013 videoconference:

1. why do I want to contribute to the development of Qatar and the Gulf
2. and how do I envision making the QU Environmental Sciences Centre more of a regional and international centre?
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First, I outline the kinds of pressures on and opportunities available for further developing regional and national centres for environmental studies, such as the Qatar University Environmental Studies Centre, and for taking regional leadership for knowledge production in the Gulf.
I have been involved in, and shaped by, environmental studies centres for most of my life, going on four decades. I have had the privilege of working in research facilities from North America to the Middle East and in Europe, East Asia and the Sahel region of Africa. My formative experiences were for the Province of British Columbia and in the United Nations technical agencies.
Vancouver and the south coast of British Columbia on the northern border of the USA,
kelp forest ecosystem in fjord adjacent to temperate rainforest, Juan Perez Sound, Gwaii Haanas, Haida Gwaii, British Columbia
Wild sorghum in former lake-bed north of Mount Greboun, Aïr Mountains, Niger 1 December, 1985
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Secondly, I explore the relevance of my experiences with developing teams for environmental research in my own region, on the West Coast of Canada (another urbanizing area seeing a historic expansion in export of fossil fuels), to the current information and capacity-building needs in the Gulf.
Both the Arabian Gulf and Pacific Canada are relatively affluent parts of the world that were formerly backwater ‘Resource Frontiers’.
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As the global environment shifts and our economies diversify, the types of information necessary to manage and protect a range of resources, sensitive sites, ecological processes, and amenities, are increasing and becoming more nuanced.
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This lecture has two other functions:

a. to provide Qatar University with some more concepts for future strategic planning for the Environmental Studies Centre and
b. to ‘test the waters’ (of the Arabian Gulf) to see if I can communicate these ideas clearly, at Qatar University, and, if so, to obtain a sense of whether or not these priorities have relevance to ESC staff and QU administrators.
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A. Introduction
More and increasingly creative and innovative environmental research is needed throughout the world. The survival of our communities and their continued health and prosperity of communities depends on more and better information and knowledge products.
As environmental problems have become more complex, so have been the needs for knowledge and the support for research teams.
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How can pioneering centres such as QU's ESC, established in 1980, be expanded while better supporting already established research groups?
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My central recommendations are to broaden both the applied, more descriptive ('service') and the scholarly work while better linking this work to new more creative and theoretical initiatives in response to global trends, impacts on local ecosystems, and shifting needs of human communities.
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I then explore some priorities for energy-exporting and urbanizing coastal regions such as Qatar and the Gulf, on one hand, and the West Coast of Canada, on the other hand.
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Finally, I propose some principles and strategies for capacity-building, as some additional research groups, as the basis of discussion for strategic planning for the Environmental Studies Center over the coming five years.
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The next Director of the Environmental Studies Centre will be asked to forge a transparent plan and vision, on one hand, that is, on the other hand, sufficiently adaptive and flexible that the vision can be guided, transformed, and 'owned' by both ESC researchers and the leadership of the entire university (and more broadly the country).
B. The dynamic of applied and more descriptive and theoretical environmental research: The need for both

In beginning to explore trends in needs for environmental research in the world today, an initial principle is for the benefits of both
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applied work, responding to immediate proposals and crises, on one hand, and

more theoretical and creative initiatives, that will become more valuable as time-series and for identification of trends as the years go by, on the other hand.
C. Global trends warranting expanded programmes of environmental assessment and monitoring

For much of the last half century, the work of environmental research centres has involved teams such as those
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well-established at Qatar University:

- Marine Sciences;
- Remote Sensing & GIS (geomatics); and
- Environmental Impact Assessment
- Geotechnical; and
- Air Quality.
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These established research foci remain as important as ever and global trends in environmental studies centres have been to add the following teams and units:

i. biodiversity (extending to terrestrial and shore ecology and related landscape ecology along with genetics of wild and cultivate species);
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ii. spatial modelling and planning (and related decision-support) often added to RS and GIS groups as broader, 'geomatics' or 'geospatial informatics’;
Makbarat al Sahabi, Dibba (UAE & Oman) 12 May, 2006
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iii. urban ecology, sustainability practices, and related technologies (extending from architecture to fields such as environmental horticulture and agriculture extending to ‘ecological design’ and ‘environmental planning’); and
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iv. a range of social science research in environmental studies related to:
✧ stakeholder analysis,
✧ traditional environmental knowledge,
✧ governance and environmental decision-making, and
✧ communication and contemporary culture.
The last decades of the village and cultural centre of Snaauq on Vancouver’s False Creek
Village of Ighalabélabene, Bagzane Plateau, Aïr Mountains, Niger 17 November, 1986
Many of the forces that have fueled the expansion in environmental studies research have been global:

