

WOMEN FOR THE ENVIRONMENT



Ten Women Who Made a Difference

Sidsel Mørck

Bergljot Børresen

Anne Grieg

Berit Ås

Theo Colborn

Renate Künast

Åshild Dale

Malin Falkenmark

Sheila Watt-Cloutier

Marie-Monique Robin

*Anthology by 10
Rachel Carson Award Winners*

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Foreword

This anthology is a tribute to Rachel Carson (1907-1964), author of "Silent Spring" and "mother" of the modern environment movement. It is also a tribute to the ten Rachel Carson Award winners from 1991 to 2009 who are the contributors to this anthology. We are deeply grateful to them for having taken the time and effort to write an essay on environmental topics in which they take particular interest. They are all of them extraordinary women who have won the Rachel Carson Prize because of their courageous, important and long-standing work for a better environment, just like Rachel Carson herself.

We would like to thank Stabenfeldt Publishing House for helping with the layout of this anthology.

We are also particularly indebted to Professor Emerita Ms. Berit Ås, for providing us with the speech the late Award winner Psychiatrist Anne Grieg gave on receiving the prize in 1995.

Special thanks also to our sponsors who have made the printing of this anthology possible. You will find them listed on the last page.

Last, but not least, we want to thank Ms. Liv Høie at the International School of Stavanger for translating originally Norwegian texts into English.

Enjoy your reading!

Stavanger, May 2009
The Rachel Carson Prize Board



What is The Rachel Carson Prize?

The objective of the Rachel Carson Prize is to emphasize women's contributions to environmental management by presenting an environmental award every two years to a Norwegian or international female candidate.

The prize was initiated in Stavanger in 1989, during an environmental meeting where professor Berit Ås gave a lecture on the ecological chains. On discovering that the audience knew nothing about Rachel Carson, she was so shocked that she offered her reward for the lecture to establish the Rachel Carson Fund together with NOK 10 from each of the persons present. The initiative was followed up by three Stavanger women, Ms. Else Olsen, Ms. Brit Skjærvø and Ms. Venke Helene Thorsen,

who invented the Rachel Carson Prize.

The first prize was awarded in 1991, to writer Sidsel Mørck.

The award consists of a sum of money and a statuette, a cormorant, made by the artist Irma Bruun Hodne. This water bird has been chosen to symbolize Rachel Carson's commitment to save the seas and to represent a species threatened by man's indiscriminate use of chemicals.

The prize is being governed by a board, seated in Stavanger, Norway. The board appoints a free and independent jury, the Prize Committee, which elects the award winner.



Rachel Carson (1907-1964)

Rachel Carson – Mother of the new Environmentalism

Rachel Carson was born in Springdale, Pennsylvania. She studied English and zoology, and literature was her medium in addressing important scientific issues.

Her second book, "The Sea Around Us" (1951), was awarded with two prizes. In 1962 she published "Silent Spring", a scientific book about the effects of uncritical use of chemicals. This book caused her lawsuits and derision, she was attacked by the chemical industry, media and even the authorities of the United States. But the book became a runaway best-seller with translations into more than forty languages.

President Kennedy appointed a special panel to examine Carson's conclusions, and the Senate organized hearings. Rachel Carson's warnings proved valid, and her fight for what she believed so strongly in, resulted in laws against DDT and global treaties to phase out 12 pesticides.

"Silent Spring" is regarded as one of the most important books published in the twentieth century, and its impact has been compared to that of "Uncle Tom's Cabin". With "Silent Spring" the new environmentalism was founded.

As Rachel Carson said, "Man is part of nature, and his war against nature is inevitably a war against himself".



Award winner 1991: Sidsel Mørck



Writer Sidsel Mørck, born in 1937, received the very first Rachel Carson-prize.

Sidsel Mørck was awarded the prize for courageous and tireless environmental struggle over more than a generation, particularly directed at industrial pollution.

She has often, as Rachel Carson herself, been portrayed as a prophet of the Day of Judgement, but this has never made her lose footing.

Sidsel Mørck wrote her first collection of poems in 1967 and has later published in total 35 books including books for children, essays, novels and poems. She has taken actively part in many sociological and environmental debates. Through books, essays, papers and more than a hundred articles and editorials she has been fighting for the environment. She is now in the board of the Sofie prize, also an environmental prize.

In 1988 she was awarded the Norwegian Leftist Party's Environment Prize, and in 1990 she won the Honour of Free Speech for "brave use of the work in the combat for the environment."

Market and Environment

By Sidsel Mørck

It is 18 years ago since I was the fortunate winner of the Rachel Carson Prize. During this period, I have been constantly more engaged in the obvious connection between market economy and environmental problems – not least the constantly increasing climate changes.

The ongoing financial crisis provides us with indisputable evidence that the economic system of today contributes to huge damage of the environment and nature. When our Minister of Finances – belonging to SV, the Socialist Left Party – encourages people to increase shopping in order to ride

out the actual financial storm, she confirms exactly this statement. She knows better than most people that increased material consumption leads to increased commodity production and an increased rubbish mountain. That is why SV's political program of today states that the party wants to reduce consumption to protect the environment. But the formulation about consumption reduction is omitted in the latest proposal of the new party program!

Such manoeuvring is called political adaptation. A convenient and short-sighted adap-

tation which will have profound and long lasting consequences – human, economic and political. In this context, it is appropriate to turn more focus and attention on oil as propellant for machines, than on water as propellant for people.

Norway is a rich country, following an aggressive policy in order to become still richer.

On account of the oil activity, climate gasses flow out and money flows in. A general evaluation of this activity, with all its consequences, has never been undertaken. The standard used to measure the successfulness is focused on big figures in the accounts. Thus we can afford to decorate our façade with some rain forest millions and climate quotas – and send well dressed politicians on a world tour as commercial travellers selling great words.

In addition, Norway has an Ethical Council which is supposed to create “extenuating circumstances”. It is their job to oversee the investments of the Oil Fund’s billions of Norwegian kroner. Norway is the only country in the world having such a Fund, and we could have been proud of it – if it had functioned properly!

The Oil Fund’s money is invested in companies that must follow a list of ethical instructions. The Ethical Council must see to it that these instructions are respected in practice, and report their findings to the Finance Department. If the instructions are not followed, the actual company can be excluded. Moreover, the National Bank of Norway is responsible to execute active ownership – meaning that it should have a real influence on the board decisions of any particular company.

In practice, this has had only a minimal effect; it is mostly a writing desk assurance. This is mainly due to the fact that the Fund’s money is dispersed in relatively small investments, spread over a large number of companies. “This implies that the Ethical Council and the National Bank have capacity problems in actively following the Fund’s 800 000 companies, who, in their turn comprise other companies. (...) In 2007, the National Bank executed active ownership in 15 companies, representing

only 0,19 % of the companies in the portfolio.” (Daniel Reiche, Klima 5 2008)
Thus, the ethical guarantee is practically zero.

Moreover, the instructions themselves are defensive in their framing: The Fund **must not** invest in unethical activities. An offensive formulation would be in far more effective: The Fund **must** invest in ethical activities! With such an approach the Fund could invest large amounts in activity aimed at the future – e.g. development of renewable energy. With such an approach, it would be less embarrassing having a prime minister who pretends that Norway is an environmental pioneer state. Likewise, it would become less thorny for Norway having a Minister of Finances who closes her eyes for the obvious connections between material consumption and environmental problems.

The intense oil activity of Norway is backing the establishing of an economic system which with great certainty will lead to new crises. The mantra of market economy is “growth” – a growth that has no goal beyond itself: Further growth. By its investments, the Oil Fund participates in practice in consolidating the uncontrolled market economy, direct results of which being to day’s financial and environmental crises.

Still, our resources in the Oil Fund can be used in a way that is far more aimed at the environment and a sustainable future: We have been witnessing how planned economy threw freedom overboard, to safeguard equality. Likewise, we have seen how market economy threw equality overboard, to safeguard freedom. But both these economies are man made. And so, it must be possible to create a third economy, based on nature’s absolute, non negotiable, ecological premises.

In this process, Norway has exceptionally good conditions to be an initiator, based on our solid economy. As this economy is based on polluting activity, we have a particular responsibility.

