IMCG Action Plan 2007 -2010
Adopted at the IMCG General Assembly Finland 2006.

Introduction

The IMCG Action Plan 2002 – 2006 covering the period 1st January 2002 to 31st December 2006 formulated the following key medium term objectives (4-6 years):

a. To identify the global diversity of mire features, functions, and values;
b. To reduce the most urgent and significant threats to mires;
c. To explore mechanisms that further our objectives and sustain our achievements.

We tried to reach these objectives by

- Facilitating worldwide exchange of information and expertise;
- Assisting coordination of efforts and resources;
- Promoting positive action;
- Increasing understanding and awareness.

The IMCG network has made huge progress in both its conservation output and its organisational capacity within the last years. Instrumental to this has been the prioritisation of its work around the Action Plan, its wide strategic partnerships, its active networking, and - above all - the dedicated, tireless efforts of its members which constitute the network.

However the IMCG is nowhere near reaching its potential. As an organisation the IMCG stands on the brink of becoming a significant force within the international policy arena where opportunities and necessity demand its attention. On the other hand IMCG lacks the ability to fulfil this role being limited by its capacity as a purely voluntary led organisation. IMCG considerably ‘'punches above its weight’ and has a good (and improving) profile and membership. With some investment in the organisational structure of the network its output could be considerably increased.

To take us further, we need to pay attention to the following:

1. Our strategic ambition. The new IMCG Action Plan 2007 – 2010 should not only be an updated list of activities but must in its sum and consistency reflect what we want to achieve, what we cán achieve, and what we must achieve.
2. Our profile and membership. Currently the IMCG membership is still geographically biased with the majority of members in (Western) Europe, a severe under-representation in “established” peatland regions such as North-America and SE.-Asia, and its absence in most countries of the world.
3. Our over reliance on a few active volunteers and its risks to the organisation. The organisation must use the capacity of its network, its members, and its partnerships more effectively to minimise these risks.
4. Our financial strategy and management. The organisation needs to generate unrestricted funds to sustain and expand the network, to enable its members to take proactive steps, to raise its profile, and to meet the targets in the Action Plan.

This Action Plan presents the tasks of IMCG for the period 2007 – 2010 (2012). Firstly it addresses the generally low esteem that mires and peatlands have in society (the *Cinderella Syndrome*) as a root cause for mire destruction. Secondly it discusses the most urgent topical threats to mires worldwide.

The analyses presented in this paper are a basis for discussion within the network that will culminate in the commitment of specific IMCG members to concrete actions, deliverables, and times of delivery.

The analysis below constitutes a background for planning of concrete actions of IMCG, its members and its partners. Please find your "niche" here. Check how *you* and *your* activity can contribute to the main goals of international mire conservation!

Fighting the Cinderella Syndrome

Fourteen years after Richard Lindsay introduced the Cinderella Syndrome concept (1992) to describe the general attitude towards mires and peatlands, the situation has substantially improved, also thanks to IMCG. But "Cinderella is still in the kitchen". Peatlands are still largely considered "wastelands" - areas with no value and consequently low prices and taxes, providing large areas of unoccupied space. Substantial peatlands are located in coastal areas and along rivers, where over 50% of the world's human population lives. Their location near to coastlines makes it tempting to convert them to provide infrastructure for towns and harbours. Also, nearby peatlands often serve as urban waste deposits.
Still most mires are destroyed by ignorance, short-sightedness, and stupidity. Still the root cause of mire destruction is *lack*: lack of knowledge, lack of awareness, lack of appreciation, lack of planning, lack of regulation…
Next to addressing urgent and topical threats, a mire conservation network will have to systematically address these issues, to prevent that we keep mopping with the tap open.

The Cinderella Syndrome

When the Ramsar Convention was in its early stages of development, wetlands in general were still widely seen as rather useless places, crying out to be drained and turned into productive land. Ramsar has done great things with all wetlands in the last 25 years, but the imbalanced site-list suggests that perhaps it has done rather better with some wetland types than with others - to paraphrase George Orwell - "All wetlands are equal in the sight of Ramsar, but some are more equal than others." Perhaps it is not surprising that peatlands appear to have lagged behind the rest of the field. If wetlands in general were unpopular in those days, peatlands, or mires, languished at the very bottom of the popularity stakes. Unfortunately, in many parts of the World it seems that they still do.
Why is this? It's almost certainly largely because a cultural antipathy which is centuries old has shrouded the World's peatlands in such obscurity that now we have a cultural blind spot about the habitat. At its worst, it has hidden their existence entirely from our consciousness, but it hides them from our thinking in many more subtle ways. To most people, peatlands are still wastelands. They are still dangerous. They should be drained, now that we have the technology to do so and finally turn them into something economic.
We do not even have a vocabulary available from common usage to describe the habitat. There was confusion in the Workshop because there are not adequate terms in different languages to describe certain basic types. There are times when one must envy our grassland and woodland colleagues. How can you conserve something when you do not even have a word for it?

From: Richard Lindsay (1996): Themes for the Future: Peatlands – a key role for Ramsar.

Wise use of peatlands

One of our major instruments is the Wise Use Approach, developed in long-term collaboration between IMCG and the International Peat Society (IPS). IPS and IMCG define 'wise use' as "those uses of mires and peatlands for which reasonable people now and in the future will not attribute blame". The wisdom of a decision or act is judged by balancing the pros and cons of all (direct and indirect) effects on (all present and future) human beings. Wise Use builds on the strong interrelation of different peatland functions and values that requires an integrative approach to prevent that a partial solution of one partial problem creates a cascade of new problems.

Temperate fen peatlands in East-Central Europe
In the last years East-Central Europe has experienced a massive abandonment of agricultural peatlands through a combination of peat soil degradation, increased costs of drainage through subsidence, and changed economic conditions. This abandonment has resulted in
- a continuation and increase of environmental problems (emissions of CO_2 to the atmosphere and nitrates to the water, fire)
- a loss of economic carriers and rural employment/livelihoodt
- a loss of biodiversity.
This problem complex concerns millions of ha in East Germany, Poland, the Baltic States, Czechia, Slovakia, Belarus, Ukraine, and Russia.

