Name of the case study	Iqaluit - Inuit women facing climate change, vulnerabilities, and adaptive capacity from a gender perspective- Canada (Resilience)	
What about this case makes it interesting? How does this case contribute to understanding of resilience and/or regime shifts in the Arctic?	Women and men have different tasks in their subsistence activities. Therefore, any change impacts them differently. Climate change in the arctic is affecting communities and exacerbating the differentiated vulnerability by gender. Iqaluit is an Inuit community from Nunavut that suffered the effects of climate change. The case portrays the Iqaluit woman's resilience to cope with climate and socioeconomic changes that impact their traditional activities. The introduction of wage labour, land-use change due to industrial expansion, western education, among climate changes, constrains traditional livelihoods. Several environmental changes have been detected, such as warmer temperature, thinner ices, change in seasonality, decreased caribou and seal population, decreased quality and abundance of berries, and the arrival of new insects, birds, and plants. The most affected livelihoods are berry picking, sewing, and the amount of time women can be on the land. Inuit women based their adaptive capacity on mental health, physical health, traditional/western education, access to country food and store-bought foods, access to financial resources, social networks, and their connection to their culture. Despite the rapid changes in climatic conditions being observed in Iqaluit, Inuit women face other challenges in their daily life experiencing high suicide rates, food insecurity, and housing shortages. Yet, t climate change acts as an exacerbating factor for many socio-cultural issues impacting the vulnerability and adaptive capacity of Inuit women.	
Contributors	Carla Lanyon, Stockholm Resilience Centre Juan Rocha, Stockholm Resilience Centre	**Key references: Cite in the text using (1), (2), (3) etc. and provide a reference list at the bottom of the template.** (1)Bunce, A., J. Ford, S. Harper, V. Edge, and IHACC Research Team. 2016. Vulnerability and adaptive capacity of Inuit women to climate change: a case study from Iqaluit, Nunavut. *Natural Hazards* 83(3):1419–1441.

Reviewed by (Name and affiliation)	*							
Category	**Resilience/ Adaptability**		**Loss of resilience**			**Transformation**		
	X							
Case study details:	**Country**	**Place**	**Scale – space**	**Scale – time**		**Sector(s)**		**Other (e.g. disturbance)**
	Nunavut, Canada	Iqaluit	52.6 km	1999-2016		Women traditional livelihoods		
Drivers (mark with X in appropriate boxes)	**Climate**	**Geopolitical**	**Mineral/ oil extraction & infrastructure**	**Tourism**	**Shipping**	**Biological invasion**	**Rapid demographic change**	**Other:** ***state here***
	x		X					

	Biophysical	Social
1. Basic description of coupled social-ecological system in focus (What are the key components and stake holders) If possible draw a systems diagram or conceptual map of the case – this can be a series of diagrams to capture different periods in the case and the drivers/ actors/ events that characterize the period.	**a) What types of ecosystem(s) and other major biophysical features are present?** Berries: The species they collect are blueberries, crowberries, and blackberries. Seal, caribou. Sea ice, landscape **b) How are the case boundaries defined in terms of ecosystems or biophysical characteristics?**	**c) Who are the key groups of people in this case?** 41% of non-Inuit population 59% Inuit population Female population represent the 58,1% **d) What kinds of livelihoods are important in the system?** Women livelihood are: Wage labour in the service industry and Iqaluit´s government sector. Informally Inuit women also work in childcare, traditional art, and craftwork. Furthermore, many women connected with their community as volunteers and entered the political environment. Berry picking is a traditional livelihood female-dominated activity. Sewing allows the reproduction and transmission of traditional knowledge and skills, provides the family with outdoor clothes and extra income, and crafts items. In the community, older women who sew have an important status because they hold skills and knowledge. **e) What institutions are key to this case?** **f) How are the case's boundaries socially defined, and how do these social boundaries relate to biophysical**

		boundaries? The administrative border defines the boundaries.

2. Timeline Draw a timeline of *key* events/ developments to the case. Points to include: Make clear the period of time over which the change is being considered. Provide a brief description of event/ actors, and ecological impacts. Mark particularly significant events with *. Consider both biophysical and social dimensions. Additional points that can be considered: Is it possible to identify periods of change from one type of system to another, transformations? Identify disturbances or events that	1950s/1960s introduction of waged employment 1999 Iqaluit become a territorial capital, experienced an increase in population and infrastructure construction 2000: A notable decrease of caribou populations until the present