All over the world, there are “green economists” working on alternative solutions which can replace to day’s market model. All their calculations and systems have a common starting point: the real

limitations of the earth, the conditions of nature, and long term perspectives. But often, these economists lack both stimulating expert surroundings – typically because they live geographically isolated – and sufficient research subventions – typically because they work with alternative solutions.

In this regard, Norway can use its economic muscles to contribute positively. We can initiate and finance an international forum where “green economists” can enjoy optimal conditions for stimulating cooperation and further research. The aim must be to merge economy and ecology into a new model – a global “ecology”.

The world’s invariable poverty problem, the accumulation of wealth in favour of the elite, an increasing rubbish mountain, pressure on the natural resources, climate changes and an environ-

mental collapse registered in all quarters – all these phenomena demonstrate that the market economy of to day is not an appropriate governing tool!

Symptom treatment has no effect – it is, on the contrary, directly dangerous. To repair an economy with growth as its goal, is as effective as putting a plaster on a cancer tumour. Moreover, this will lead to new crises, which again will lead to new crises, which in their turn contribute to postpone a wholly necessary about-turn. The British environment counsellor, John Ashton, summarizes the situation of to day in these terms: “We need imagination to meet to day’s problems on the level they deserve to be met. The deep question is about imagination and leadership.” True! But where do we find it?

Translated by Rudi Kessel

Award winner 1993: Bergljot Børresen



Dr. Med. Vet. Bergljot Børresen, born 1936, was the winner candidate of the Rachel Carson Prize in 1993. She is Doctor of Veterinary Medicine in the field of clinical pathophysiology.

Her global consciousness was awakened in the early sixties when she got involved in an educational project for women in Lima, Peru. As a young veterinary scientist she co-authored a political report on the environmental consequences of the incipient offshore oil industry.

Her work as a teacher in population genetics as well as her research in the field of clinical pathophysiology made her well equipped for her membership in the Norwegian Government's Commission on Nuclear Safety during the 1970s. In 1986 she was the first to alert the Norwegian community to the seriousness of the Chernobyl accident.

As a follow up to this work she was on the Board of the Norwegian Organization against Nuclear Weapons, as well as a co-founder of Norwegian Physicians against Nuclear Weapons.

Friend, Foe, or Food?

By Bergljot Børresen

When an animal (always including the chimpanzee that calls itself "human") confronts an individual from another species, the body language says: Should I flee it, fight it, befriend it or eat it? For centuries science discussed observable behaviour and the physical states of animals, ignoring the mental states that must be linked to that behaviour: cognition and emotion. This has changed completely during the last few decades. Today the collective weight of discoveries in cognitive science is permanently changing the professional landscape. There is a growing consensus that all animal species have had ample time to evolve complex

and diverse behaviours as befits their multiplicity of lifestyles - plus the cognitive hardware to go with them. Modern evolutionary theory views the various vertebrate lineages as highly diverse groups that radiate from a common ancestor hundreds of millions of years ago. And comparative psychologists, behavioural ecologists and neuroscientists are increasingly uncovering a huge degree of similarity between the groups. It is no longer assumed that animals must have a blown-up *neocortex* similar to humans to be able to use their heads. It is the *palaeocerebrum*, the "old" and "primitive" brain which we humans share with all the other animals, that

generates initiative, thinking and emotions in all species, humans included.

Researchers now know that the primitive brain is inherited as a "kit" practically unchanged from species to species, because it is indispensable, perfectly designed, and not in need of improvements. It is essentially "new" in all living species, and while science ponders what name to give it, we can call it "*our common brain*".

So in order to understand what makes any animal tick we must first know the emotions and instincts that emerge from the human brain. The "seat" of emotions is not found in our famous six-layered cortex. Extensive research on animals as well as on human epileptics and during conscious brain surgery has shown that structures in the *common brain* are the starting point for every emotion that reach the conscious mind.

The emergence of emotions is always *instinctual*, provided we understand instinct as an *innate ability of the brain to turn on exactly the right emotions at the instant certain signals are picked up by the senses*. The job of the cortex of any animal is to modify the intensity of the emotions in accordance with the individual's judgement, based on the actual scenario as well as accumulated experience. So if you meet a tiger or another big predator, fear makes you careful. If you see your own dog, your social emotions switch on, anywhere between joy, indifference and anger, depending on whether the dog's presence is welcome. If you find a lone doe calf, your compassion, or *vegetative identification* may make you consider taming it. But if you are the tiger, or a big game hunter, or a seal clubber on duty, or a butcher, your *social emotions main switch* which is situated in your *hypothalamus* turns OFF, and *predatory non-emotionality* sets in.

The OFF mode enables human beings to hunt untroubled by empathy with the prey, to slaughter a pig, to boil live lobsters, or to fight unflinchingly for an hour with a salmon on the hook. Hunters and fishermen report no aggressive feelings during the hunt, and say the switch metaphor covers their experience exactly. Trying to describe the sudden change of feeling when they go in for the kill, they

tend to use words like "the cool, calculating hunting mood".

The switch can turn quickly, however. Science shows that under certain circumstances an individual from any species can act as a *social releaser* and trigger a human's social emotions towards that animal. In other words: Any animal can induce a person's main switch to flip into the ON position for vegetative identification and loving care. The animal then becomes a pet instead of prey; FRIEND, not FOOD. Exactly the same mechanism operates in the common brain of the animal; it answers the humans' invitation to friendly interaction with social signals characteristic of its species. Then, from the animals' point of view, the members of its adopted human family change from FOE or FOOD to FRIEND.

The "friend, not foe or food"- status always applies to the single individual, not the alien species as such. Thus humans never eat their tame parrot or pet turkey, a dog never eats the household cat or its owner, the cat never the rat it was raised with.

Science has recently shown that such flip-flop-switches regulate most of the functions of the *basal ganglia* of the common brain in all vertebrates. So all social animals can and do switch between seeing somebody from another species as either "one of us" or "one of them".

Two revolutions

The custom of keeping domestic farm animals more than ten thousand years ago during the *first agricultural revolution*, triggered the economic and technical evolution we are still in. Even the pathogenic microbes that each species carried evolved and combined and gave us scourges like measles, tuberculosis, common cold, influenza and small pox.

The small dimensions of the family farms in Europe through the millennia produced a well-oiled social switch that could change positions easily, resulting in feelings of intimacy, cooperation, respect and care in humans towards their animals. These animals were seen as a *community of subjects*. During the last five decades, however, this

pattern has changed radically. "Domestic" animals have changed into "production" animals. They have become *collections of objects*, often in units of tens of thousands, shut in huge factory premises or narrow cages, fed by machines, transported in layer upon layer in heavy train wagons.

Under such conditions the animals do not have the slightest opportunity to induce empathy in the people who "care" for them through all this technology. Convinced that animals are unconscious items of meat on the hoof, the caretakers perform their duties in a permanent state of *predatory non-emotionality*.

The modern "agroindustrial society" represents a complete, revolutionary break with ten

thousand years of social cooperation between humans and their farm animals. Today's animal industry, in a permanent FOOD mood, deals with exploited captives, not "domestic" animals. In addition, the "animal monoculture" found in modern feed lots is a completely new bacteriological environment, producing new, aggressively pathogenic microbes which, like SARS and bird flu, threaten to jump the species barriers and become world epidemics.

The consequences of this *second agricultural revolution* on human and animal health and welfare as well as on the general economy and ecology, is probably of the same order of magnitude as those of the first agricultural revolution.

Award winner 1995: Anne Grieg



Anne Grieg was born in 1925 and died in 2006. She was a specialist in child and juvenile psychiatry, and received the Rachel Carson Prize in 1995 for her literary research and educational work on the consequences of pollution from radioactive substances, with particular reference to affected areas all around the world.

Anne Grieg wrote articles, she gave papers and lectured in various fora on health hazards caused by nuclear testing and the effects of low radiation dosages on children's health. She built up an archive of documentation on health and environmental risks associated with nuclear technology. She worked in many fields and led numerous campaigns.

Anne Grieg was an active campaigner for Norwegian Physicians against Nuclear Weapons.

Selected works: Children of the nuclear Age, 1987, Health hazards Caused by Radioactive Pollution to the environment, 1990, Children of the nuclear Age, 1987 and A World in Fear. From Despair to Solidarity. On the Threat of the A-bomb and Its Physiology, 1984

Rachel Carson Award Speech 1995

By Anne Grieg

Your Royal Highness, Ladies and Gentlemen.