An **integrative approach** would include:
- Rewetting to stop environmental degradation and emission, restore natural water purification functions, and increase evapotranspiration to cool the landscape
- Development of new land use options/economic carriers including "paludicultures" (agriculture/forestry under wet conditions), wilderness (natural areas with low management costs and attractivity for ecotourism) and biodiversity (continued traditional -and expensive- exploitation on the "best" spots.

The book "The Wise Use of Mires and Peatlands" (2002) has laid a sound but global fundament for further work. Given the regionality of peatland types and problems there is a need for developing more concrete guidelines and action plans for different regions and sectors, e.g. in cooperation with the International Peat Society and other stakeholder groups. Considering the many threats to mires from energy generation (see below), the options for cooperation with that sector have to be explored.

The paradigm of "wise use" requires peatland users to take environmental and social aspects into account, whereas conservationists need to internalise economic and social issues.
Some progress in putting Wise Use into practice has been made by parts of the peat industry, e.g. by focussing peat extraction on less valuable peatlands, by restoration of exploited peatlands, and by financial support to the science and conservation community.
Wise Use is, however, still far from internalised and the concept is often corrupted to mean that the use of peatlands – for whatever purpose, in whatever way – is always "wise".
Worldwide many local "wise use" initiatives and actions have been undertaken, often by IMCG members, amongst others projects in over 40 countries financed by the IMCG supported Global Peatland Initiative.

With respect to wise use, **tasks for IMCG** for the period 2007 – 2010 include:
- The further development and dissemination of the IMCG/IPS Wise Use approach especially with and among the peat(land) and energy sector
- The development and implementation of more concrete guidelines for different regions and sectors
- The maintenance and expansion of effective networks and partnerships
- The development of regional strategies for the conservation and wise use of peatlands
- The development of local and community-based peatland wise use initiatives and actions
- The integration of the wise use approach into national legislation

- The initiation and support of social, economic and technical studies on local and national land use practices and policy incentives especially in regions with traditional land use
- The identification and stimulation of synergies between international conventions (e.g. Biodiversity-CBD, Ramsar, Climate-UNFCCC, Desertification-UNCCCD)

Research, expertise, and institutional capacity

Knowledge and understanding are prime issues in the Wise Use approach. Its implementation requires institutional capacity that has to be created and enhanced by information and training. The IMCG network, with members from research, administration and management, offers ideal opportunities for exchange of experience and expertise. Important roles in this respect are played by the IMCG website and newsletter. The open access Internet scientific journal "Mires and Peat" will improve the exchange on a more scientific level.

Typical for the IMCG network are its personal bonds brought about by the field symposia and joint projects. In southern Africa a regional network of peatland experts was established by IMCG**,** including experts from South Africa, Mozambique, Zimbabwe, Botswana and Namibia. A similar network has been initiated in Patagonia on the occasion of the IMCG 2005 Field Symposium in Tierra del Fuego.

With respect to research, expertise, and institutional capacity, **tasks for IMCG** for the period 2007 – 2010 include:

- The international exchange of information and expertise, including the continuation of the IMCG website, Newsletter, Field Symposia, and Workshops, and the further development of the "Mires and Peat" journal
- The stimulation of research and research networks to share and to improve knowledge of the ecological character, values, and functions of the world's peatlands
- The stimulation of research into the role of peatlands in mitigating the impacts of global change
- The improved understanding of the economic values of peatland ecosystem services
- The creation of Regional Centres of Expertise in the wise use and management of peatlands to facilitate training and the transfer of knowledge
- The stimulation of integrated multi-disciplinary peatland research
- The stimulation of peatland inventory and monitoring

Inventory and monitoring

"What you know, you can value; what can not be justified, will not be protected"
From the IMCG Restoration Manual Draft 2006

Several IMCG activities of the last years have contributed significantly to identifying global mire diversity, its functions and values.
A comprehensive **overview of peatland functions and values** was published in the IMCG/ IPS book "The wise use of mires and peatlands" (2002).
With respect to the worldwide harmonisation of **peatlands terminology**, the Ramsar CCGAP has proposed to use a basic list of terms and concepts presented in the IMCG/IPS wise use book. For scientific purposes IMCG has develop its Universal Mire Lexicon. Further standardising of terminology is taking place in the framework of the European Mires Book.
Two global **data sources of peatland distribution** have been developed:

- The ISRIC – IMCG "peatland map of the world" (2002) presenting the worldwide distribution of peatlands/histosols, based on the FAO/UNESCO soil map of the world (1:5,000,000) (see www.wetlands.org/projects/GPI/worlda4.jpg). First estimates of peatland occurrence in all countries of the world were published in the IPS-IMCG wise use book.
- The "IMCG Global Peatland Database" (2004) with information on distribution, extent, status and threat, and ecological characteristics of peatlands for all countries of the world, accessible under www.imcg.net/gpd/gpd.htm . The Ramsar CC-GAP has proposed to use this IMCG overview as the "global peatland database" asked for in Ramsar Resolution VII.17. This requires a regular up-dating of the database to strengthen and maintain its importance as a global standard.

Since 2002, new inventories – often by or with substantial help of IMCG (members) - have contributed to a better knowledge on the distribution of peatlands in southern Africa, the Andean region, Patagonia, Russia, Mongolia, Georgia, central Europe and Indonesia. The IMCG European Mires Book is compiling up-to-date information of all countries of Europe (incl. Georgia, Armenia, and Azerbaijan).