- expanding industrial impacts (and need to better identify mitigation measures);
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- climate change (both mitigating CO2 footprints and reconstruction of communities and economic activities to lower vulnerability from changing temperature and storm patterns along with sea level rise along with an array of related trends such as marine acidification);
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Climate change is contributing to sea level rise which in turn has huge implications for the future of low-lying areas such as much of Qatar and the Gulf. Modelling will of future shore geomorphologies will become increasingly important in environmental studies.
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- assessment, protection and monitoring of local biological diversity at three levels: ecosystems, species, and gene pools (often increasingly at risk);

mangrove, Ras Al Khaimah
Northern Garry oak ecosystems of the islands of the south coast of Pacific Canada now have over one hundred species at risk of extirpation and extinction mainly from urbanization and invasive species.
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- toxic contamination and ecological accumulation;

- the intensifying radioactive plume from the Fukushima Daiichi nuclear disaster
Sockeye salmon migrate through the North Pacific, absorbing Fukushima radiation and then spawn on the West Coast of North America.
Grizzly bear eating spawning Sockeye salmon on the Central coast of British Columbia
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- urbanization & infrastructure including sustainability strategies, practices, and technologies along with new opportunities for urban spatial and site planning;
Misfat Al A'biyeen, Hajar Mountains, Oman 2004
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- innovations in and recovery of agriculture, and other food production such as fishing, and pressures for better food security;

- recovering traditional environmental knowledge (as much is being lost with elders passing);
falaj,
Misfat Al A'ibriyeen,
Hajar Mountains,
Oman 2004
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- environmental health, stakeholder analysis and impacts on human populations (assessing the redistribution of the benefits and costs of globalization and environmental change); and
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- communication of environmental knowledge extending to academic and scientific communities, popular media, and contemporary culture.
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Lookout (2001, Vancouver)
Christos Dikeakos and Noel Best
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D. Needs for expanded research needs for energy-exporting and urbanizing coastal regions

In energy exporting regions of the world, including the Arabian Gulf and the North-West Coast of the North America, the global pressures that I just outlined for
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increased and more useful environmental knowledge involve some more specific needs for information.
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In energy exporting coastal areas, we are seeing sustained impacts from expanding industrial sites and operations, especially from infrastructure, pipelines, and shipping, with more information needed to minimize destruction and contamination of habitat.
KEY RESOURCE CONFLICTS IN B.C.

ALASKA

The Sacred Headwaters
Contains the Mount Ibapah coal deposit, one of the world's largest undeveloped stocks of high-quality anthracite coal. The Tawahka band opposes a Fortune Minerals mine there and is also against coal-bed methane extraction throughout the region, proposed by Shell Canada Ltd.

Enron Valdez
Enron's Valdez spills 80 million litres of crude oil in Prince William Sound after striking high reef.

NEW RULES FOR TANKERS

All vessels will be double-hulled, giving them an outer layer of steel that would act as a buffer in case of an accident. The Exxon Valdez had a single hul.

Enbridge Northern Gateway Pipeline has promised that tankers loading crude oil from its proposed facility at the port of Kitimat would operate to the highest international safety and environmental standards.

Prince Rupert Gas Transmission

Prince Rupert gas transmission (PRGT) conceptual corridor
Marine alternatives for the conceptual corridor
Alternatives under review
Proposed PRGT compression facilities
Potential future PRGT compression facilities (TBD)

OTHER

Proposed Pacific NorthWest LNG export facility (3rd party)
TransCanada's NOVA Gas Transmission Ltd. (NGTL) existing system
Potential North Montney mainline pipeline