It is with a profound gratitude that I receive the Rachel Carson prize 1995. I thank the women who initiated this prize to honour the great pioneer, to encourage women to efforts to protect the environment and to make their efforts visible. I also thank the artist Irma Brun Hodne who created this beautiful cormorant in bronze.

My main work in the environmental field has been to accumulate and disseminate insight into health consequences of the increasing radioactive

contamination of our environment. My work had hardly been possible without co-operation with a selected group of women with other professional-background than my own. Long-term effects of radioactive substances moving in the natural environment, in the food chain and in living species are so complex that a multiprofessional approach is necessary.

An important part of the contamination of the environment results from test explosions of nuclear weapons. This pollution is not evenly distributed. Those hit the hardest are minority

populations in remote places, with little capacity to make their voices heard and defend their interests. Often military interests have decided what health studies were conducted - and not seldom the data have been kept secret. Last week China performed its 43rd nuclear test, the second this year, and while we enjoy this festive dinner, France is, as we all know, preparing a new round of nuclear tests in the Pacific.

France has conducted about 170 nuclear explosions in Polynesia, first in the atmosphere, when people living on near-by islands were exposed to heavy local fallout, and significant radiation doses were measured as far away as Peru.

Later France was forced by the international opinion to move its tests underground. President Chirac now claims that there will be "strictly no pollution", but this is wrong.

To put it mildly, water-saturated, fractured rocks without containment structures or natural barriers are not suited for storage of high-level radioactive waste.

The French have claimed that leakage from the tests would not occur for thousands of years, but leakage to the ocean is already clearly documented. Radioactive elements are accumulating in the food chain, and we are only at the beginning of a long-term environmental disaster.

How will this influence the future of the people of Polynesia, who always depended upon the bounty of the sea for their living?

My own conclusion from studies of existing research into health effects of radiation is that the effects on children are seriously underestimated. A broad specter of health damage to the growing youngsters and negative effects on human reproduction seems to be a more serious public health problem than major congenital defects and cancer. Children are more vulnerable than adults. Foetuses are more sensitive than children - and The foetal brain is the most vulnerable organ to low-dose radiation exposure.

There is every reason to fear the fate of coming generations in Polynesia. And they are not alone - which in this case is no comfort.

All the five nuclear powers have committed similar crimes on the human environment and health, particularly on indigenous populations. The people who live in the vicinity of uranium pits, reprocessing plants and nuclear weapons factories are also radiation victims, and the future fate of the child population around Chernobyl gives more reason to concern today than only a couple of years ago. The whole nuclear-industrial complex has seriously put our descendants at risk. With half-lives of ten-thousands of years this legacy is now humanity's permanent burden.

Thank you for listening, - thanks again for the prize and for the opportunity to point to some facts that worry me.

Award winner 1997: Berit Ås



Berit Ås, born 1928, was awarded the Rachel Carson-Prize for her lifelong pioneering work for justice and quality of life for the weakest in our society.

As a professor in Social Psychology she worked doggedly for a better environment spread over many fields of society: feminism, children's and family policy, traffic security, anti-smoking, peace movement, political leadership, education and other. She has always been a popular educator, and she has often lectured in Norway as well as abroad. Berit Ås was the first female leader of a political party in Norway, the Socialist Left Party, and she has served for the Norwegian Parliament. She was among the first to call for a formal risk assessment of offshore drilling operations in the North Sea.

Berit Ås led efforts to establish the Women's University Foundation in Norway. She has also formulated the five Master suppression techniques which she claims are used against women in particular, though these may be used against other disadvantaged groups as well.

It was Berit Ås who in 1989 initiated the Rachel Carson-Prize in Stavanger, Norway. After she had held a lecture, she asked the audience if they knew Rachel Carson. When she saw the minor response, she gave her fee to the establishment of a Rachel Carson-Prize-committee.

About Children's Health Hazards

By Berit Ås

A tiny handful of women have the same stature as Rachel Carson in the field of environment. The Jesuitical nun Rosalie Bertell for one. In a future crisis period of water shortage, the Swede Elin Wagner with her book *Peace with the Earth* holds a high rank, as does the physician Helen Caldicott with her UN award-winning film about the nuclear threat: *If You Love This Planet*. It is a warning of future health issues resulting from nuclear waste - which we presently don't know how to dispose of - and of damages already done to the human genome by radiation from nuclear plants and nuclear weapons testing. Rosalie Bertell predicted with prophetic impetus more than 20 years ago the future hazards posed to our health by radiation. She warned of long-term effects as well as the perils of low-dosage radiation.

Like many women before her Dr Bertell was not given credibility, and neither the politicians of the world nor the leaders of the nuclear industry acted upon her

warnings. At present there are more than 400 nuclear plants only in Europe. Finland is planning a new one and Sweden is expanding its nuclear power programme. Irresponsibly so, according to many. As I am writing this, in February 2009, we receive news to confirm Dr. Bertell's warnings from 20 years ago. Let's have a look at the results of this new research, but not until we have taken into consideration the Nobel Laureate Professor Linus Pauling's caution from 1961: nuclear tests already at that time caused 200 000 more people to be diagnosed with cancer in America. He was harshly criticised by nuclear power enthusiasts in Norway for his statement.

In February this year the Swedish television programme RAPPORT presented a series of research papers indicating that children who live in the vicinity of nuclear plants have increased risk of developing leukaemia and blood cancer. A German research paper

commissioned by the German Institute of Radiation Protection records the risk to be redoubled. As many as 30 reports from 9 different countries have shown similar results. In Sweden research in this area has been barred, even though the head of the radiation protection expects an increase in the incidents of cancer in children who live close to nuclear power plants. Such an investigation is inconsequential, he claims, as long as "no one can explain why this happens".

The research scientist Rosalie Bertell could explain why. She emphasises that modern science, split in its various disciplines, is too Balkanised to appreciate that a number of specialities have to be compared to explain this phenomenon. It takes expertise on cell and molecule level, knowledge about the sensitivity of various organs and information about changes in susceptibility related to age and gender. One must be cognisant of both physical and biological mechanisms, research the general state of health in the population, and have access to measurements of background radiation in the area.

In my speech for the prize presentation I included Dr Bertell's research results on the amount of white blood cells in populations living near nuclear plants. At an early stage she found that the level of white blood cells decreased in proportion to the proximity to the plant. In addition to augmenting the danger of developing leukaemia and cancer, the number of incidents of a range of ailments dependent on well functioning white blood cells also grew, amongst these contagious diseases as well as infection in general.

Her epidemiological work for the North American nuclear industry, showed that where the radioactive fallout after nuclear testing was heaviest, namely in the wind-swept lower part of the Nevada desert, the population fell victim to various ailments. Among these were obesity caused by damages to the thyroid gland, *precocious ageing and impaired intelligence* in pupils at High School level. She gave 8 lectures in Oslo on the emerging breast cancer epidemic in the U.S., sponsored by a religious community in New York. She was thoroughly ridiculed, particularly for her findings of impaired intelligence. The attacks were spearheaded by a well-known professor of biology, who at a later stage researched the maturation of intelligence in a group of youths born in the period when nuclear fallout from Novaja Semlja hit the North of Norway and the Norwegian coastal areas. His

research verified Dr. Bertell's conclusions and he was consequently all but ostracised in his own country.

The nun Rosalie Bertell has performed a series of investigations.

In the chapter called MILITARY AND CIVIL NUCLEAR TECHNOLOGY from a book I will return to, she has given a detailed account of damages to DNA in her report on soldier Ted Lombard's innumerable diseases contracted after working in transport of uranium and plutonium. She also describes how his children and grandchildren suffered various diseases by way of transmission of his damaged DNA. Ted's youngest son had epilepsy, was deaf and dumb and ended up in an institution. His children born before he started working for the military had none of these problems.

She has studied health injuries in the Pacific Islands where the Americans performed their nuclear weapons testings, and her scientific research related to the population of Hiroshima and Nagasaki is highly respected.

She has, like the physician Helen Caldicott, investigated the effects of intensive uranium mining performed by the Navaho Indians in Mexico in the 1950s. Children of these workers developed 17 times as many cases of cancer in their reproductive organs and 5 times as many incidents of bonemarrow cancer than children elsewhere in the country. Her book *No Immediate Danger, Prognosis for a Radioactive Earth* has a unit on radioactivity and its biological impacts, another one on military and civil nuclear technology and a third part about lies and cover-ups of research results which may shed a harsh light over the nuclear industry.