General conclusions from the available inventories are:

- Peatlands occur in almost all countries of the world; the total area of peatlands on earth is approximately 4 million km^2.
- The general inventory status is (very) insufficient and largely outdated; for some regions almost nothing is known, e.g. for large parts of Africa and South America and for the mountain areas of central Asia.
- Eighty per cent of the global peatland area is still pristine, i.e. not severely modified by human activities. Sixty per cent of the area still actively accumulates peat. This pristine area is concentrated in the (sub) arctic and boreal zones.
- The global pristine peatland (mire) surface decreases by 0.1% (5,000 km2) per year, the global peat volume by 0.05% per year. The area of mires is hence decreasing with a rate ten times faster than the expansion of mires during the Holocene. The proportionally largest losses have occurred, and still occur, in the temperate and tropical zones. Fifty per cent of the losses are attributable to agriculture, 30% to forestry, 10 % to peat extraction, and 10 % to urbanisation and infrastructure development (incl. flooding for water reservoirs).
- The peatland character of various ecosystem types is massively overlooked. This especially applies to mangroves, salt marshes, paddies/rice fields, boreal paludified forests, cloud forests, elfin woodlands, highland sedge fens (pastures), spring mires, páramos, dambos, and cryosols. Peatlands may occur in almost 20 wetland categories in the Ramsar Classification System, in over 40 habitat types of the EU Habitat Directive, and in over 60 types of Endangered Natural Habitats of the Bern Convention.
- Inventory data area largely limited to "peatlands" in general. An overview and inventory of mire types is failing on a worldwide scale. This severely hampers the identification and effective conservation of mire ecosystem diversity.
- Changes and trends in the quantity and quality of the peatland resource are not sufficiently detected.

With respect to inventory and monitoring, **tasks for IMCG** for the period 2007 – 2010 include:

- The regular updating of the IMCG Global Peatland Database
- The stimulation of peatland inventories in Africa, South America, and Central Asia
- The finalization and publication of the book "Mires and peatlands of Europe"

- The preparation and publication of the book “Mires and peatlands of Southern Africa”
- The preparation and publication of the book “Mires and peatlands of Russia”.
- The preparation and publication of the book “Mires of Tierra del Fuego”
- The development and publication of a unified and integral overview of global mire types and their global distribution
- The propagation of mire ecosystem diversity in the Convention on Biological Diversity, the Ramsar Convention and regional and national inventories and conservation plans.

Education and public awareness

The regional and global awareness on peatlands and peatland issues has substantially increased in recent years as manifested in the attention in global media. Global, regional, national and local networks and activities have significantly contributed to enhanced awareness of policy and decision makers. The number of scientific and popular publications on peatlands has grown considerably.
Websites, including that of IMCG (www.imcg.net) and a large variety of excellent national and local websites, e.g. in Russia, France, Ireland, Canada and the UK, have increased access to information on peatlands worldwide.
Peatlands are increasingly incorporated as an environmental theme in educational programmes. Teaching, learning and training resources on peatlands have been developed and promoted especially in areas where peatlands form a significant component of the landscape and culture. Good examples include Ireland (Irish Peatland Conservation Council), the UK, Canada (Burns Bog Conservation Society), Russia (PRP) and Georgia (Tchaobi).

Programmes for peatland planners and managers have been performed in central and eastern Europe (UK Darwin Initiative, Birdlife Belarus and Wetlands International), in SE Asia, Russia and China (UNEP-GEF peatlands, biodiversity and climate change project). The latter project also stimulated the preparation of a “global restoration manual” to provide practical guidance and information exchange for peatland restoration worldwide. The IMCG field symposia specifically aim at exchange of management and policy experience between participants. In South Africa the “working for wetlands” programme pays much attention to training for peatland restoration.

In order to ensure that the importance of peatlands as a global wetland biodiversity resource is fully understood, it is important to develop and implement environmental education, training and public awareness programmes focusing on peatlands.

With respect to education and awareness, **tasks for IMCG** for the period 2007 – 2010 include:

- The advance of awareness on the benefits of peatlands at all levels of decision making
- The development, promotion, and dissemination of teaching, learning and training resources on peatlands
- The stimulation of incorporating mire and peatland issues in all forms of environmental education
- The training of planners and managers with respect to peatland functions, values, and management
- The support of individual members in developing and disseminating information and background knowledge on mires to a wide range of public – from children to ministers

Policy and legislation

Under democratic conditions, the goals of society are pursued by "mutual coercion set by mutual agreement": guidelines, conventions, and laws, in which people - in an open debate based on all the information and reasoning available – have agreed freely to restrictions on the realisation of individual preferences. Such agreements are made from the perspective of citizens who take a moral interest in public affairs while the coercion itself (norms, laws) restricts the behaviour of private persons and interest groups who try to satisfy their preferences and economic interests.
IMCG tries to participate in this process of finding and implementing regulation on all levels. The European mires book project reviews the national policies with respect to peatlands in all European countries. The IMCG congresses seek to identify strongholds and weaknesses in national policies. Our work in international bodies and conventions is aimed at reviewing laws and regulations to promote the conservation and wise use of mires and peatlands.

With respect to policy and legislation, **tasks for IMCG** for the period 2007 – 2010 include:

- The stimulation of peatland conservation, wise use and management issues in the discussions and resolutions of the Ramsar Convention, the CBD, the UNFCCC, and the UNCCCD including stimulation of joint action plans with respect to peatlands
- The continuation and expansion of the Ramsar Coordinating Committee for Global Action on Peatlands to a multi-conventional coordination body
- The review whether appropriate legal and institutional frameworks for effective conservation and wise use of peatlands are in place worldwide, e.g. water management and land use planning mechanisms and legislation
- The study whether the particular importance and requirements of peatlands are fully incorporated into national policies, laws, planning instruments, and incentive programmes, incl. in wetland and biodiversity strategies and plans
- The stimulation of reviews of national networks of peatland protected areas. In case of an incomplete network, the number of peatland protected areas should be increased
- The conservation of nationally, regionally and globally important and representative peatland types through the expansion of the global network of Ramsar and UNESCO sites

Peatlands and biodiversity

Species living in mires have to be adapted to the special and extreme site conditions that prevail. As a result, mires are in general poor in species as compared to mineral soils in the same biographic region. Many peatland species are, however, strongly specialised and not found in other habitats. IMCG maintains a large database on the distribution and ecology of mire plant species in the world. A similar database on mire fauna has to be developed.

Mire organisms are typically adapted to

- The high water level and the consequent scarcity of oxygen and presence of toxic ions (Fe^{2+}, Mn^{2+}, S^{2-}) in the root layer
- The continuous up-growing "peat" and rising water levels suffocating perennial plants
- The spongy soil, that makes trees easily fall over or drown under their own weight
- The scarcity of nutrients and ions as a result of peat accumulation, limited supply or chemical precipitation
- The generally cooler and rougher climate than the surrounding mineral soils
- The acidity caused by organic acids and cation exchange
- The presence of toxic organic substances produced during decomposition and humification
- The humus rich water, complicating orientation and recognition in aquatic animals.