challenged, built, or reduced resilience or adaptive capacity in the system.		
3. Disturbances What are the key disturbances in the system (present and past)	**a) Have there been major biophysical disturbances that are relevant for the case?** Arrive of orcas due to melt of sea ice, stress Inuit communities, and affect the seal populations. An increase of the rain on snow events affect the caribou population. Increase in the freezing rain during spring and summer months.	**b) Have there been major social disturbances that are relevant for the case?** The lack of proper housing, unemployment, the substance abusive, physical and emotional abuse. High cost of store food Access to snowmobiles or boats enables women's access to traditional food. An increase in hunting costs has led to less hunting in the area, negatively impacting women's access to skin.
4. Drivers of change Clarify what impacts these drivers have on the SES and if these are direct or indirect	**a) What are the key biophysical drivers of change?** Land cover changes by the development of mining and infrastructure. Climate change has increased the temperature of the area affecting the sea ice regime, precipitation, and snow. This change has also changed to unpredictable weather in the area. Earlier melting process during spring. Temperature increases have affected the sea ice.	**b) What are the key social drivers of change?** Wage labour: Traditionally, women's roles were related to activities around the house (caring for children, processing food, making clothes. Currently, Inuit women work in wage employment, being the regular, the primary income of the house. The access to finance allows them to support traditional livelihoods. Yet, it reduces the amount of time women have for engaging themselves in traditional activities. Land-use change due to the development of industries,

		mainly mining and the construction of infrastructure. The introduction of western education generates frustration among Inuit women who could not graduate and increase the inequality among the community. Higher levels of western educations lead to higher income.
5. Sources of adaptive capacity: What factors allow(ed) the system to adapt to disturbances in the past and present? Give a brief assessment of recent or on-going changes (+/-/0 = increasing/ reducing/ not affecting adaptive capacity)	**a) Within the ecosystem?** (-) Thin ice and early breakup increase travel risk and reduce time spent on the land. (-) The arrival of new species in the area (-) Decrease of caribou population (-) Decrease on seal population health (-) Changes in the fruiting and flowering cycles of Arctic plants.	**b) Within society (e.g. people, social capital, management, institutions, infrastructure):** (-) The weather has affected the reproduction of traditional livelihoods, constraining the access of key elements such as skin berries and land. Skin and quality have decreased, with the uncertainty of the weather making it more difficult for women to spend time in their land. (-) Women have less time and energy available to reproduce their traditional activities since they have formal employment. (-) Decrease in access to traditional food sources. (+) Women change their strategy to pick the berries. They go earlier and to different locations using snowmobile, boat, or ATV.

		(+) Sharing networks support family members and friends. They share food (traditional and from the store), childcare, and housing. And also share the transportation for harvesting trips. (+) Financial security regarding access to cash and credit allows women to invest in longer trips to pick berries and connect with their land. (+) To replace the lack of time women spend on land and reconnect with nature, they talk long walks outside the town or short distances on the tundra. (-) Drinking and gambling are harmful activities that are replacing the time spent on land. (-) Chronic health conditions, especially in elders, constrain the opportunity to spend time on the land and connect with their landscape and traditions. (+) Strong Inuit identity expressed in the traditional methods, skills, activities, and food connect women with their land reinforcing mental health.
The next two sections break down the information in Section I. While it is not necessary to fill these sections, if you have additional information pertinent to specific rows below feel free to enter the material.		
II.1-8 SES, resilience and		

adaptive capacity		
	Biophysical	**Social**
II.1. Where do we find change and resilience in the face of change?	**a) Within nature** Decline in caribou populations due to the changes in the snow and ice regimes and the land-use change caused by industrial development. Snow and rain events among mining had made it more challenging to access caribou. Decrease in seal population and the quality of their fur. New mammals have also arrived in the area, is more common to see polar bears and orcas, concerning the community regarding safety. Habitat disturbances related to economic development, such as an increase in shipping or air traffic, have also been found to result in behavioural changes among Arctic seals more generally. Berries are smaller, seedier, and less abundant.	**b) Within society** Changes in the abundance and quality of key elements from Inuit food system are becoming a concern. The variation in snow, sea ice, rain on snow events, and the land-use change by the industrial development affects food security, mental health, and communities wellbeing.
II.2. What are the system's key components?	**a) Key Ecological components (e.g. lakes, coastal zones, caribou)** Sea-ice Snow	**b) Actors in society (e.g. individuals, groups, public or private organizations)? How are people organized – by geography, livelihood, family, etc.?** Inuit women's role commonly involves having a stable