The awareness of especially children's vulnerability to low-dosage radiation is now spreading. EU Directive 29/96 which instructs confectioners to incorporate low-dosage radioactive waste into consumer goods (except children's toys, cosmetics and food) was passed by the Norwegian Storting without debate. At that point a minority group of a British governmental commission had already proffered serious concerns about endorsing it. The research scientist Chris Busby and many others caution that children are probably about 18 times more susceptible than grown men, and women probably twice as sensitive as men. In the name of Rachel Carson we wish to protect children and all things alive.

Award winner 1999: Theo Colborn



Theo Colborn, born 1927, is an American Professor in Zoology. She was awarded the prize in 1999 for twenty years of work in the field of environmental toxicology to promote awareness and knowledge for the implications of toxic chemicals work. Dr. Colborn's work has triggered world-wide public concern of endocrine disruptors, and has prompted enactment of new laws by governments, the private sector, and academics.

Colborn's first career was as a pharmacist. At the age of 52 she started further studies in epidemiology, toxicology and water chemistry, and she earned a PhD in Zoology. As a professor she has been engaged in research and has served on numerous advisory panels. She has published and lectured extensively on the consequences of prenatal exposure to synthetic chemicals. Over the years she established and directed the Wildlife and Contaminations Program at World Wildlife fund US. Her book, *Our Stolen Future*, has been published in more than a dozen languages.

In her retirement she has set up a non-profit organization, The Endocrine Disruption Exchange (TEDX), to carry on her work. See www.endocrinedisruption.com

Rachel, Where are You?

By Theo Colborn

If Rachel Carson had lived just a few more years she might have prevented one of the most intractable disasters facing the world today—the penetration of man made endocrine disrupting chemicals into the womb, that has led to a pandemic of human disorders across the northern hemisphere. Now, into the fourth generation of people exposed to such chemicals from before conception through adulthood statistics tell us that humankind is under siege. As a result of corporate influence over the media, academia, and governments the truth is now only surfacing about the pandemics of endocrine disrupting disorders that are reach-

ing into homes tearing families apart, stretching beyond the limit of family and social service dollars, and undermining the economy and security of the world. A child born today faces high odds of developing at least one or more of the following: attention deficit hyperactivity disorder, autism spectrum disorders, learning disabilities, diabetes, obesity, childhood and pubertal cancers, abnormal genitalia development, and infertility because of abnormal development and function of their reproductive systems. Even breast and prostate cancers, and Parkinson's and Alzheimer's Diseases have joined the above list of disor-

ders that have been linked with prenatal exposure to endocrine disruptors.

Through Silent Spring Rachel Carson helped a vast readership understand what the dispersal of highly toxic pesticides in the environment meant to the survival of humankind and other life forms. She wrote in her 1962 book that we were a society “dominated by industry” and “specialists who could not see the big picture”. Not much has changed since then. If she had stayed with us longer I am certain that she would have discovered the long-term, irreversible damage that chemicals can have in the womb, affecting more and more individuals in each new generation. She would have been able to put into words what others have tried to do and failed and perhaps turned the trend around. She could have kept readers spellbound while describing the insidious nature of endocrine disruption. As she pointed out in her book, we are challenging the integrity “...of some two billion years of evolution and selection of living protoplasm”, “...a possession that is ours for the moment only.”

It was not until 1991, 17 years after Rachel Carson passed away, that a group of international experts attending a weekend work-session at the Wingspread Conference Center, Racine, Wisconsin released a Consensus Statement warning about chemicals that have the potential to disrupt the endocrine systems of animals and humans. For lack of a better term, they chose to name these chemicals “endocrine disruptors”. They also estimated with confidence that “Unless the environmental load of synthetic hormone disruptors is abated and controlled, large scale dysfunction at the population level is possible.” They could never have predicted that within the next ten years a pandemic of endocrine related disorders would begin to emerge in the northern hemisphere, and that 28 years later, the pandemics would be posing a threat to humankind of catastrophic proportions.

As prescient and correct as the Wingspread Consensus Statement was, it never got the attention it should have, perhaps because the scourge it described was not cancer. And perhaps because the words needed to describe endocrine disruption are

“embryo” and “fetus”, and at that time these words were political lightning rods because of the bitter battles over abortion. And, no one could begin to perceive how much corporate money would be poured into suppressing, diminishing, or distorting the proceedings of that meeting suppressed and the subsequent supporting research that followed over next 18 years. But when one considers that almost all of the endocrine disrupting chemicals that have become an integral part of our lives are derived from the toxic by-products of producing gasoline and natural gas, and burning coal one can begin to understand why the public does not know what endocrine disrupting chemicals are, their source, and how and where they have moved into our lives. The puppeteers controlling the media include (1) the energy corporations who sell their toxic, elemental, by-product feed-stocks to (2) the chemical companies who make the endocrine disrupting chemicals who sell them to (3) the products manufacturers. These corporations rehired the same public relations firms that attacked Rachel Carson and others after the Wingspread Consensus Statement was released. So, as more and more different kinds of chemicals were deliberately being created for more and more purposes, and in greater and greater volumes, more and more dollars were covertly spent keeping the public doubting and complacent while at the same time casting aspersions on those doing endocrine disruption research. Rachel Carson would have known all about this.

Sitting back now and taking a long hard look at all the data available, the big picture tells us that -- *Endocrine disruption, like climate change, is a spin-off of society's addiction to fossil fuels.* Setting aside their effects on infertility and just considering the impacts of endocrine disruptors on the brain, intelligence, and behavior alone, it is not improbable to estimate that endocrine disruption can pose a more imminent threat to humankind than climate change. Go to www.endocrinedisruption.com.

An effective way to strike at the heart of the problem is to switch as soon as possible to alternative, non-fossil sources of energy to reduce the availability of the precursors of endocrine disrupting chemicals. Perhaps, if the sale of benzene and

other feedstock by-products from the processing of gasoline and natural gas are taxed high enough, change will take place, but that is too slow.

Needed most is an International Inner Space Research Program driven solely by prevention with funding equal to or surpassing that of Outer Space Research. This program must place health above the bottom line. It will serve humankind by setting old paradigms aside and utilizing entirely new research approaches to understand better the womb environment and how to detect chemicals that can undermine our ability to process information, to love and be compassionate, to contribute to society, and not live in a state of dependency. This research can be accomplished in a laboratory environment where only researchers with no conflict of interest are allowed to work and where they can speak out about the implications of their research without being accused of being biased or junk scientists. Rachel Carson would have understood this need, I am sure.

In the meantime, citizens need to be educated about these chemicals that reside in their flesh and learn how to protect their health and that of their families. For at whatever level climate change is being considered -- community, state, regional, national, or international -- it should be understood that reliance on fossil fuels includes more risks than have been put on the table. It will take an educated citizenry to provide the support and encouragement for bold and intelligent leadership to introduce considerations for the embryo and fetus when calculating how much time is left.

What we need now are elected leaders around the world who will put endocrine disruption at the top of their agenda because they know that cleaning-up the womb environment comes under the scope of international security and that “peace begins in the womb”.

Award winner 2001: Renate Künast



Renate Künast, born 1955, received the Rachel Carson-Prize when she was the first female Minister for Consumer Protection, Food and Agriculture in then West-Germany.

She has been rewarded the prize for her great courage and hard work for a change of agricultural policy in her own country and within the European Union. She is a strong advocate of organic farming, which avoids pesticides, drugs and other manmade chemicals and feeds. Renate Künast took office in the midst of the foot-and-mouth disease crisis, and immediately set out to reform old-fashion agriculture. She worked doggedly to promote environmentally friendly farming methods, to improve consumer safety and food quality, and to protect biological diversity.

Renate Künast has a law degree and has practiced as a lawyer. In the late -70s she actively took part in the anti-nuclear movement, and in 1979 she joined the "Alternative list", the precursor to the Green Party. She has had various political assignments, and has been a fervent advocate for civil rights and citizens' participation in democratic processes, especially after the German reunion.

Today Renate Künast is co-chair of the Green Party in the German Parliament, and a most popular female politician.

Sustaining What Sustains Us

By Renate Künast

"Man is part of nature, and his war against nature is inevitably a war against himself."