The most important reason for loss of mire species diversity is the loss of habitats by direct human impact (especially drainage). Very little information is available on biodiversity losses and/or changes provoked by climate change but it is sure that these developments are aggravated by human induced habitat losses.

The diversity of mire types is a paradigm example of ecosystem biodiversity that surpasses species biodiversity. Because of their strong climate dependence, climate change may lead to the local, regional or even global loss of mire types. Most sensitive are peatlands in cold (palsa, polygon mires etc.) and oceanic climates (rainfed blanket and percolation bogs, highland mires). For their conservation under changing climatic conditions, it is essential to minimize further anthropogenic stress on these vulnerable peatlands.

Urgent attention has to be paid to the conservation of tropical peatlands. In tropical peatlands, drainage for subsistence agriculture and destructive harvesting of tropical peatland timbers have a large impact on biodiversity.

Undamaged mires are generally resilient against invasive species, but invasion may increase as a result of of anthropogenic impact or climate change (cf. the expansion of the American *Sarracenia* in European mires), threatening the original flora and fauna.

With respect to bio-diversity, **tasks for IMCG** for the period 2007 – 2010 include:

- The prevention of further reclamation and over-exploitation of remaining tropical peat swamp forests
- The documentation and highlighting of the importance of peatlands as reservoirs of unique biodiversity
- The inventory and mapping of rare and unique mire types all over the world
- The identification and protection of hot spots for peatland-dependent species
- The identification and protection of hot spots for peatland ecosystem biodiversity (peatland types)
- The promotion of national and international research into mire species composition, biology and ecology to define facultative and obligatory mire species and their resistance to climate change and other impacts
- The identification of peatlands as important biodiversity refuges, especially in the context of human impacts and climate change
- The designation of additional Ramsar sites to include the full range of peatland types and biodiversity in the List of Wetlands of International Importance
- The designation of UNESCO World Heritage Sites to include the full range of peatland types and their natural and cultural biodiversity
- The development of a Global Red List of Endangered Mire Species and Mire Types
- The propagation of mire ecosystem diversity in the Convention on Biological Diversity, the Ramsar Convention and regional and national inventories and conservation plans
- The monitoring and highlighting of problems caused by invasive species in peatland ecosystems

Peatlands and greenhouse gases

Mires absorb carbon dioxide (CO_2) and store it for a very long time as peat. Therefore peatlands are ecosystems with much more organic Carbon per ha than other terrestrial ecosystem types. The CO_2 sequestration of the world's mires (approximately 1% of the CO_2-emissions from global fossil fuel consumption) gives them a modest but positive role in

decreasing atmospheric greenhouse gas (GHG) concentrations and in cooling the climate. Because of the short lifetime of methane (CH_4), the ongoing methane emissions from peatlands on the other hand do not increase atmospheric GHG concentrations and therefore do not contribute to climate change.

Direct human activities such as drainage, land-clearing, and fires (combined with climate change) are turning peatlands from key carbon and nitrogen stores to important sources of CO_2 and nitrous oxide (N_2O). Currently the contribution of degraded peatlands to the total global anthropogenic GHG emission budget (possibly as large as 30 %!!) is fully unnoticed in international climate policy. Emission trading instruments of the UNFCCC Kyoto Protocol are not yet functioning with respect to peatlands, although the Protocol does enable this. Restoration of degraded peatlands is therefore insufficiently implemented as an important strategy in fulfilling Kyoto GHG reduction goals and as an instrument in climate change mitigation.

Kyoto Protocol Article 6. 1. For the purpose of meeting its commitments under Article 3, any Party included in Annex I may transfer to, or acquire from, any other such Party emission reduction units resulting from projects aimed at reducing anthropogenic emissions by sources or enhancing anthropogenic removals by sinks of greenhouse gases in any sector of the economy…

UNFCCC Decision 13/CP.9 on "good practice guidance for land use, land-use change and forestry in the preparation of national greenhouse gas inventories under the Convention" covers also peatlands – albeit without mentioning them specifically - as part of "wetlands" that can function as carbon sinks and sources (details cf. www.unfccc.int). This includes not only active mires, but also exploited peatlands, flooded peatlands, and artificial wetlands on peat soils. Starting April 2005, Contracting Parties should implement this guidance. According to Decision 19/CP.9, sources and sinks related to land use change will be included in the reporting form on Articles 3.3, 3.4 and 6 of the Kyoto Protocol

The Kyoto Protocol currently does not support the „non-use" of peatland as carbon stores. A change of the policy in this respect cannot be expected, as this would contradict the basic logic of the UNFCCC. Therefore, voluntary mechanisms for carbon conservation in peatlands have to be developed (cf. www.bio-rights.org). These could also support the conservation of peatland biodiversity and the reduction of poverty, one of the main causes of peatland degradation and fires in the tropics.
The peat fires in SE Asia, a global hot spot of peatland GHG emissions, have a huge impact on the local economy, destroying resources for forestry, agriculture and biodiversity. Moreover, the resulting smog affects the health of hundred thousands of people.

With respect to greenhouse gases, **tasks for IMCG** for the period 2007 – 2010 include:

- The promotion of the importance of peatland as carbon stores of global importance within UNFCCC and other relevant international conventions
- The exposition of degraded peatlands as substantial sources of GHG emissions
- The assessment of the contribution of degraded peatlands to the global anthropogenic GHG emissions
- The improvement of IPCC Guidelines for National GHG Inventories with respect to peatlands
- The stimulation of systematic incorporation of peatlands in the national inventories of GHG sources and sinks under the UNFCCC
- The improvement of peatland carbon inventory data
- The revelation of the cost-effectiveness of GHG emission avoidance through peatland restoration
- The development and implementation of new financial mechanisms for peatland conservation for carbon storage

- The incorporation of peatlands in national adaptation action plans
- The support of carbon conservation in peatlands parallel to the wise and sustainable utilization of peatlands
- The reduction of peatland fires

Burning issues

The most urgent and significant threats to mires can be summarized as follows:
- climate change and politics
- global energy politics
- peat extraction for plant cultivation
- water stress
- tropical peatland agriculture and forestry in the tropics
- poverty.