Routing will include consultation with local stakeholders and environmental, cultural, economic and other factors.
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Energy-exporting coastal areas are major sources of atmospheric CO2 and increasingly vulnerable to some of those trends and both sets of trends and synergies warrant more monitoring and analysis.
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Increased industrial operations, urbanization, and climate change are putting local biological diversity, marine, terrestrial, and shore, increasingly at risk with more inventorying, assessment, and monitoring necessary.
Our energy exporting regions are vulnerable to toxic contamination from some of our industrial operations and urbanization, on one hand, and more global problems, such as radioactivity and heavy metals, on the other hand.
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Urbanization in our energy exporting regions will increasingly require lower impact infrastructure based on local research -- linking back to regional traditions and vernaculars.
In coastal regions exporting fossil fuels, protection of fisheries has become crucial to the survival of traditional communities. Similarly, our relatively wealthy regions are seeing pressures for better food security and recovery of sophisticated agricultural practices.
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Since the first wave of establishment of national and regional environmental research centres, the recovery of traditional environmental knowledge has become increasingly important, especially for construction of baselines and confirming trends, as much of this information (and language) is being lost with elders passing.
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Environmental health, stakeholder analysis and impacts of environmental change have become increasingly important especially as populations urbanize and are more vulnerable to industrial operations and global change.
Communication of environmental knowledge has been increasingly viewed as an aspect of environmental sciences extending to transmission of ideas through academic and scientific networks, popular media for needs of local communities, and into contemporary culture.
In the remainder of this discussion, I recommend a range of new policies, approaches, and practices, being developed in centres of environmental research throughout the work, and to adapt them, where needed, for Qatar University and the region.
I recommend that your next Director take one to three years to implement the following principles for expansion.
E. principle #1 Supporting and expanding the work of the research groups

Environmental research, whether field, laboratory, theoretical, or communicative is heroic. Researchers deserve more recognition and resources and the personal relationships forged in research teams must lay the basis for organizational expansion.
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F. principle #2 Modelling trends & identification of alternatives
In order to support environmental problem-solving and policy development, information is needed in better usable forms that foster modelling across time and space.
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Modelling and anticipating changes to the marine ecosystems of the Arabia Gulf, as with this research from Pacific Canada, will be an increasingly important part of environmental studies in the region.
G. principle #3 Opportunities for diversifying and expanding research groups

To further respond to and take leadership on environmental change in the region, centres such as at Qatar University can support a small number of additional teams and facilities such as
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G. *principle #3* Opportunities for diversifying and expanding research groups

- biodiversity assessment, conservation, and monitoring (extending to terrestrial ecosystems),
- urban ecology and sustainability technologies (including environmental horticulture and even food production),
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G. principle #3 Opportunities for diversifying and expanding research groups

- stakeholder analysis, community modelling, and communications --

or

incorporate more of this work into the already established research groups.
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G. principle #3 Opportunities for diversifying and expanding research groups

Some new researchers might best be appointed to contribute to two research groups.
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H. principle #4 Expanded regional meetings and collaborative groups in the region
Exchange of more knowledge and particular data sets is necessary for better environmental management and ecosystem recovery in the Arabian Gulf Region -- especially in the GCC countries.
H. *principle* #4 Expanded regional meetings and collaborative groups in the region

Greater exchanges would require some additional guidelines on information sharing, for national security purposes, from universities such as QU as well as involving national agencies.
H. *principle* #4 Expanded regional meetings and collaborative groups in the region

This effort to expand regional networks exchanging environmental data will elevate the QU Environmental Studies Centre to a leadership position for the research institutes within the region and globally.
I. *principle #5* Fostering field research and empirical studies

The quality of environmental knowledge is only as good as the level of the field research and ongoing monitoring.

Field research professionals are heroes and heroines who deserve further support and recognition.
I. principle #5 Fostering field research and empirical studies

A new generation of GCC field scientists, often women, must be fully supported including as part of Qatarization.
J. *principle #6* Recovering traditional environmental knowledge

Today, environmental knowledge from traditional communities, including in the Arabian Gulf, is increasingly used for re-reading cultural landscapes and 'remapping' environmental resources.
J. principle #6 Recovering traditional environmental knowledge

Research institutes must work quickly as elders pass and traditional communities and environments are being transformed.
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K. principle #7 Diversifying learning, teaching & supervision practices in environmental studies
With so many environmental changes and threats to our communities warranting better understanding, we need more researchers who are better prepared
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K. principle #7 Diversifying learning, teaching & supervision practices in environmental studies

for collecting a range of information especially in the field. Senior researchers will be increasingly needed
K. principle #7 Diversifying learning, teaching & supervision practices in environmental studies to supervise and sometimes actually teach students and junior researchers through course laboratories, field studies internships, and research teams.
K. principle #7 Diversifying learning, teaching & supervision practices in environmental studies

