Nutrition and the environment

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Abstract
The global warming depends on many factors. Economic interests of richer countries accentuate the responsibility of ruminants and deforestation, neglecting the responsibility of fossil fuels and the utilization of clean energy sources, that are indeed already efficient, for the resolution of the problem.

Introduction. The human population will increase from the current 7.4 billion to 8.5 and 9.7 billion, respectively in 2030 and 2050, despite the decrease of birth rate that is predicted after 2015. The increased world population poses problems of food supply, environmental sustainability, global warming (GW) and climatic changes.

Food supply. Currently, about 11-12% of the population (especially Asia and Subsaharian Africa) is undernourished; however, this value was 18% in 1990. One third of the food produced (1.3 billions of tons) is spoiled, due to inefficient logistics of distribution. It is likely that without this waste undernourished population would not exist. The food crisis of the last times has been determined by the speculation on foodstuffs and by grabbing of lands (land grabbing for 20 million hectares) in the South of the world, Africa but also Asia, for both the production of agrofuels and foodstuffs by developed countries and large state-owned companies, joint venture between public and private (Cotula L. et al., 2009; P. De Castro, 2011). The lands are reclaimed from nomadic or sedentary populations who have owned them for generations but cannot demonstrate the ownership because in developing countries there is no guarantee of land rights but informal and traditional rules, recognized locally but not by international agreements. History teaches that less than 100 years ago the colonialists rather than renting those surfaces decimated the populations that owned them; it is worth reminding that the decline of Masai begun in 1890 with the spreading of bovine pestis, likely transmitted by the European colonialists. It followed a terrible outbreack of smallpox that killed thousands of people. Dedan Kimathi was hung on February 18th 1957 by the British colonial authority; Mandela was imprisoned until February 1990). As news travels fast, rules changed and it is not possible to rule out that also scientists are convincing the public opinion that the meat of ruminants is harmful to allocate pastures to these new forms of economical colonialism.

Deforestation. Although deforestation has slowed down, it still exists aggravating the GW. Industrialized countries have deforested both Europe and other countries in the past and today they invite developing countries to restore the forests. In Italy entire forests provided the wood for the construction of the roman fleet and for warming up the thermal baths, in the UK the Robin Hood's Sherwood forest is now reduced to 423 ha, the pau brasil (Caesalpinia echinata) of Atlantic mata was reduced in powder by the colonialists to produce a precious staining. It is also reminded that the wild deforestation of *Sequoia sempervirens* in the mountains at the western borders of Sierra Nevada was interrupted by the government of the United States only in 1890. In my opinion, today the developed countries should plant trees in the areas that they have burgled and alternate the present pasture areas with tree crops. Between 2000 and 2007 in Brazilian Amazonia 154,312

Km^2 of forest disappeared, an area that is equal to the surface of Greece and represents 0.134% of the total surface of above sea level lands of the planet, without taking into account glaciers and deserts. If the drama of deforestation is really in the interest of the human kind it would be sufficient that each country allots 0.134% of its surface to forests, that, as an example, corresponds to 404, 12500 and 11000 hectares, respectively for Italy, USA/China and Brazil.

Global warming (GW) and consumption of animal-derived products. The increasing population will require new cultivated lands and/or a further increase of the yields, also because new countries, as could be predicted, have been adopting the western alimentary style: for example in China between 1980 and 2012 the meat consumption has increased from 20 to 59 Kg pro capite. The developing countries increase the consumption of animal-derived products pursuing a status symbol, as it occurred in Italy and Europe after the 2nd world war. Animalists and scientists emphasize that consumption of animal-derived products is a non secondary cause of GW. The main responsible would be ruminants

Figure 1 – Increase of CH4 (ppb) in atmosphere (IPCC) and corrected ruminants between 1978 and 2012