In the following we analyse recent developments of these largely interrelated issues.

Peatlands and climate change

The distribution of mires and mire types over the globe clearly reflects their dependence on climate. As mires concentrate in humid or cool regions, a changing climate can be expected to seriously affect their character, their carbon balance and their radiative forcing.

The diversity of mire types is a paradigm example of ecosystem biodiversity that surpasses species biodiversity. Climate change may lead to the local, regional or even global loss of mire types. Most sensitive are peatlands in (sub)arctic (palsa, polygon mires etc.) and oceanic climates (rain-fed blanket and percolation bogs) where the largest changes in climate are expected to take place. For their conservation under changing climatic conditions, it is essential to minimize further anthropogenic stress on these vulnerable peatlands. Especially threatened are high mountain peatlands, where the interference of overexploitation and climate change lead to rapid erosion and desertification.

On the other hand, peatlands also influence the regional and local climate through evapotranspiration and associated alteration of heat and moisture conditions. The palaeoecological record shows that several mire types and their communities in the boreal and temperate zones (e.g. raised bogs, percolation fens) are highly resilient against climate change. As their local climate is often considerably cooler than that of their immediate surroundings, they may play an important role in mitigating climate change by providing refugia and migration routes for species that are threatened by global climate change. This mechanism is illustrated by the occurrence of arctic “relict” species in mires in the temperate zone and by their function as wet biogeographical enclaves within regions with a (semi)arid climate.

Furthermore restoration of large complexes of drained degraded peatlands, such as in Central Europe, may substantially influence the regional climate through evaporation cooling.

With respect to climate change, **tasks for IMCG** for the period 2007 – 2010 include:
- The identification of the effects of climate change on peatlands in the various peatland zones of the world
- The identification of the adaptation and mitigation capacities of mire species with respect to climate change
- The stimulation of the attention of the Arctic Council (incl. CAFF) to the effects of climate change on (sub)arctic peatlands
- The stimulation of the attention of the UN Convention to Combat Desertification to the effects of climate change on high mountain peatlands

- The elucidation of the role of pristine or restored peatland in regional meso-climate regulation
- The assessment of the role of the wet and cool peatlands as refugia and migration corridors/stepping stones in a drying and warming world

Peatlands and energy

In many countries peatlands have played an important role in energy politics for along time. On the other hand energy politics increasingly influence peatlands.
Peat is an important energy source in Finland, Ireland, Sweden, Estonia, Latvia, Lithuania, Belarus and Russia and is used in smaller volumes in many other countries, including China, Indonesia and Burundi. In recent years, technical developments have led to lower, more competitive peat prices, higher energy efficiency, lower emissions and multi fuel capabilities in energy generation. Peat is increasingly used to facilitate biomass and forestry trash combustion. The further development of gasification technology will lead to even more efficient peat use for energy. On the other hand, the deregulation of the electricity market has lowered the demand and created an over-capacity of peat energy in the European Union.

The volumes of peat necessary for energy generation are substantial. It is estimated that by 2020, peat energy plants will have exhausted all peat resources of formerly peat-rich Ireland. As peat emits more CO_2 per unit energy and is (still…) generally more expensive than other fossil fuels, peat as an energy source is primarily interesting for regional or domestic socio-economic reasons. In Finland and Ireland employment in the rural area is the most important socio-economic driving force for peat extraction for fuel.
These honest reasons for using peat for energy are corrupted by false argumentation by the peat industry (incl. IPS) of peat being a renewable resource (see box). In Sweden and Finland, peat is being promoted as a (slowly) renewable fuel and has been awarded advantages over other fossil fuels, a position confirmed by the European Commission as compatible with EU competition and environmental protection regulations.

Peat is not renewable…

Claims of renewability of peat lack a scientific foundation and are based on suggestive use of terms and false arguments. Indeed is peat renewable: it is still being formed at present, like it has been formed since hundreds of millions of years. But this does not distinguish peat from other fossil fuels, as also lignite and coal deposits are still formed today.
Not the renewability (i.e. the fact that they can renew) is relevant from a climate point of view but the rate of renewal (i.e. the time period required for their formation). Burning coal means releasing carbon that has not been part of the atmo- and biosphere for millions of years. Peat burned for fuel is thousands of years old. For coal and peat the rate of renewal is so small that their renewability is irrelevant for society. Renewable with respect to the greenhouse effect means the use of energy sources that replenish as quickly as they are used up (= short rotation). Furthermore, the fact that a type of fuel is renewable does not mean that it is actually renewed. If the fuel is not given opportunity to renew, the use of a “renewable” fuel contributes as much to the greenhouse effect as any non-renewable fuel.
Erroneously it is often claimed that after a peatland has been exploited, peat accumulation will re-start and greenhouse gases will be stored again. This may indeed be the case but the rates involved are only a fraction of those emitted by burning thick layers of peat.
The most common argument used to defend the renewability of peat fuel is that less peat is extracted than is annually accumulating. This argument is false for a range of reasons:
- In almost all countries of Europe, in the whole of Europe, and over the whole Earth more peat is disappearing faster than it is being formed. Next to the actual extraction of peat, enormous losses occur in agricultural, forested, and cutover peatlands. In claiming renewability of fuel peat, all of the gains (all peat accumulation in a country or a region) are falsely balanced with only part of the losses (only from peat extraction).
- Much peat accumulating “elsewhere” is not available for exploitation, because of technical or conservational reasons. Peat that is not available is no “resource” and may not be used for balancing losses through peat combustion.
- Peat extraction is not only consuming peat but also destroying the peat accumulating ecosystems. Unless peat is actively regenerating on the cutover sites, the resource will eventually be depleted. And that is the current

situation on Earth. The area of cutover bogs that has been restored to peat accumulating ecosystems is negligible and stands in no proportion to the area degraded by peat extraction.
- The peatlands whose CO_2 sequestration is claimed for balancing CO_2 emissions from peat combustion were already part of the greenhouse balance long before the anthropogenic rise of atmospheric CO_2-levels. They were and are part of the natural sink system that compensates natural sources. These natural sources include the methane (CH_4) emissions from natural peatlands.
- Peat extraction and combustion creates an extra source of greenhouse gases. To be greenhouse neutral, additional sources require additional sinks. Peat extraction is mobilising new carbon sources without creating such new sinks. Also in this respect, burning peat does not differ from burning coal.
Peat combustion is not a climate neutral activity. There may be honest reasons to locally – and with due observation of the many other values of peatlands -, use peat for fuel, but these reasons do not include renewability.