In the longer-term, cross appointments, where researchers are also appointed as university lecturers professors, is desirable especially for capacity-building,
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K. principle #7 Diversifying learning, teaching & supervision practices in environmental studies

Qatarization, and increasing the number of environmental field researchers in the GCC region.
L. principle #8 Strategies for facilities development

New needs for environmental information warrant additional equipment and facilities – both on and sometimes off the campus of Qatar University.
L. principle #8 Strategies for facilities development

In terms of cost-effectiveness, much of the equipment necessary is increasingly movable and facilities can often be relatively mobile.
L. principle #8 Strategies for facilities development

Some additional field stations, both rural and urban facilities especially where instruction and capacity-building can take place, may be worthwhile and could foster innovation.
some of the coral reef monitoring sites in south-eastern Qatar and north-western UAE
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M. *principle* #9 Building functional bilingualism in environmental science for the Arabian Gulf
While English is the main international for science, Arabic is an increasingly strategic global language where environmental concepts and facts warrant better communication.
M. principle #9 Building functional bilingualism in environmental science for the Arabian Gulf

More and better engagement in the English language is necessary for the Arabian Gulf environmental research centres. Similarly, more scientific information on the environmental is necessary in Arabic for Arabian Gulf countries.
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N. principle #10 Expanded and diversified communication of environmental knowledge

Environmental research centres, such as the QU ESC, have mandates to provide a wide range of data, knowledge, and concepts to a diversifying range of audiences and stakeholders.
N. *principle #10* Expanded and diversified communication of environmental knowledge

Management of pressures for provision of more information can be based on the guidance of the university and government agencies.
N. principle #10 Expanded and diversified communication of environmental knowledge
Sometimes, advisory councils, representing a range of academic, government, and civil society stakeholders, can assist in the setting of priorities for expansion in dissemination of environmental knowledge.
O. principle #11 Diversifying research products while improving quality and impact

One of the most important roles of the incoming Director of this Center will be to support and supervise researchers in increasing and improving their production of high impact scientific publications in international, peer-reviewed journals.
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O. *principle #11* Diversifying research products while improving quality and impact

The new Director will need to develop publication and dissemination plans with each researcher and to support each individual in this work on a weekly and month basis (with lots of monitoring).
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O. principle #11 Diversifying research products while improving quality and impact

Like old-style professors, the incoming Director should be prepared to organize regular meetings with researchers as well as professional development seminars related to increasing the flow of publications --
O. principle #11 Diversifying research products while improving quality and impact

and to be prepared to assist in the editing and being the second or third author for some publications. And there is a range of new journals and web-based venues for presenting peer-reviewed scientific products.
O. principle #11 Diversifying research products while improving quality and impact

In the longer-term, this Center could be the home of the major international, peer-review journal on Arabian Gulf environmental studies.
P. principle #12 Strategies for professional development of Center researchers

The biosphere and all human communities, including the Arabian Gulf, are experiencing increasing stress. Trying to better understand these changes, and often ecological losses, can be difficult for environmental researchers.
P. principle #12 Strategies for professional development of Center researchers

The first principle for a Center Director is to make the lives of researchers easier and to phase in policy changes in ways that minimize disruptions (and meetings) for already, fully employed staff.
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P. principle #12 Strategies for professional development of Center researchers

Similarly, policy innovations and programme expansions can only take place with the guidance of Qatar University leadership followed by relative consensus of Center researchers.
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Q. Capacity-building & implementation strategies
The kinds of expansions and shifts in the work of centers such as this would take three to five years to institutionalize. Some of my recommendations might not be necessary and there may well be already established and local approaches that would be more appropriate.
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**Q. Capacity-building & implementation strategies**

The two central principles in these conversations leading to implementation of policy changes is to find ways to better support the work of researchers and
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Q. Capacity-building & implementation strategies

building consensus with university administrators and Center researchers that will not require a huge numbers of new meetings and hours of administration.
R. Conclusions

Many of my recommendations for expanding the work of environmental research centres, such as this one in Qatar, are based on what I have learned in my own energy exporting region in Pacific Canada.
R. Conclusions

Just as many of these approaches represent the local approaches and innovations of researchers in regions such as the Arabian Gulf.
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R. Conclusions

The incoming Director of this Center, and groups like it around the world, cannot try to impose Western approaches but rather work with a range of innovations, that span research and capacity-building, and
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R. Conclusions

renegotiate and implement possibilities for local needs -- to support this group for increasingly taking a position of regional and global leadership.