Based on my professional and personal experience, I very much agree with Rachel Carsons' statement. Over recent decades, humanity has benefited enormously from development; it has enriched our lives, but has not been sustainable. Our current way of living has caused a serious climate change and led to the loss of biological diversity. The dramatic scope of these two major environmental challenges is highlighted by many international reports. Still, man is not able to act adequately. Short term needs are still considered to be more important than the protection of our vital natural resources. We must proceed to action now as we are well on the way to destroying our livelihoods.

Biodiversity is life

Nature's diversity makes our planet a unique habitat, having its own value. However, biodiversity is of concern not just because of its intrinsic value. In fact, biological resources provide all our food, many medicines and industrial products. Biological diversity underpins human well-being through the provision of ecological services such as those that are essential for the maintenance of soil fertility and clean, fresh water and air. It also offers various recreational opportunities and is a source of inspiration and cultural identity. Thus, preserving biodiversity is part of our responsibility towards future generations.

The dramatic loss of biological resources

Today, we are facing a dramatic loss of biological diversity, at the levels of ecosystems, species and genes, caused by environmental degradation, over-exploitation, invasive species and under-appreciation. It's a global catastrophe causing irreversible damage. Worldwide, two key drivers are increasing the pressure: population growth and growing per capita consumption.

We must realize that the loss of biodiversity bears huge economic risks: The global economy is losing more money from the disappearance of forests, for example, than from the current banking crisis, according to the EU-commissioned study on the Economics of Ecosystems and Biodiversity (Teeb). It estimates the annual cost of forest loss between \$2 trillion and \$5 trillion. The figure is calculated by adding the value of the various services that forests perform, such as providing clean water and absorbing carbon dioxide. The study, headed by a Deutsche Bank economist, parallels the Stern Review into the economics of climate change. In 2001, the EU committed itself to halting the loss of biodiversity across Europe by 2010. Nearly eight years later, we must concede that we are still far from reaching this goal. The current rate of global species extinctions is hundreds or thousands of times the natural rate – almost 150 species extinct every day. Entire habitats are at risk of being destroyed: Europe has lost more than half of its wetlands and most high-nature-value farmland; many of the EU's marine ecosystems are seriously degraded.

Linking climate protection and nature conservation

Climate change and the loss of biodiversity go hand in hand. Specific ecosystems like forests, moors or coral reefs are the Earth's CO₂ reservoirs and regulate our climate. Wetlands attenuate extreme weather, floodplains serve as a buffer for the hydrological regime, and tropical forests – the Earth's lungs – are essential to the survival of humanity as a whole. The clearing of virgin forests contributes around 20% to global warming. A large proportion of global greenhouse gas emissions results from conversion of natural vegetation

into land used for other purposes. Moreover, if climate change continues at the current rate, up to 30% of the world's species are likely to be extinct by 2050.

Even if we are able to keep global warming within the threshold of two degrees Celsius, we will have to cope with evident environmental changes in many regions. Intact habitats and natural diversity are essential if we want to ensure that the ecosystem is able to adapt to the consequences of global warming. The biological diversity in agriculture, for example, is of fundamental importance for food safety. Therefore, the challenge lies in systematically linking climate and biodiversity protection.

Political implications

Our lifestyle can make a vital contribution to a sustainable and fair use of biodiversity and thus to the preservation of our natural resources. As a former Minister for Consumer Protection, Food and Agriculture, I believe that policy-makers must provide effective rules, in particular in the field of European and global agriculture and forestry policy. Organic farming, like sustainable fishing and forestry, guarantees higher species diversity and a better impact on the climate.

Our economic activity must be changed fundamentally: towards ecological growth, towards a green market economy. We need life-cycle management and increased transparency; above all, we must raise public awareness and promote public participation. We must promote an ecological, socially compatible lifestyle which brings prosperity and health not only to some, but to all people worldwide. At stake is a higher quality of life – for the individual as well as the community.

To manage the forward-pressing challenges, we as the Green Party strongly implement biodiversity policy as a cross-disciplinary task. This means that, in addition to integrating nature conservation and species protection into the traditional ecological fields, biodiversity issues must be fully taken into consideration in transport, energy, economic, trade and finance policy. We strongly need policies and cultural practices which unite protection and sustainable use of our natural resources.

Award winner 2003: Åshild Dale



Åshild Dale, born in 1944, was awarded the Rachel Carson Prize for her long-standing contributions to nature and the environment. Her most important achievements have been in the realization of vital aspects in the field of nature- and culture conservation, especially where children and young people have been involved. Her farm and mountain farm have been hosts to children and young people, Norwegian and foreign, who through active participation have acquired an understanding of biological diversity and green values.

Åshild Dale has initiated projects, published popular science articles in newspapers, magazines and television programmes, yearbooks and research reports.

In 2000 she won the international "Prize for Women's Creativity in Rural Life". In 2002, together with her husband, she received "Seterprisen 2002" (Mountain Farming Prize 2002).

Åshild Dale has studied business and tourism, and has work experience from farming, tourism and journalism.

Under the same Sky, with the same Challenges

By Åshild Dale

The encounter with women in Tigray in Ethiopia in the winter of 2008 boosted my belief that fighting for a sustainable development is worthwhile in both the southern and northern hemispheres – and that women must take the necessary actions. In the course of intensely busy days of seminars and field trips in the company of participants from a range of African and Asian countries, I experienced that we, despite various points of origin, have so incredibly many challenges in common and can also join forces for common solutions.

As a practice-host for participants in The Development Fund project Exchange for sustainable development (ESD) since 2002, I have had the pleasure of sharing thoughts and ideas with many youths from Africa, Asia and Latin America. We have a lot to learn from each other and more in common than one would imagine at first sight. The Tigray province in the northern part of Ethiopia still bears traces of the many years of war, and compared to us most of them live in deep poverty. The work of the Women's Association of Tigray and other development organisations, however,

demonstrate good results and provide optimism and hope of progress for the local population. We witnessed how small measures like protecting the soil, securing the water supply for agriculture and households, education of women as "barefoot engineers" of solar energy or access to cheap loans for purchase of domestic animals could lift a whole community out of poverty and despondency. In Norway we do not know poverty, but we see many manifestations of ruthless exploitation of our natural resources that might cause severe problems for future generations. The examples of over cropping and devastation of people's livelihoods are many, in the south great areas of topsoil are destroyed by major technical interventions, overgrazing and erosion – in our own country we cover our best mould by asphalt at an ever-increasing speed. A tragical development in a world where billions of people have too little to eat, and it is a paradox to me that politicians and authorities both nationally and internationally demonstrate such lack of will and power to act.

Fighting for the waterways – what have we learned?

The whole of my adult life I have been involved in the conservation of nature and the environment, initially as a politician and in NGOs, later as a farmer/ecosystem manager and communicator. In conversations and cooperation with people from both hemispheres I have learned that exploitation of natural resources and the destruction of natural landscapes constitute major obstacles for economical and social justice. Nature strikes back, poverty and famine are mainly the result of short-term pursuit of profit extracted from the soil, water, forests and minerals with no thought of long-term sustainability. The goal is constant growth. Given the documented global warming and the negative development in the third world, we in the rich part of the world must realise that growth comes at a price, a very high price! There are signs of a budding understanding, however, that time has come for a change of course if we are to save our natural resources. There is reason for concern, however, that the unfolding financial crisis might hamper the fundamental comprehension of the challenges at hand. Or should I venture the statement that 'every cloud has a silver lining', in that this might

force us to stop and figure out a new course while there is still time! Global warming as well as financial crises speak of a social development gone wrong. So far few politicians or political parties have been punished for passivity or lack of enterprise in environmental policy. Public memory is alarmingly short, though, which is plainly demonstrated in energy policies these days.

The zooming in on the environmental impact of the development of hydroelectric power plants boosted the discussions on environmental policy in Norway from the late '60s onwards. Mardøla and Alta are keywords in that context, many lost battles – eventually followed by great victories. A range of sprawling waterways were permanently protected which in turn has helped smoothe the path for the protection of vast mountain regions in the form of landscape preservation areas and national parks. Locally we won the battle for the permanent preservation of the waterways in Norddal and Geiranger. This in due time formed the backbone of the Geiranger-Herdal preservation area which in 2005 earned the inscription on the World Heritage List. It is only fair to say that the place on the Unesco list was obtained by way of a three-stage rocket! In the aftermath several politicians have declared that "the time of great hydro-power development projects are over". Recently, however, certain politicians have declared their readiness for a replay. This is when our experiences from 30-40 years ago come in handy. Today's politicians need the competence and knowledge we gained during these environmental battles. It is time for refresher training!