From the IMCG Resolution for the European Union, the United Nations, and the Global Environmental Facility, adopted in Paarl, S-Africa, 2004.

Similar to the 1973 global oil crisis, which triggered a renewed focus on **fuel peat** in Sweden, Finland, the USA and created the interest in peat for fuel in Rwanda, Burundi, Senegal, Jamaica and many other states, global energy politics and prices are again affecting the use of peat as an energy source.
In east-central European countries, the pursued independence from Russian oil and gas are currently the driving forces for (re-)converting oil-fuelled energy facilities to the use of peat. The recent National Energy Strategy of the Russian Federation promotes the replacement of oil and gas by biomass fuel and includes peat in its biomass concept. Russia receives substantial Worldbank support for its renewable energy program that includes peat. It intends to enlarge its domestic use of fuel peat in order to export more gas and oil to the west.
The Swedish peat industry has in recent years more than doubled peat extraction volumes to currently 11 –12 million m^3 a year. Sweden furthermore imports substantial volumes of peat briquettes from Belarus. To replace its nuclear power plants, Ontario (Canada) is considering large-scale peat extraction as an energy source with less environmental impact than sulphur-rich – and more expensive - local coals.

A further increasing focus on peatlands as sources of energy and of alternative **raw materials** for petrochemical products can be expected with the decreasing availability of global oil/gas reserves ("after oil"…) and the increasing energy demand of developing countries (China!). This will not only result in increased peat extraction, but also in an increased use of peatlands for forestry and the cultivation of **energy crops** such as is already happening in Germany (maize) and SE Asia (oil palm). It will be important to stop perverse incentives for energy crop production on drained peatlands and to direct biomass production to already degraded peatland sites and combine it with rewetting.

Global energy politics also affect peatlands in an indirect way. Increasing demands for renewable energy lead to the destruction of mires through flooding for **hydropower**. In Canada 20,000 km^2 of water reservoirs have flooded 7,500 km^2 of wetlands and peatlands. In Finland, approximately 900 km^2 of peatland are covered by water reservoirs. In Russia, most fens of the Volga valley were destroyed when a cascade of reservoirs was built for hydroelectricity production. Large hydroelectric projects are currently being planned or developed in Iceland, Malaysia, Cameroon and Brazil, largely for aluminium production. Similar developments in other countries, e.g. in South Africa (Braamhoek mire!), Lesotho, and Uganda do not cover such large areas but may substantially affect mire biodiversity.
Rapid expanding facilities for **wind energy** generation threaten and destroy peatlands in oceanic and mountainous regions (Ireland, Scotland, Lewis, Northern Spain), and may create new environmental disasters (cf. recent landslides in Irish blanket bogs).
Vast areas of peatlands in Russia (W.-Siberia), Alaska (Prudhoe Bay), and Nigeria (Niger delta) have been destroyed by expanding infrastructure for **oil and gas** exploration, exploitation, and transport or are threatened (cf. Arctic National Wildlife Refuge, USA). Road

and pipeline constructions not only change the hydrology, but also cause GHG exchange misbalances over large areas. In Georgia (Transcaucasia) facilities to carry Caspian oil to the Black Sea are being constructed in the Ramsar protected Kolkheti National Park. The planned pipeline between Siberia and China will affect peatlands along 150 km. Also opencast **coal and lignite mining** leads to important losses of mires in several countries.

To counteract unnecessary peatland destruction through energy politics, **tasks for IMCG** for the period 2007 – 2010 include:

- The combat against the perverse argument of peat being a (slowly) renewable resource
- The combat against perverse incentives for cultivating energy crops on drained peatlands
- The prevention of destruction of valuable peatland sites by energy infrastructure
- The study of the incentives of energy policy
- The development of mechanisms to guarantee mire-friendly planning and decision making
- The focussing of peat extraction for energy on the least valuable peatlands
- The inclusion of the carbon (incl. methane) losses from peat in the GHG balances of "renewable" energies
- The promotion of peatland restoration by combining environmental objectives (reducing peat oxidation, increasing biodiversity) with production and sustainable exploitation of biomass

Peat and plant cultivation

Next to energy peat, the most common current use of peat is for horticulture. The modern production of greenhouse and container crops involves the integrated management of water, fertilisers, pesticides, and growing media. Important requirements are uniformity, consistency, and predictability of the final product. Growing uniform, high quality plants at very high productivity levels demands growing media with the best possible features. Sphagnum peat has emerged as the foremost constituent of growing media. Currently 30 million m^3 of slightly humified Sphagnum peat are used globally per year for producing high-quality growing media.

Growing media are materials, other than soils *in-situ*, in which plants are grown. They provide a physical structure in which plants can root. In addition they facilitate the water-gas system in the root environment (including the uptake of nutrients and trace elements). Growing media are used in the professional and the hobby market.
In the professional market, growing media are applied on a large scale in greenhouse and container cultures for soil-less food production (mainly greenhouse tomato, cucumber, sweet pepper, and strawberry) and the production of cut flowers and pot plants. In comparison to in-soil cropping, growing media have substantial benefits: no need for soil decontamination, better utilization of nutrients, lower energy consumption, and higher yields. These benefits contribute to an ongoing increase in soil-less horticulture.
In the hobby market, growing media are better known as potting soil, used in- and outdoors to grow pot plants.
The total volume of growing media consumed in the EU (hobby and professional) is estimated to be some 45 million m^3 (or 15 million tons) annually. Hobby applications are estimated to account for approximately 60% of this volume.
Large variations exist between countries in the consumption of growing media per capita because of differences in the size and structure of professional horticulture and by differences in consumer behaviour.
Worldwide, peat based growing media cover some 85 - 90% of the market. Other materials applied are composts, synthetics, and a wide range of natural organic products and minerals, including stonewool, perlite, and coir (coconut shell fibres).