	Caribou Berries Seals	income from wage labour and contributing to a minor percentage of country food than men. Women are also in charge of the kids, food, handicraft, and clothes. Vulnerable groups of women don't have the same opportunities to develop strategies. This vulnerability is related to income, education, physical and mental health, connectivity, among others. Elders' women, especially those who sew, have special recognition in the community since they have specific knowledge and skill. Men oversee hunting activities and have an extra income source temporarily to invest in their traditional livelihoods. Pauktuutit is a women's association from Nunavit. They are working to improve the domestic violence in Inuit communities.
II.3. What are the key linkages? E.g. ecosystem services, resource extraction. These linkages should exist. If there are not mutual links between social and ecological components the case is	**a) From nature to society (e.g. ecosystem services)** Provisioning ES – caribou, seal, berries Cultural ES – spiritual grounds, human-nature relation provides mental health and well-being. Also, connected people in the social network can reproduce and values, knowledge, and skill transmitted. Minerals extraction	**b) From society to nature – modifying nature, extracting resources (e.g. hunting, mining, water pollution)** Landscape degradation due to the development of mining and urban infrastructure. Hunting to have the material to sew. Harvesting different types of berries

not a social-ecological system.		
II.4. What are key interactions?	**a) What are the key ecological interactions within the case?** Unpredictable weather and temperature impact how community members spend in the land engaging with their traditional activities safely. Open sea and changes in the landscape allowed the arrival or the increase of species not common in the area. The temperature impacts the fruiting and flowering cycles of Arctic plants. **b) What are the most important biophysical tele-connections to distant systems?**	**c) What collaborations, conflicts, or other key linkages exist between actors?** Industry and Inuit communities having land-use conflicts Wage labour and traditional activities. The demand of time in wage labour generates a conflict among women, decreasing their time practicing their traditional livelihoods. For instance, very few women have the knowledge to clean the skin to sew, women mentioned they don't have the time and the energy to do it anymore. Sharing networks **d) Between local actors and distant actors?**
II.5. Culture	**a) How is the relationship between society and nature viewed?** Berry picking, sewing, and spending time on the land were all described as having positive impacts on mental health and well-being. From providing meditative spaces to allowing women to provide for loved ones to reaffirming Inuit identity, these three traditional activities are essential aspects of women's lives.	**c) What are key cultural features of relevance for the case?** Traditional livelihoods are critical elements for women's mental and wellbeing. These activities among the time spent on the land strengthen their traditions and identity. Picking berries is also a social space where women meet other friends, have their own space; and a cultural practice

	b) What meanings are attributed to nature and to interactions with nature?	embedded in the landscape that requires the skill and use of traditional knowledge to collect them and prepare them. Sewing requires skill, traditional knowledge, and time to practice. Traditional food system Sharing networks **d) What are key cultural practices and beliefs related to nature?** Nature and community are embedded. Women need to spend time in their land to connect with their culture. That gives them mental health and wellbeing.
II.6. Disturbance What are important types of stress & shock	**a) Describe important biophysical or ecological shocks and stresses (e.g. floods, storms, etc).** Rain and snow events	**b) Describe important social shock and stresses (e.g. austerity policies, changes in government policy, introduction of new technologies, etc.)** The introduction of technologies facilitates traditional activities. Access to a snowmobile and/or boat helped support women's access to country food and strengthened their cultural identity, both through increased time on the land and consumption of culturally important food.
II.7. What are key	**a) What types of ecological processes (e.g. loss of**	**b) What types of slow social processes (e.g. aging,**

slow variables Changes that occur over decadal or longer time scales	**permafrost, shifts in species composition) are driving important long-term changes in ecological structures and processes?** Land-use change	**population growth, loss of language) are driving important changes in social institutions and behaviours?** Loss of some traditional knowledge Growth of population. The majority comes from diverse backgrounds and geographical locations.
II.8. Relationships with ecological regime shifts	**a) Are ecological regime shifts driving further ecological change or pressure?** **b) Are external or internal ecological dynamics potentially or actually producing ecological regime shift(s)?**	**c) Can social stresses or major changes be attributed to ecological regime shifts?** Development is contributing to land and vegetation change **d) Are there specific social practices that might be contributing to ecological regime shifts?**
II.8 Regime shifts	**If a regime shift exists and is important to this case describe it below.** Please indicate whether the regime dynamics are well-established, contested, or speculative.	
II.8.a. Detailed description of alternate regime shifts A case study can contain more than one type of regime shift	**Briefly describe the structure of each regime. What does each regime look like?** **What are differences in ecosystem structure and function? (e.g. permafrost loss, vegetation change)?** **How do the properties and behaviours of regimes differ?** **e.g. collapse of subsistence food sources, fundamental change in types of livelihoods, change in governance institutions, new actors with significant political power who transform decision making)**	
II.8.b. Feedback mechanisms within the system that maintain each regime	**Ecological feedback mechanisms**	**Social feedback mechanisms**