Choice of energy is a choice of society

Far too little has been done to curb energy consumption and invest in energy-efficiency. The energy demand has been permitted to grow freely in correlation with affluence and luxury, and many of today's politicians reveal a chilling ignorance of history – and similar lack of competence. Various expert sources have produced documentary evidence of severe and long-term damaging effects from projects of hydroelectric development, locally in the shape of dry river beds, damming of large areas, climatic changes, changes in ground water level and of course reduced

habitat for many species of plants and animals. It has also been documented that major regulation of the waterways impacts the ocean environment, indicating that hydroelectric power may not be quite as "clean" as many people used to maintain – and the number of supporters is on the rise. The regulation of so many waterways implies that a very small part of our country is presently boasting a pristine natural environment, thus posing a threat to ecosystems which constitute the habitat for the last remaining herds of the European wild reindeer. There is every reason to remind today's politicians of these facts and to do away with the myth of the hydroelectric power as clean and unquestionable. It is time to realise that choice of energy is a choice of society. Not even the sacrifice of all our remaining waterways will suffice if we do not convert to a more sustainable consumption that includes stimuli for energy-efficiency, low-energy solutions and phasing out of non-renewable energy!

As a major exporter of oil and gas Norway has a particular international responsibility in contributing to an increased production of renewable energy as well as improving the energy-efficiency in general. Windpower and wavepower are areas that deserve considerable development resources. Public transportation needs a vigorous boost as does a pricing policy of energy which punishes overconsumption and luxury. The latter two are examples of small measures which quickly might result in reduced emissions.

Nature sets the limits

As a farmer and ecosystems manager I am constantly reminded of the reality that nature and climate set limits for what soil and grazing animals will yield. In a short-term perspective the production may be increased by means of industrialisation and injection of non-renewable resources, but in the long term only small-scale agriculture based on local renewable resources is truly sustainable. This is demonstrated in practice – "duty instead of words" – on our farm and summer mountain farm - saeter - which are presently being remodeled into an ecotourism establishment. In my encounters with trainees and thousands of guests from all over the world I often use my experiences from this

small-scale farming when I teach how to manage our natural resources sustainably in a long-term perspective, as opposed to depleting them. About 900 years ago our ancient laws demanded that the farmer practised transhumance – if not he would be charged with "grass robbery". The grazing fields around the farm were to be protected against overgrazing to remain in good condition in spring and autumn – and the infields for haymaking. This was the way to ensure a good long-term management of scarce resources, and I often compare this readily understood local management of resources to today's global reality. Drawing on experiences from local, simple, and easy to follow situations presents a pedagogical advantage when applied to the more complex global challenges and I generally receive very positive response from it. To make the simple and genuine become exclusive is the motto of our ecotourism, where a lively farm and saeter are our main assets. Lots of positive responses and support every year from thousands of guests descending from practically all over the world – and amongst them a great many children and youngsters – gives me hopes for a better future!

Threats against sustainable farming

Unfortunately, extensive and sustainable farming systems are under threat, in Norway as well as in the rest of the world. The demand for cheap food is the main reason for this, involving of course industrial farming, which in turn leads to depletion of the soil and the restructuring of communities in a less environmental friendly direction. This trend is also a threat to biodiversity. Grassroot action is called for, and luckily organisations like *Norsk seterkultur* and *Natur og Ungdom* - Nature and Youth - have managed to turn the spotlight on what is at stake. In the '90s I myself took the initiative to organise farmers who practised transhumance and people interested in this practice, and I am pleased to see that the work of the organisation *Norsk seterkultur* has resulted in renewed interest in transhumance, both as an ancient culture and farming practice as well as the basis for innovative development within food production and ecotourism. The saeter is a unique arena for an appreciation of ecological interrelations, where it is demonstrated live what a diversity of

plants the grazing animals have prepared – and still prepare – the living conditions for. More of the landscapes cultured by the muzzle and the scythe must be preserved! Over 30 percent of the species listed on the so-called red list (of endangered species) have their habitat in agricultural landscapes, mainly where pesticides and chemical fertilisers have not been used. In this connection transhumance and outfields grazing prove very important, and only by using this farming practices can we preserve the inherent values. As of today far too little of the Norwegian landscape shaped by transhumance is protected and ensured a longterm management. The Norwegian summer pasture landscape and the multifaceted culture of transhumance is a small but still vital remainder of a common European tradition that Norwegian authorities on behalf of the international community has a duty to preserve. Traditional use is the best preservation, and through an active policy to support transhumance and outfields grazing the combined bonus of meaningful food production and preservation of biodiversity is secured. In this context it is imperative that *Naturmangfoldlova* (the law on biodiversity), which will sub-

stitute *Naturvernlova* (the law on environmental protection) from 1970, protect the biodiversity in agricultural landscapes and also that the legal system come with financial measures set up to preserve the farming practices that have created and sustained the said landscape. The diversity of the summer pasture landscape is also a basis for food with unique qualities which can provide increased revenues and new jobs in rural districts. Even within this field I experienced similarities in my own village and villages in Ethiopia. We came together for discussions on how to ensure control of local resources for the local community – f.i. in small cooperatives, in order to boost local economic growth by enhancing unique qualities and create a basis for production and sale of locally grown food. I will always remember a woman in a village of Tigray who, by means of a cheap loan, had bought a cow. The cow fed her family and part of the milk was churned into butter or made into yoghurt that she sold from a small shack by the road, and the revenues enabled her to send her children to school. Through undertakings of this sort the village became more self-sufficient and its inhabitants more in charge of their own destiny.

Award winner 2005: Malin Falkenmark



Professor Malin Falkenmark, born in 1925, was awarded the Rachel Carson Prize 2005 for her long-standing research for an ecologically defensible use of the resources of the earth, focusing on sufficient water supply for people all over the world. Her work has always implied a natural as well as scientific approach.

She is Fil.Lic. from Uppsala University, 1964, Ph.D.Honoris causa, Linköping University, 1975, and Professor of Applied and international Hydrology, 1986.

She has been Executive Secretary of the National Committee for Unesco's International Hydrological Decade Programme. From 1976 she has been involved in interdisciplinary research at the Department for Water and Environment Studies at Linköping University. She was for many years Chair of the Scientific Programme Committee of the annual Stockholm Water Symposia, as an adviser to Stockholm Water Company.

Malin Falkenmark is both a scientist and a writer. Among her most important publications are: "Water for a Starving World" (1976), "World Freshwater Problems. Call for a new realism" (1997), "Freshwater as shared between societies and ecosystems" (2003), and "Balancing water for humans and nature" (2004).

Peak Water – Entering an Era of Sharpening Water Shortages

By Malin Falkenmark

A new concept, "peak water" has emerged. It indicates that the era of easy access to blue water is coming to an end in many regions of the world. Expanding water pollution, depleted river streamflow, overdrawn groundwater, water usability threatened by salinisation, and water for ecosystems sinking below the acceptable minimum all point to a peaking of blue water resources, a theme highlighted in "The World's Water 2008-2009" from the Pacific Institute. There is also a widespread green water scarcity linked to soil and land degradation but generally discussed as desertification. Human ingenuity, coping strategies and fundamental rethinking on water management are urgently needed

to mitigate the drivers of peak water – whether blue or green - and adapt to their effects on freshwater and other natural resources.

Borrowing momentum from the peak oil debate, the peak water concept has appeared in environmental texts predicting that as future demand for water grows its availability in many places will shrink. The term itself is a new and apt name for the present and looming threat of amplified water scarcity - real or perceived - of both blue and green water sources occurring around the world.

Blue Water Scarcity Mounts

At the 2008 World Economic Forum in Davos, Switzerland, water scarcity attracted considerable concern. A CEO Water Mandate was formulated with the aim to assess the level of water insecurity and its influence on future economic wealth and political security. The International Water Management Institute (IWMI) has shown that a man-made blue water scarcity, manifested in terms of river basin closure, is a problem developing mainly in irrigated regions but covers over 15 percent of all continental land.

