Global warming

group. The session began with emphasis on the importance of the interaction of cultures as raised by Dr. Nesy in reference to Dr. Abu-Dayyeh's morning presentation. Dr. Abu-Dayyeh agreed that cultural interactions were the most important issue for the purpose of people to understand each other and that the invention of a "contemporary culture" or "contemporary literature" may facilitate better communication among the people of the world. Mr. Arthur Wolf, Netherlands joined the discussion by offering that education on ethics may be the most important way to increase intercultural communication and yet allow people to retain their cultural identity or religion and that encouragement of critical thinking was essential. Dr. Kanaly expressed his agreement and offered that an educated, empowered citizenry is most important.

There was a discussion among all participants on why animals need to be raised in factory farms, and the balance of ethics and efficiency and economy. Marketing was also related to the consumption patterns, and the values of wealthy consumers who valued presentation and cleanliness of food over the cost was different in different cultures. There was also a discussion of cage size and animal rights, and antibiotic consumption.

Dr. Macer reminded the participants that the purpose of the working group is to (1) identify the values at stake in meat production and to identify them for a range of cultures, (2) to offer alternatives to the energy systems linked to industrialized meat production, and (3) to determine areas for future research and identify gaps that require future study. A draft report outline linked to the agreed upon meeting objectives would be developed.

Dr Macer also thanked the United Nations University, Institute of Advanced Studies for their cooperation in providing the room for the meeting, and for arranging the logistics for web casting the meeting.

Global warming: not a myth

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During 1990s global warming alarms were often taken lightly, and were regarded as misinterpretation of year-to-year climatic fluctuations. In 1996 Dr. Gowarikar of the New India Meteorological Department said, in the context of warming up climate, "Frankly, climate change seems an issue blown up to larger than its size…" (PTI News, March 1, 1996). Dr Krishna Rao, Deputy Director General of the Meteorological Office, New Delhi, opined, "As for global warming…over the past 100 years a rise of just 0.4^{o} C. has been recorded… Not that one should not take heed of this temperature rise but it (is) too insignificant to affect the country's climate" (PTI News, July 18, 1997).

But now evidences of the earth getting warmer are such as cannot be ignored. Himalayan glaciers are melting fast. Ice, floating on the Arctic Sea is shrinking both in area and in thickness, reaching all time low in 2007 (Reuters News, May 1, 2008, citing statements of the climate researcher Sheldon Dorbot of the University of Colorado at Boulder).

The Lake Baikal in Siberia (spelt as 'Baykal' in Oxford Atlas) is the world's largest and deepest fresh water lake. It is gradually warming up. Its average water temperature has increased by 1.21^{o} C. since 1946, chlorophyll content has gone up 300% since 1979, and zooplankton grazers have also increased (Hampton et al., 2008). Cladocerans among the zooplankton feeders have increased in number 335% since 1946.

Reuter's News, May 1, 2008, citing a prepublished paper by Moore et al., points out that warming up of the lake Baikal is threatening existence of the only fresh water seal living in the lake. The female of this seal raises its young ones on the ice in the lake; this is safe, as on shores there are many predators waiting to attack the seal pups. With gradual loss of ice cover of the lake and with increasing mortality of the pups there is obvious possibility of the only fresh water seal going extinct. The diatoms, flourishing beneath the ice cover in the lake, die and become food for the biota in the lake. Hence the loss of ice cover will affect survival of a number of species in the huge water body.

McClintock, Ducklow, and Fraser (2008) have spent a total of 36 seasons in the Antarctic Peninsula. The Peninsula is a claw-like extension of the continent of Antarctica, extending westward, towards the Cape Horn of South America. The authors point out that the Antarctica locks about $2/3^{rd}$ of the planet's fresh water as ice. But then it is warming up at a fast pace. Since 1960 the average mid-winter temperature has gone up by 6^{o} C., which is "the highest rate of warming anywhere on the planet, five times the global average". Further they say that in the last 25 years ice-cover in the western part of the Antarctic Peninsula has declined by 40%. These environmental changes are having obvious effects on the biota of the region. Krills, which are shrimp-like crustaceans, are an important component of the zooplankton of the region. They are dependent on the ice-cover to complete their life-cycle. Juvenile krills live under ice to escape predators. They feed on algae growing in fissures in the ice-cover. With decline of the ice-cover krill habitat is shrinking. The zooplankton also includes the protochordate salps, which are soft-bodied, and have few predators; hence they are a dead

end of the food web there. With receding ice-cover the krill populations are fast declining, and salps are increasing in number. The authors point out that the replacement of krills by salps has, "potentially grave consequences for an Antarctic food web", because large predators, like penguins are highly dependent on krills for their nourishment