II.8.c. What key changes drive regime shifts? Describe how these changes alter the state of the system or feedback processes.	a) **Drivers of ecological regime shifts (either social or ecological)**. **b) How do these changes alter biophysical feedback processes?** ,	c) **Drivers of social regime shifts (either social or ecological)**. **d) How do these changes alter the social feedback processes?**
II.8.d. Ecosystem services substantially impacted by regime shift	**a) Changes in ecological processes that produce ecosystem services**	**b) Changes in demand for ecosystem services (market and non-market)** **c) Changes in the institutional context of ecosystem services e.g. changes in access and changes in how ecosystem services are valued as expressed by rules and regulations.**
II.8.e. What is (+/-) impacted by changes in ecosystem services directly or indirectly	**a) Impacts from regime shift on ecological components**	**b) Impacts from regime shift on social actors**
II.8.f. Potential cascading effects	**Describe, if any, the likelihood of potential ecological cascading effects to other SES**	**Describe, if any, the likelihood of potential social cascading effects to other SES**
II.8.g. Where do actors intervene to alter regime shift dynamics and who can do the intervening? This can be listed here	**Ecological oriented interventions**	**Socially oriented interventions**

or marked with (*) in the table above		

REFERENCES/ SOURCES CITED:

(1)	Bunce, A., J. Ford, S. Harper, V. Edge, and IHACC Research Team. 2016. Vulnerability and adaptive capacity of Inuit women to climate change: a case study from Iqaluit, Nunavut. *Natural Hazards* 83(3):1419–1441.
(2)	

GLOSSARY OF TERMS IN THE TEMPLATE

Actor	We use this term generally to look for individuals, groups, organisations, and so on that structure actions and/ or are stakeholders.
Adaptive capacity	Is the capacity of actors in the system to manage resilience in order to stay within a desired state during periods of change. This is related to the diversity in the system behind the provision of a function.
Disturbance	This refers to any disturbance to the system, regardless of scale, duration, intensity and frequency. See shock and stress.
Driver	Actor or process that directly or indirectly affects change in a social-ecological system. External means that the system in question (the scale being looked at) is unable to affect the driver in question – there is no feedback from the system to the driver.
Ecosystem services	The goods and services humans derive from ecosystems. These include: provisioning, regulating, cultural ecosystem services respectively.
Feedbacks	A change within a system that occurs in response to a driver, and that loops back to control the system. A feedback can help to maintain stability in a system (negative or balancing feedback), or it can speed up processes and change within the system (positive or enhancing feedback). Feedback processes play a very important role in determining system thresholds and in maintaining system resilience.
Institution	Here we refer to the humanly devised constraints that shape human interactions, such as rules, norms and laws. These can be formal or informal. Note that we are not referring here to institutions as organisations.
Regime shift	For complex systems, a substantial and enduring reorganization of the system, where the internal dynamics and the extent of feedbacks undergo change.
Resilience	This is a property, in this context of social-ecological systems. It relates to the capacity of a system to cope with disturbances and recover in such a way that they maintain their core function and identity. It also relates to the capacity to learn from and adapt to changing conditions, and when necessary, transform.
Shock	A sudden, unexpected disturbance. This kind of disturbance is often punctual, and has important impacts on large parts of the system.

Slow variable	When analysing complex system is often useful separating “fast” and “slow” variables. Fast variables often represent the primary concern of ecosystem users, for instance game or crop production. Slow variables shape the behaviour of fast ones but change slowly with respect to the overall dynamics of the system. Examples of slow variables might include permafrost thawing for a social-ecological system of Arctic hunters where the fast variable is game, or soil organic matter for an agricultural system where the fast variable is crop production.
Stress	This is a disturbance that has long persistence and often low intensity in impact.
Social-ecological system	This is an interwoven system of human societies and ecosystems. This concept emphasises that humans are part of nature and that these components function in interdependent ways. In the template identifying these interactions between the components aims to identify the processes and actors/ components that interact and particularly the feedbacks between the human-related components and the ecosystems/ biophysical components.
Stakeholder	See “actor”
Systems Diagram	This is using a diagram to illustrate the configuration of a system. This is done by defining its structure, function, and feedbacks. For a case there may be more than one diagram if the system changes in character (actors, processes, drivers, disturbances, feedbacks etc.) over time.
Timeline	The goal with the timeline is to capture important events – both punctual and over longer periods of time, identifying the causes of these events and the actors/ processes involved. This should be done chronologically and distinguishing events.