Blue water scarcity has conventionally been conceptualised by addressing use-to-availability ratio – also called criticality ratio. The usual recommendation is for water demand management to bring down over-appropriation. The relative amount that should remain unallocated to maintain aquatic ecosystem health has been specified as "environmental flow". The water quality dimension of the unallocated flow is frequently neglected but poses a serious problem for both human and ecosystem health. As population increases, a second dimension of blue water scarcity has to be taken into account. The population pressure on the available water, or the level of water crowding, is a phenomenon referred to as "chronic water shortage". When combined with high water stress this results in "severe water shortage". By combining these two dimensions it has been shown that 1.4 billion people are already living in over-appropriated areas. 1.1 billion of these people live in areas that are also suffering under severe water shortage. In such areas, demand management will not be enough. These areas will require import to achieve food security.

For each aspect of water scarcity, the populations affected are expanding. Following predictable climate change, it can be foreseen that by 2050, depending on the rate of fertility decline, the population in countries with chronic water shortage (above 1,000 people per million cubic meters per year) will be 3 to 5.5 billion. Looking at the other dimension of blue water scarcity, expressed as use to availability ratio, the population in countries with high water stress (more

than 40 percent use to availability) may rise to between 4.5 and 7 billion people.

Green Water Scarcity and Food Security

Green water may also be scarce in different ways. This leads to problems for food production, especially in semiarid regions. Green water in the soil is exposing quantitative deficiency in vulnerable regions. Manmade green water scarcity, which results in land degradation conventionally called desertification, a phenomenon that has remained high on the political agenda since the 1970's. Natural green water scarcity in semiarid regions is caused by a lack of rain, which may, but may also not, increase with climate change.

Problems of green water deficiencies caused by meteorological factors, (i.e. lack of rain) can be met by irrigation in areas that do not also suffer blue water shortages. In situations where the deficiency is manmade and land degradation has left the root zone too dry to meet the water needs of crops, the deficiency can be mitigated through soil and water conservation. The way forward may be "triple green" agriculture: green water based, green for increased production – like was seen in the "green revolution" in agriculture – and green in the sense of being environmentally sound.

Globally, producing food for the growing world population will be challenging. By mid-century, half of the world population may live in countries where national food self-sufficiency – generally preferred by politicians to avoid the risk of food riots – is impossible. Food trade will therefore be essential to eradicate hunger. If fertility decline would follow the UN medium projection, world food trade would have to double by 2050. In low-income countries, where purchasing power is low, cropland expansion will have to be accepted to make a decent level of food security possible.

Food production ambitions might however be lowered, for instance by avoiding unnecessary food losses from field to fork (see article pages 12-13). If 2200 kcal/p day would

be considered enough, at least half of this huge future water deficiency would be covered. Many countries would still, however, remain import dependent.

Governance Implications

Today's water crisis is seen as a crisis of management, not a crisis of water shortage. Many international organisations mainly focus on blue water and are more concerned with water stress caused by high use-to-availability ratios than with chronic blue water shortages.'

Tomorrow's water resources management will have to address green and blue water together with the strong link between land and water. This is especially critical in the semiarid tropics where poverty, under nutrition and population growth dominate. In Australia, a long sequence of drought years linked to climate change is causing both green and blue water shortages and revealing the needed shift towards a blue/green and land/water integrated approach.

Humans are exerting multiple pressures on the freshwater resources. Population growth, economic development, increasing water demands, increasing water pollution, increasing food expectations and climate change are squeezing from all fronts. Future water resources governance must sharpen its tools to avoid approaching tipping points that would unbalance a peaceful world.

Water and the Planet's Life Support System

The global change debate is now raising concerns. At the recent Tällberg Forum in Sweden, the possibility of formulating planetary constraints for human activities was analysed. As the water cycle is central in the operation of the global life-supporting system, determining a maximum blue water withdrawal to safeguard a minimum river streamflow was one of the ten items under discussion. Water shortages are mounting while demand and consumption rapidly accelerate. The urgency of this situation can not be overstated. Yet, the need to anticipate, prevent, mitigate and adapt to this reality and potential "peak water" remain either poorly understood or

greatly underestimated. Measures to control the massive driving forces behind global warming, population growth and economic development that rapidly accelerate unquenchable demand for water must be crafted. Water resources management will have to address the original resource – precipitation – to steer land and water-related human activities that are compatible at the basin level and strive towards hydrosolidarity.

This article originally appeared in the December 2008 issue of *Water Front* magazine, published by the Stockholm International Water Institute. Copyright 2008.

What is Blue and Green Water?

Blue water is the visible water contained in rivers and aquifers. Green water refers to the invisible water in the soil, which comprises a huge but often forgotten portion of water resources. Both sources originate from the rainfall captured within the water divide of the catchment. Climate defines the constraints to human activities in terms of evaporative demand, droughts, dry spells, rainfall seasonality and variability. The roots catch the infiltrated rain, which supports plant production and vegetation covers in forests, grasslands and croplands, and which transpires back to the atmosphere. Runoff, resulting from the climate, topography and the ability of the soils to absorb the rain impact the consumptive water use of the vegetation.

Award winner 2007: Sheila Watt-Cloutier



Award winner 2007:

Sheila Watt-Cloutier

Sheila Watt-Cloutier, born in 1953, was awarded the Rachel Carson Prize 2007 for her contribution to show the world how climatic changes and environmental poisons affect human individuals and cultures in Polar areas.

Sheila Watt-Cloutier is a Canadian Inuit. She has been president for the Inuit Circumpolar Conference, a general interest group for 155,000 Inuits in Canada, USA, Greenland and Russia. Through her strong engagement in areas from the UN to the citizens of the Islands of the Pacific Ocean she is calling attention to the dangers that will appear globally, and are already an established fact in Polar regions.

Climatic changes represent a threat to the whole planet, and in the Arctic regions they are already effectuated. Whole cultures, such as the Inuit culture, are in danger of disappearing with the ice.

"We are in essence fighting for our right to be cold," she says. She will be publishing a book on this issue in 2009.

Towards New Climate Leadership: A Voice from the Arctic

By Sheila Watt-Cloutier

I was deeply honored to receive the Rachel Carson Prize in Stavanger in June 2007, and have been both alarmed and encouraged since then to see the effects of climate change becoming ever more apparent and urgent, and the global efforts to address it finally taking shape.

For decades, Inuit hunters have reported shorter winters, hotter summers, thinner sea ice, invasion of new species of fish, birds and insects, unpredictable weather, accelerating coastal erosion, and much more – all a result of global climate change.

Hunters have fallen through sea ice and lost their lives in areas long considered safe.

Over the last several years, I have crisscrossed the globe to speak out about the changes we have experienced. I have asserted that Inuit human rights are endangered because of the changes to our climate and that these changes are connected to the destructive cycles of consumption and emissions far to the south. I have reminded the world that climate change is not just an issue of politics, technology and industry, but of

human communities, and ultimately human rights. The Inuit culture is based on the cold, ice and snow. As Inuit, we have no choice but to defend "our right to be cold."

Our culture has literally gone from the ice age to the space age in the last few decades. We have weathered this storm of modernization remarkably well, although we continue to struggle with the impacts of this tumultuous change at the community and societal level. Human induced climate change is a new assault on the very way of life and culture for us as Inuit. It threatens the memory of where we were, who we are, and all that we wish to become. Culture for us is not window dressing, nor is it trivial. Its very foundation is based on solid values and principles.

The changes to our land and ice now impacting the internationally protected human rights of Inuit are opening a boom in energy and resource extraction which will only accelerate the problem. Amidst all of this, our governments are rushing to assert their Arctic sovereignty through promises of armed ice-breakers and increased military presence rather than dealing with absolute reductions of greenhouse gases. The opening of the North West Passage must be seen as a symptom of the derogation from international human rights obligations and an environmental disaster, not only an economic opportunity to open an international shipping route.

Leaders, decision-makers, and citizens at every level, in every nation, and in every context, must now realize that we have gone too far. We are no longer faced with preventing the world from reaching some unsustainable point; we must pull ourselves back from our already unsustainable point. Just looking to the Arctic, and observing the reinforcing feedbacks already in place - less white ice reflecting the sunlight rapidly increasing the rate of melting, causing even less ice, and so on - shows the urgency of the action required before these feedbacks spin out of our control.

