

IPR of individuals and communities that are outside the formal sector and supporting information flow inside the country to provide availability of innovations of both the formal and informal sectors (for example, through launching a national registry of innovations)¹².

Conclusion

There is a unique situation in India with innovation and the Indian-specific path of innovation development. The country already possesses the framework of its implementation. The ecosystem of GRI support and augmentation has shown its vitality and potential as it functions all around the country and even abroad. It needs a strong state base to reach the needed scale and effectiveness. Recognition and integration of the ecosystem into the national innovation system would bring these results. In reality, this means inclusion of the largest segment of society in creative activity that would provide relief of economic and social tensions caused by great disparity in income, the low level of economic development of

many rural and urban areas, and social injustice. It is the right time to go from policy statements to real policy.

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Uniqueness of magnetic field in promoting life on Earth

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A few press statements by various scientists (for e.g. Collinson *et al.*¹) have recently appeared, attributing the magnetic field of the Earth as being responsible for making it unique and habitable. Likewise, Barabash *et al.*² based on the data from Pioneer Venus mission, attributed complete loss of water on Venus to its lack of magnetic field, which resulted in sunlight directly ionizing the water and the ions getting completely stripped away due to the advection of solar wind.

In this context, I would like to draw attention to two papers of this author^{3,4}, published 34 years ago, on the crucial role of the magnetic field in the evolution of life on Earth. The above papers considered and discussed in considerable detail, two distinct processes through which the magnetic field was able to assist in the evolution of life on Earth.

The first is through formation of the magnetosphere around the Earth which shields it from direct impingement of the continuously blowing supersonic solar wind from the Sun, carrying frozen-in magnetic field, as well as the solar particle radiation on the sunward side of

the Earth. It is also responsible for the formation and maintenance of trapped Van Allen belt particles which also shield the Earth's atmosphere from the direct impingement of solar particles.

The second effect of the Earth's magnetic field is to cause the well-established latitude dependence of cosmic ray particles, which results in a significant reduction in the intensity of cosmic ray particles impinging on top of the Earth's atmosphere, particularly at middle and lower latitudes. As a result, global production of cosmic ray-induced NO in the atmosphere is considerably reduced, particularly at middle and lower latitudes^{5–7}. Significant reduction in NO, a major sink for ozone, has led to the formation and maintenance of a permanent ozone layer in the atmosphere, which has been responsible for protecting the entire biological life on Earth from direct exposure to solar ultraviolet radiation. Without the formation and maintenance of such an ozone layer, life with oxygen metabolism could not have come into existence.

The two papers by this author, cited above, have shown how the magnetic field of the Earth shielded the Earth from direct impingement of solar wind and particle radiation in addition to controlling the intensity of galactic cosmic rays impinging on the Earth's atmosphere, which was responsible for the development of a permanent ozone layer, both of which became essential for making our planet Earth unique for the development of life.

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