Another clear change in the Antarctic Peninsula biota, noted by McClintock et al. (2008), is among penguins. There are three species of penguins in the peninsula, Adelie, Gentoo, and Chinstrap. Among them Adelie penguins are truly Antarctic. Females of Adelie lay their eggs under ice shelves. Their chicks feed under ice-cover. Adults of Adelie feed mainly on krills, and for this they have to visit 'hot spots', which are places where Antarctic Circumpolar Current, through upwellings, brings warm waters close to the surface with abundance of krills. Receding ice-cover is taking their breeding places farther away from their feeding spots. Adelie penguins feed only during sun light hours, and during winter this duration of these hours is much shortened. On the other hand Gentoo and Chinstrap penguins breed in subantarctic regions; hence they do not suffer from such disadvantages as do Adelies. It has been noted by the authors that among the penguins, active in the Antarctica, Adelies are declining in number, and Chinstraps and Gentoos are increasing.

The great traveler and naturalist Prof. P. Jolivet has put a question (in a personal communication): "Can we expect *Nothofagus* forests and their fauna to reappear (in the Antrctica)?". *Nothofagus* is a genus of trees, which were flourishing in the Antarctic Peninsula in late Cretaceous (80 million years ago) (Hill, 1992). Then the Antarctica had not migrated to the South Pole, and had a temperate climate.

Woolly mammoths lived in Eurasia and North America 300,000 years back. Surviving through different climatic changes, they eventually became extinct 36,000 years ago. Two different hypothetical explanations have been offered for their extinction, viz. through environmental changes, and through anthropogenic (i.e. produced by humans) effects. Nogues-Bravo et al. (2008) have prepared climate envelope models and population models for woolly mammoths for different time periods. From these models they have inferred that climatic changes (mainly warming) in late Pleistocene drastically reduced populations of the mammoths, so that eventually they became restricted to Arctic Siberia. This drop in population size and distributional range made them more vulnerable to hunting pressure by humans. Thus combined effect of the warming up of climate and anthropogenic impacts led to extinction of the mammoths. This history of extinction may be repeated with other species. Warming up may restrict population size, say through spread of infectious diseases, as in case of the African lions in the extended periods of drought in 1994 and 2001 (National Geographic News, June 26, 2008), and also their ranges of distribution. Anthropogenic events (such as extension of urbanization, agriculture, road construction, and building of dams) may further affect their survival and may eventually lead to their extinction.

Besides accelerating the rate of extinction of organisms, global warming may have direct undesirable effects on humans. The Bar Association of India, in their 2008 meeting, in which representatives of different local bar associations of the country participated, discussed at length the effects of global warming. In the meet it was inferred that, as the sea level rises with the warming, people in large groups will be leaving coastal areas. This will increase population density in inland areas, and with this law and order situation will worsen (IANS News, May 1, 2008).

With warming of continents disease carrying vectors, like mosquitoes, will develop faster, and the concerned infectious diseases will become more common. It is also feared that with this climatic change incidence of HIV will go up, and may reach epidemic levels, as has been pointed out by Daniel Tarantola and David Cooper of the University of New South Wales (IANS News, May 1, 2008). In developing countries the high incidence of HIV is due to "gender inequality" and to "lack of access to essential services". These factors are likely to become more intense with increasing population density, which may be foreseen as resulting from earth's climate warming up.

Majumder (2008), citing World Allergy Report, says, "As temperature increases (with global warming), plant pollination seasons may lengthen, and proportionately, human exposure to allergic pollen will increase". It is feared, therefore that asthma and rhinitis will become more common.

With these alarm bells ringing, nations should gear up to do their utmost to minimize emission of green house gases without political considerations, as global warming knows no political boundaries.

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