The Arctic is one of the last peaceful and pristine places in the world. To truly assert each nation's Arctic sovereignty, they should work to promote

thriving human communities across the Arctic, free from the fear of either military strife or massive environmental change. Such a path of ethical and balanced leadership will ensure that nations' policies align with their principles.

Even as some governments continue to dither and delay, I see a momentum building among **citizens** of the U.S. and Canada, who are moving ahead to cut greenhouse gases and implement new technologies to address climate change. At the core of this recognition is a growing understanding by people, not only as institutions or governments, but as individuals, of their place in the web of existence. Many now see how the cars they drive, the consumptive choices they make, and the politicians they elect connect to the Inuit hunter far to the North challenged by thinning ice as he strives to feed his family. That human connection cuts through bureaucracies, through endless talk of economics and grand policy, to empower individuals and communities to action. It reminds us that we are connected through our shared atmosphere, and ultimately, our shared humanity.

Just last year, the nations of the world came together in the U.N. Human Rights Council to formally declare what Inuit have been saying all along, that climate change is a major threat to the human rights of all peoples, and especially to the vulnerable and poor. Having blazed the trail on making this important connection, I am pleased to see the U.N. has taken this important next step.

It is now clear that the new U.S. administration will not shy away from the tough decisions required to meet the challenges of climate change and greenhouse gas reductions. Together with Australia, which has also rejoined the international community, my own state, Canada, now stands alone in the developed world. It is time that Canada, and all nations, return to the principled path, supporting human rights, promoting peace and joining the international community in the fight against climate change. The climate challenge requires strong, ethical and principled leadership and a return to basic principles: fairness, compassion, justice, and opportunity for all.

Our climate leaders should bear in mind the sustainable ways of living that have been developed by indigenous peoples the world over; indeed, our knowledge of the rapid changes we have observed in the past decades has already helped inform international environmental decisions like the Stockholm convention on transboundary contaminants. Both a greater awareness of how people have developed sustainable modes of living, and stronger mechanisms for the world to access and integrate environmental observations from those living closest to the land, will be vital in our future, sustainable world. One cannot underestimate the wisdom of Indigenous Peoples and I cannot stress enough the world's need to listen to the wisdom this ancient voice offers towards sustainable living.

While we cannot shut down our economies or return solely to traditional ways of living, many elements in our modern consumption lifestyle and this disposable world that we have become are unsustainable. I believe we are on the opening edge

of a vast change in every aspect of our society, an awakening as a shared humanity of the need for change, and the enormous potential of what we can become.

I applaud and am greatly encouraged by those who have already stepped so boldly into this space, often taking risks with their companies and personal fortunes, or making courageous choices to turn away from unsustainable businesses based on unsustainable energy systems to develop new technologies, products, and systems that meet our shared challenges. Beyond the private sector, I look forward to the coming December, when the nations of our planet will assemble in Copenhagen, and, I hope, complete an agreement that succeeds the Kyoto Protocol, garners the support and participation of all nations, and finally sets us all on a course towards the reconnection of our shared humanity and the restoration of our climate. Our world is already changing fundamentally; indeed, I believe we have only just begun.

Award winner 2009: Marie-Monique Robin



Photo: Dominique Robin

Marie-Monique Robin, born in 1960, is a French journalist. She is awarded the Rachel Carson Prize 2009 for her work with the book and film "The World According to Monsanto". Here she is dealing with a very important issue: people's right to know what they are eating. Marie-Monique Robin is an advocate for the labelling of genetically modified food, which is a legal claim in Europe, but not in most other countries. She also insists that independent research is absolutely necessary to prove whether genemodified food is harmful or not.

Marie-Monique Robin is also focusing on the fact that farmers are losing control over their crop because the gene producer "owns" the seed and farmers tend to feel that they are controlled by the producer.

The film, shown for the first time in 2008, has since been shown in 15 countries, and the book is a best-seller and has been translated into 10 languages. Producing the film and the book shows great courage, since Monsanto is a powerful company with 18.800 employees.



Our Right to Know

By Marie-Monique Robin

Dear Friends,

First of all, it is a big honor for me to have been chosen as the winner of the Rachel Carson Prize for 2009. The first time I heard about this extraordinary woman was in the 1970s: I was a teenager (I am born in 1960), grown on a French farm, somewhere close to the city of Poitiers, and my professor in geography spoke about her book *Silent Spring* during a lesson on the « Green Revolution ». I was so terrified that I could not sleep during the next nights. At that time, my father and his four colleagues (among them two uncles of mine) were using a lot of pesticides on our family

farm, without knowing that they were poisoning themselves and our environment. Today from these five farmers, two have died under the age of sixty from cancer, two are suffering cancer, and my father who used to deal with the cows and didn't manipulate some much « pest killers » is the only one who could achieve retirement in a good state of health...

I became journalist exactly twenty-five years ago for two reasons: to defend the environment and the human rights. Therefore I travelled a lot from the North to the South of the planet and I am now

convinced, after having carried out around 200 reports for the TV, that both issues are closely linked: the capacity of living in a safe environment is a human right.

My « story » with Monsanto began in 2003, when I made three documentaries for the franco-german channel ARTE (to which I pay a tribute for the quality of its programs) about biodiversity. The first called « Biopirates » told how corporations like Monsanto were holding abusive patents on living organisms which are contributing to a new drastic reduction of biodiversity. The second, called « Wheat: Chronicle of a Death Foretold? » told the story of the golden cereal, from the very beginning 10 000 years ago until today, and explained how the practices of industrial agriculture, that brought the « Green revolution », made disappear thousands of local landraces and varieties, a dramatic evolution which will be accelerated by GMOs. Finally, I made a documentary, called « Argentina: the Soybeans of Hunger » about the cultures of Roundup ready soybeans in Argentina, where I depicted the environmental, social and health disaster which represent the introduction of Monsanto's GMO which today cover 60% of the grown area in the country.

For these three documentaries, I travelled around the world for a year: Europe, the United States, Canada, Mexico, Argentina, Brazil, Israel, India. Everywhere lurked the ghost of Monsanto, almost like the Big Brother of the new world agricultural order, the source of much anxiety. Therefore, I proposed a new investigation to ARTE about this powerful multinational, created in 1901 in Saint Louis (Missouri), which is the world leader of GM foods (90% of genetically modified crops) and presents itself on its web home page as "an agricultural company" whose purpose is to "help the world's farmers to produce healthier food... while reducing the impact of agriculture on the environment." But what it doesn't say is that before getting involved in agriculture, it was first one of the largest chemical companies of the twentieth century and one of the biggest polluters in industrial history.

«The world according to Monsanto» tells how the firm became one of the major industrial empires

on the planet. First, by producing PCBs (polychlorinated biphenyls) which were used as coolants and lubricants in electrical transformers, and from which Monsanto very early knew that they were devastatingly harmful to human health and the food chain, but didn't say anything until they were banned after massive contamination was observed; weed-killer 2,4,5-T, which was the basis for the grimly famous Agent Orange, the defoliant dropped on Vietnamese jungles and villages (which enabled Monsanto to secure the largest contract in its history from the Pentagon); bovine growth hormones—the first test products for GMOs—whose purpose is to increase the milk production regardless of the known consequences for the health of the cows and consumers; the weed killer Roundup, presented in endless advertising as biodegradable and favorable to the environment, a claim flatly contradicted by legal decisions in the United States and in Europe, etc.

Each time, to sell its harmful products, the firm has resorted to the same procedures: concealing scientific data, lies, manipulating regulations, corruption, pressuring scientists and journalists, as well as threats. As such, it continues to affirm that its genetically modified plants are without danger for the environment and for human health and that they constitute, thanks to their alleged higher yields and the lower need for pesticides that they are supposed to induce, a model of sustainable development that is capable of eradicating hunger in the world.

Can we trust it? Clearly: not! That's the conclusion of my three years investigation, which reveals Monsanto's real aim: to impose its patented GMOs in order to get its hands on the seed market and therefore on the world food chain. This documentary and book bring me closer to Rachel Carson, who was the victim of a smear campaign conducted by Monsanto accusing her of being a «hysterical woman» unqualified for dealing with such «complicated scientific issues».

For if there is one thing I'm certain I do not want, for myself and even less for my three daughters and my future grandchildren, it is the world according to Monsanto... Exactly as Rachel Carson did...

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