This slightly humified peat is restricted to raised bogs, which only occur in the (boreo-) nemoral and southern boreal zones. Consequently peat extraction for growing media concentrates on a small belt across the globe. Within the EU, this peatland type has become near to extinct and is consequently a priority habitat in the EU Habitats Directive (92/43/EEG).

In most countries of western and central Europe the stocks of slightly humified sphagnum peat (white peat) are nearly depleted after centuries of agricultural use and peat extraction. To cover the demands, white peat is imported from northern and east-central Europe and Canada in increasing volumes. As demands are rising, stocks are decreasing, and good alternatives in professional horticulture are not (yet) available, the threats of pristine bogs being opened for extraction are growing.

On the other hand pressure from environmental groups is increasing, including requests for environmental certification of peat products by the retailers. Since the end of the 1980s anti peat campaigns in Europe, especially in the UK and Ireland, have tried to persuade the public and the horticultural trade to decrease the use of Sphagnum peat. Consequently the British government decided in February 2002 to have 90% of the peat replaced by alternatives by 2010. The peat industry is developing and supplying these alternatives.

The continuing growth of population, urbanisation, and welfare will increase the demand for high performance growing media and soil improvers worldwide. Growing demands are especially observed in Europe, North-Africa, North America, Japan, China and the Near-East. It is important to direct this demand as far as possible to renewable alternatives and to prevent that it leads to the crude destruction of valuable peatlands. In Patagonia and China, for example, the current rapid expansion of peat extraction for horticulture leads to an unnecessary waste of peat and peatlands. In Georgia plans are even made (a.o. by a major Danish company) to extract peat from the globally unique Imnati mire in the Kolkheti Ramsar site and National Park.

Next to the Canadian Sphagnum Peat Moss Association, that took the lead in offensively propagating the use of peat, the new European Peat and Growing Media Association (**EPAGMA**, founded 2004) is currently developing a strong political lobby in favour of peat, that includes the use of biased, dubious and unfair arguments. The latter is illustrated in the European Union Ecolabel discussion where EPAGMA criticized the “prominent role of IMCG statements” but refused to discuss factual argumentation.

For low quality use, such as for amateur potplants and gardening, alternatives are available from composts from bio-/green waste and sewage sludge. In practise, however, high-quality peats are still being squandered for low-quality applications in increasing amounts. IPS and its member industries still uncritically support and stimulate this unwise use in spite of their incessant verbal propagation of the “wise use of peat” concept.

Sewage sludge is a by-product from sewage plants treating domestic or urban waste waters, septic tanks etc.. The progressive implementation of the Urban Waste Water Treatment Directive 91/271/EEC in the EU has increased the quantities of sewage sludge from 5.5 million tons of dry matter in 1992 to nearly 9 million tons by the end of 2005. Around 45% is currently recycled to agricultural land, 18% is landfilled, and 17% is incinerated. Uncertainties over possible risks for human health and for the environment still hamper the expansion of sludge recycling.
Bio- and green waste is increasingly separately collected and composted. The total annual amount of bio- and green waste in the EU is nearly 60 million tons, with a potential of approximately 30 million tons of compost production. Most composts are currently applied in low price segments such as agriculture. Relatively low volumes find as yet applications in the production of high quality topsoils or as constituent in growing media.

Stocks in short supply, insufficient qualities and non-competitive prices have until now prevented a substantial use of alternatives for peat in high-quality applications. Experiences from years with low peat supply have, however, shown that professional consumers can rapidly and readily adapt to alternatives whenever necessary. A promising future alternative for peat could be fresh Sphagnum biomass which has the same qualities as white peat and which could be cultivated on peatlands degraded by peat extraction, agriculture or forestry. In Germany, the peat industry and research institutes collaborate to develop such renewable raw

material for high quality horticultural media from fresh Sphagnum. In Canada, the professorial chair for peatland management at Laval University (Quebec) has adopted Sphagnum farming as one of its focal research objects.

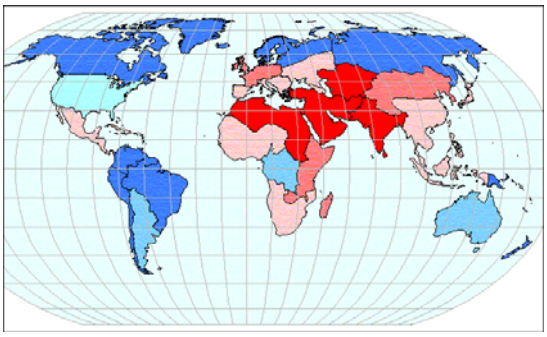
Peat was used as a soil improver and organic fertiliser in great quantities in agriculture in the years 1950-1980, especially in the Soviet Union. This use has collapsed with the general collapse of the Russian economy since 1991. As the Russian agricultural practise of bad humus economy (involving burning instead of ploughing under harvest remains) has not substantially improved, the reviving economy may lead to a renewed demand of peat for this extremely low-quality purpose.

To diminish threats to peatlands from horticulture, **tasks for IMCG** for the period 2007 – 2010 include:

- The prevention of peat extraction in pristine mires and valuable peatlands
- The combat against the perverse argument of peat being a (slowly) renewable resource
- The prevention of using high-quality peats for low-quality applications
- The stimulation of the development and use of sustainable alternatives for peat, e.g. from bio-/green waste and sewage sludge
- The stimulation of the development of high-quality alternatives for peat in professional horticulture
- The continuation of the discussion on the wise use of peat that must include both origin ànd application

Peatlands and water

Peatlands play significant hydrological roles as water sources, buffers, stores and purifiers. Population growth and climate change will put an increasing pressure on water resources (fig.1). This will lead to conflicting situations between human livelihood and peatland conservation (cf. Maputaland, S.-Africa) and increasing desertification, but also enable new partnerships where reliable and sustainable water resources are provided by mires.



	≤ 1	catastrophically low
	1.1 - 2.0	very low
	2.1 - 5.0	low
	5.1 - 10.0	average
	10.1 - 20.0	high
	>20	very high

Fig. 1. Expected water availability (in 1000 m^3 per year per capita) of the world in 2020 as a function of population growth and climate change.

