

Abstract

The Role of Fire in Achieving the Sustainable Development Goals of the United Nations †

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Abstract: The Sustainable Development Goals (SDGs) of the United Nations do not mention Fire as a key factor in achieving an environmentally-friendly human society. This paper reviews the key aspects of the impact of fire that make it necessary to update the SDGs. Upon reviewing the scientific literature, it was found that fire has been part of the Earth System for the last 400 million years, and that it is part of biogeochemical cycles. From a geological perspective, fire shaped the current Earth System. Humans have used fire in the last million years as hunter-gatherers, and the last Pleistocene period evolved with the presence of fire. Since the Neolithic revolution, humankind spread the use of fire, without which agriculture would not have progressed as it did. Fire is still used today as a tool to clear forests, scrublands and meadows in order to establish agriculture fields. To achieve the SDGs, we cannot ignore the role of fire. Fire should be present, as it is part of the geological cycle of the planet; it is part of rural culture and plays a key role in hydrological, erosional and biological cycles. We discuss the following issues related to fire in connection with the SDGs: (i) biota; (ii) soil properties; (iii) carbon cycle; (iv) sediment and water yield; (v) air and water pollution; and (vi) risk assessment. We conclude that: (i) fire is key to flora and fauna diversity; (ii) soil properties are temporally changed after exposure to fire; (iii) the carbon cycle is disturbed by fire, but the long-term impact can be a reduction in the CO₂ content in the atmosphere; (iv) sediment and water yield are enhanced by forest fires, but only during the period of disturbance; (v) air and water pollution are ephemeral; and (vi) the risk associated with fire necessitates careful planning. Prescribed fires may be part of the solution, but there is a need to educate citizens on the role that fire plays. More research is necessary due to the diversity of the biomass and the complex history of fire on the planet. Fire is part of the Earth System and the SDGs should include it as a key element in their agenda.

Keywords: sustainability; forest fires; society; humans; nature



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