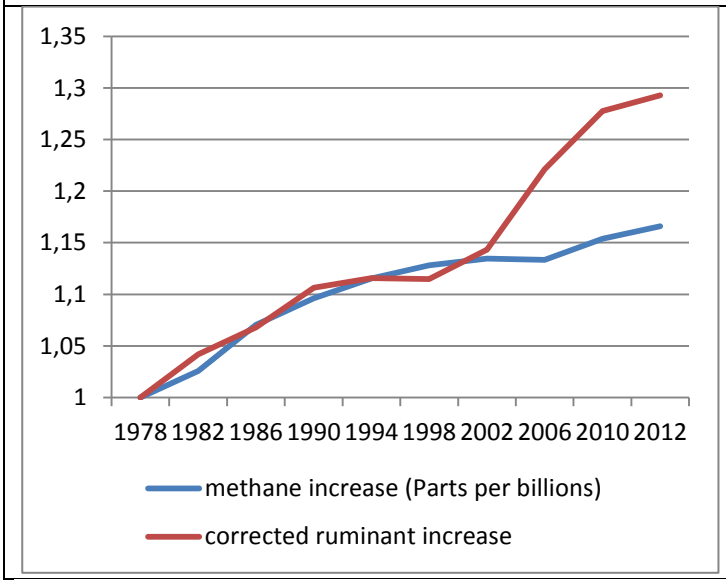
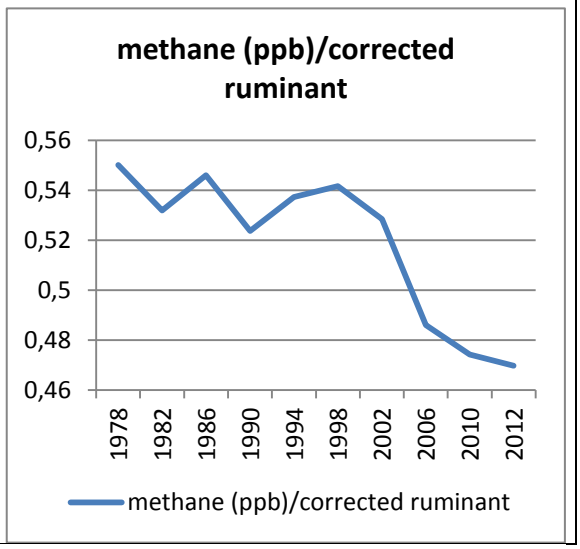


Figure 2 – Methane (ppb) input in atmosphere (IPCC) between 1978 and 2012 per corrected ruminant



that introduce CH4 in the atmosphere. If we look at the IPCC data (2007), that analyze the values of the National Oceanic and Atmospheric Administration (NOAA) and we divide the values of methane in the atmosphere (Parts per billion) of each year by those recorded in 1978, it is easy to verify that the increase of methane in the atmosphere from 1978 up to 2002 has followed that of the number of normalized ruminants (NR: 1 bovine = 8 ovine and 5 camelids) vs. that of 1978, as shown in Figure 1. Subsequently, the latter value has increased much more compared to the increase of CH4. Further evidence of the scarce reliability of the association between normalized ruminants and CH4 in the atmosphere provided by the IPCC is the value obtained dividing the methane concentration in the atmosphere by the number of normalized ruminants; after 2002 (Figure 2) the methane produced by each ruminant has decreased from 0,53 to 0,47 ppb/normalized ruminant

while the digestive physiology has not been modified. Fifty percent of the CH4 is generated by bacteria who live in the absence of oxygen both in rumen and in stagnant and swamp environments, as well as in the depths of the ocean. The atmospheric methane concentration recorded in 2005 was almost 1.8 ppm, that is more than twofold the industrial values (almost 0.7 ppm). Ruminants are not the only source of methane introduction in the atmosphere. The increase of methane in the atmosphere, as well as that of CO2, has been recorded especially since the advent of industrial era (end of XVIII century-beginning of XIX century). It is worth reminding that at that time the number of domestic ruminants in the planet was certainly lower than at present but the number of wild ruminants was absolutely higher. In the USA, for example, 101,5 millions of bovine are currently bred but it is known that in 1870 60 million bisons together with an high number of wild ruminants were present. Since that time the CH4 in the atmosphere has increased 2.5 times. In addition to the digestive processes of ruminants, the manure stocked for 3-4 months before its agronomic utilization also contributes to the release of CH4 in the atmosphere. The daily introduction of manure and slurry in the biogas plants (in Italy there are 1300 active plants that will become 2300 in 2030; in the world the biogas plants are 12000, 90 % of which are set in Europe) results in the production of clean CH4. Doing so ruminants do not cause pollution, while providing clean energy. The use of this technique in a buffalo farm of 2500 equivalent adult animals, provides electric energy for 300 families; if all Italian bovine and buffalo farms were equipped with biogas plants, 3.6 % of polluting energy (fossil fuels) would be spared. The heat produced by the plants can also be used to dry forages in an early vegetative stage (with protein content > 20%) also when it rains, saving 1 Kg of soy/head/day that can be used for human nutrition. In contrast to what is generally stated, soy is used to provide oil to humans (olive oil only satisfies 4% of lipid consumption) and extraction flour is given to animals! If we consider the activity of forage that is not used for pasture (hard parts and roots) in Brazil (1 head/ha) the organic CO2 of the plants compensate that produced by bovines. A significant source of CH4 in the atmosphere is represented by permafrost (20% of the world's land surface) that covers about 1000 billion tons of coal to which the industry hardly will give up. As a result of the GW, the permafrost is melting, releasing methane anaerobically and CO2 aerobically, which once in the atmosphere, accelerates the GW. To slow down the melting of the permafrost is necessary to prevent global warming both by limiting the use of fossil fuels and opportunely extracting methane to be used later as a clean fuel. The atmospheric concentration of CO2 has increased by 18% compared to the pre-industrial period (from 270 ppb to 319 ppb in 2005) since the carbon, stored in the subsoil for millions of years, has been used for energy purposes releasing CO2 into the atmosphere, right in the period in which the number of forests on the planet decreased. Sergey Zimov has designed a plan to avoid melting of the Siberian permafrost: the creation of huge grasslands (Pleistocene Park) with large herbivores similar to those which, together with mammoths, populated Siberia more than 10.000 years ago (horses, moose, musk ox, bisons), maintaining intact the ecosystem of the steppes – pastures. This biome with a more brilliant color is more efficient than the dark boreal forest to reflect

sunlight and keep the underlying permafrost cool. In winter the herbivores stepped on and dug the snow to find grass, allowing the ice to cool the permafrost more quickly. Thus the emissions slow down without amplifying the vicious cycle triggered by GW.