With respect to water, **tasks for IMCG** for the period 2007 – 2010 include:

- The increase of knowledge on the role of peatlands in catchment water balance
- The identification and protection of peatlands (and peatland types) that are critical for water storage, water control and water supply
- The stimulation of including the role of peatlands in watershed management, river basin planning and flood control schemes and in integrated water resources management
- The stimulation of recognizing the role of peatlands in protecting water and land resources in areas vulnerable to desertification and land degradation
- The identification of hot-spots for immediate action to prevent or stop desertification through peatland overexploitation
- The integration of peatlands into the work of the UN Convention to Combat Desertification (UNCCD)

Peatlands and agriculture

Drainage for agriculture has historically been the main global impact on mires. In particular most of the fen mires in the temperate zone of North America, Europe, and eastern Asia (China, Japan) are now used for agriculture. Peatland drainage and agriculture leads, specifically in the long term, to many problems associated with soil degradation, subsidence, and peat oxidation. Large-scale drainage of pristine mires for agriculture in the temperate zone has therefore ended and agriculture is retreating from peatlands to mineral soils. Increased productivity on mineral soils and global economic developments (EU expansion, WTO agreements) are reinforcing this tendency. Abandonment may lead to a loss of biodiversity where the peatland were still in low-intensive use (Poland, Belarus). Abandonment furthermore leads to problems of social cohesion and regional economies. In central Europe, vast areas of degraded agricultural peatlands are currently being rewetted because maintenance of their drainage and agricultural use are no longer profitable. New functions established for these restored wetlands include carbon storage, flood control, water purification and the re-establishment of biodiversity and wilderness conditions to stimulate eco-tourism (good examples in eastern Germany, Poland and Belarus). Promising is the development of new wet production functions (reed, alder wood, biomass fuel) to create new and sustainable economic carriers for rural livelihoods.

Pristine mires are currently still being reclaimed in the tropics. Drainage for subsistence agriculture affects only small areas, but impacts substantially on peatland biodiversity and environmental functions where peatlands are rare (e.g. in Southern and East-Africa). Failures to reclaim tropical peatlands on a large scale are well known including the former mega rice

project in Kalimantan (Indonesia). Industrial conversion of virgin peat forests for palm oil production is ongoing on a large scale in Sarawak and other parts of SE Asia.

Peatlands are also important as pasture for domestic livestock in many areas of the world, e.g. cattle on the Argentinean pampas, sheep and deer on the Scottish blanket bogs, yaks and horses in central Asian mountains, and water buffaloes in the humid (sub)tropics. Overgrazing of mountain peatlands leads to severe erosion in many areas of the world, including Lesotho, Kyrgyzstan, the Tibetan Plateau (China), and Mongolia.

In the near future, water scarcity will increase conflicts between agriculture and peatland conservation, especially in Africa, the Near East and central Asia, the Far East, western and central Europe, and Central America. In this respect, natural peatlands have an important function in limiting rapid water losses.

Agriculture has until recently as a rule involved peatland drainage. Where peatlands have to be used for agricultural production, the focus must be on the development and implementation of "wet" agricultural production techniques that combine harvest of useful products with the maintenance of the environmental services of undrained peatlands.

With respect to agriculture, **tasks for IMCG** for the period 2007 – 2010 include:

- The prevention of further reclamation and over-exploitation of remaining tropical peat swamp forests
- The re-establishment of adequate management techniques for highly biodiverse peatlands in low-intensity use
- The development and implementation of agricultural production techniques that maintain or restore the environmental functions of undrained peatlands and that play a supporting role in regional economy

Peatlands and forestry

The largest boom in peatland drainage for forestry took place in the 1970s, when huge areas were drained in Finland, Russia and Sweden. Currently, no further peatland areas are drained, recognizing that drained peat soils are marginal compared to mineral soils available for forestry. Timber exploitation of peatland forests is however largely continued in already drained forests and will require additional drainage efforts after the first cut. In Russia, where drainage ditches are often no longer maintained, a large part of the formerly drained peatland forests are re-paludifying, a natural process enhanced by damming activities of beavers. In North America, harvesting of black spruce (*Picea mariana*) and lodgepole pine (*Pinus contorta*) from non drained mires is of economic importance. In SE Asia, tropical swamp forests yield some of the most valuable tropical timbers, e.g. ramin (*Gonystylus bancanus*), agathis (*Agathis dammara*), and meranti (*Shorea* spp.). Many of them being harvested in an unsustainable way.

Peatland drainage for forestry in the Boreal zone may attract renewed attention for climate change mitigation because after drainage carbon sequestration in increasing biomass may initially prevail over carbon losses by peat oxidation. Furthermore also the increased use o biomass to avoid carbon emissions from fossil fuels may in future stimulate forest exploitation. It will be critically important to investigate such plans on their climate effectiveness and to balance possible climate advantages with other environmental disadvantages (water, biodiversity, long term C-store, etc.)

With respect to forestry, **tasks for IMCG** for the period 2007 – 2010 include:

- The prevention of further reclamation and over-exploitation of remaining tropical peat swamp forests
- The assessment of the effects of drained peatland forestry on carbon storage, carbon sequestration, water regulation and biodiversity
- The stimulation of wet forestry on rewetted degraded peatlands

Peatlands and poverty

In developing countries, poverty drives people into over-exploitation of peatlands, which in turn increases poverty. Maintaining and restoring peatlands will contribute directly to poverty reduction. In addition, developing integrated approaches to peatland wise use and poverty reduction contributes directly to peatland conservation.

The occurrence of peatlands often coincides with rural poverty, as a consequence of peatlands being some of the last remaining wilderness and natural resource areas. The linkage between poverty and peatlands is apparent in SE Asia, especially in the mega rice project area in central Kalimantan, but also in Africa and the Andes. Local communities located far from markets and trapped in systems of poverty often largely depend on the productivity of natural mires or on their conversion to subsistence agriculture. Peatland conservation in these areas implies reduction of poverty.

With respect to poverty reduction, **tasks for IMCG** for the period 2007 – 2010 include:

- The propagation of financial mechanisms to decouple poverty and the destruction of peatlands (e.g. Pro-Poor Payments for Environmental Services, PES)
- The creation of win-win options for poverty reduction and biodiversity conservation in poverty-trapped peatland areas similar to agri-environmental schemes in Europe and the USA