Global warming (GW) and utilization of fossil fuels. Ultimately if it is true that CH4 in the atmosphere increased , it is not true that it derives only from ruminants but also from many other sources (permafrost, swamps, rise fields, garbage dumps, etc). Methan has an half-life of 10 years and its release is aggravated by the CO2 that has an half-life of 100 years. Despite this evidence, 483 coal-burning power plants have been planned between 2009 and 2019 and 710 more will be built between 2020 and 2030 (about a third in China). Due to strong economic interests, ruminants are still considered responsible of GW, while nobody recalls anymore the manipulation of modified emissions inherent the Volkswagen's scandal. It has been estimated that the human population present in urban areas would increase from 28% to 70 % from 1950 to 2050 (P. De Castro, 2015), and that 57 % of cattle population which is bred in Africa and Asia mainly for traction, will be replaced by mechanical tools. To sustain the current production instead of 1.5 billion cattle about 900 million heads will be sufficient, that being more efficient, will be fed diets with less forage and produce less CH4, but will give foodstuffs with lower nutraceutical characteristics.

The demonization of the meat of ruminants. The beef breeds currently reared, particularly in Europe, for meat production generally provide muscle masses more and more hypertrophic and flavorless that push the consumer to prefer the meat of chicken and pork which is also less expensive. In fact between 1960 and 2012 in the world, data on global meat consumption (FAO data processing) reported a decreased percentage of beef meat (43 vs 23%) with an increased percentage of poultry meat (12 vs 33%). In my opinion if animal-derived products are flavorless and with worse nutraceutical characteristics (meat and milk produced on pasture) they would be replaced, especially in countries that do not have strong gastronomic traditions, by worms and crickets. The demonization of the meat of ruminants perhaps no longer makes sense. The demonization regards red meat but not chicken meat although broilers between hatching and slaughter grow almost 50 times in 45 days and hence more quickly than a neoplastic mass. Despite this, animal activists and some scientists tend to convince the public opinion that man is frugivorous since primates, close relatives, are not carnivores. Actually, primates consume a little amount of insects and also small animals. For chimpanzees, the meat consumption occurs mainly in the reproductive period (the female that receives meat from the male is keener to accept him for breeding). There are still conflicting opinions about the omnivorous, frugivorous, herbivorous or carnivorous nature of the man. It is known that homo habilis evolved beyond its vegetarian roots and became omnivorous at least 1.8 to 2.5 million years ago; it dates back to that time the discovery of cuts on animal bones older than 2.5 million years. Between 1.8-2.5 million years ago (when it is hypothesized that meat consumption has begun) and 600-350,000 years ago the volume (cm^3) of human brain increased from 510-600 to over 1500 cm^3. Peter Ungar, Chair of Anthropology of the

University of Arkansas, from the study of the cusps of the teeth of our ancestors, suggests an omnivorous diet based on meat resulting from hunting and gathering of the carcasses of dead animals. These activities took place in groups and generated the first social relationships and the evolution of the use of the speech. Considering that the anthropomorphic apes, from which man does not descend for sure, are not strictly fruitarian, the man at the dawn of its evolution was fruitarian but certainly ate insects as well as still many native populations do. The members of the last indigenous populations who have not yet had contact with modern mankind eat products of hunting, fishing, honey and fruit. Our ancestors, as well as all animal species, have chosen, in my opinion, different food mostly by instinct. A buffalo eats grass and does not it antelope's meat and a carnivore eats antelope's meat but not grass. Our ancestors ate instinctively meat (hunted or not) because they needed vitamin B12 which, in contrast to the herbivores (ruminants synthesize vitamin B12 in the rumen while other herbivores in the cecum) they were not able to synthesize and that is only present in animal-derived products. Even today if children are fed a diet deficient in Ca instinctively ingest small stones.

Conclusions

The mankind must pass down to future generations an ecologically sustainable planet. The solutions to problems deriving from the increased population must be the result of his intelligence rather than the response to economic interests that do not always provide correct information. For each problem there is a solution and man, unlike a primate, should transform the current difficulties in new impulses for the evolution of our history. If this did not occur in the past, when knowledge was lower, man would have not colonized the planet and will still be relegated in the Rift Valley.

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