



SDGs 2.0: How to successfully implement the Sustainable Development Goals

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Prof. Dr. Dr. Frank Rühli, PD Dr. Dr. Nicole Bender, Dr. Lafi Aldakak
Institute of Evolutionary Medicine, University of Zurich

Collaboration:

Prof. Dr. Dr. Antoine Flahault, Institute of Global Health, University of Geneva

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Contact:

Dr. Nicole Bender
Institut für Evolutionäre Medizin
Universität Zürich
Winterthurerstrasse 190
CH-8057 Zürich

Tel: +41 44 635 05 31
Email: nicole.bender@iem.uzh.ch

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|--------------------------------------|----------|
| Introduction | 3 |
| Aims and goals of the project | 3 |
| Methods | 3 |
| Results | 4 |
| Discussion and conclusions | 5 |
| Outputs of the project | 5 |
| References | 7 |

Introduction

In 2015 the 17 Sustainable Development Goals (SDG) were launched by the United Nations (UN) with the goal to end poverty and other deprivations in all member states by improving health and education, reducing inequality, and increasing economic growth. This development should go hand in hand with the protection of the natural resources and the planet [1].

However, recent analyses showed that most world regions are lagging in implementing the SDGs, especially the goals on education, sustainability, and climate change [2]. A part from political and financial challenges, there seem to exist behavioral aspects like a reluctance in the readiness to overcome such structural obstacles. This reluctance to implement the SDGs might have its explanations in the long evolutionary history of mankind.

Natural selection operates on phenotypes at the level of the individual. As a result, genes that code for phenotypes that increase fitness in a certain environment increase in frequency at the expense of other genes, even if the spread of these genes harm the population. This fact can explain a part of the human attitudes and behaviors that impede the realization of the SDGs and other efforts to enhance the survival of mankind and other species [3].

Aims and goals of the project

Evolutionary medicine is a novel field that applies evolutionary biological explanations and principles to explain and better understand human health and diseases, including public health and global health [4, 5]. In this project, we discussed different evolutionary explanations behind the reluctance to implement the SDGs, and provided suggestions for solutions inspired by evolutionary medicine. The goal was to develop suggestions on how to successfully implement the SDGs from an evolutionary medicine point of view.

Methods

In order to focus our message, we chose following SDGs:

- SDG 3: Good health and well-being
- SDG 13: Climate action
- SDG 14: Life below water

Narrative Review: we reviewed the literature on evolutionary and biological backgrounds of human attitudes and behaviours that can lead to selfish decision

making despite obvious disadvantages for the community or for nature. We specifically focused on following theories and hypotheses:

- Tragedy of the Common (TOC)
- Life History Theory
- Game Theory
- Direct and indirect cooperation

We synthesized the results narratively in a publication, summarizing the main findings in tables.

We furthermore created a leaflet for the public, a website and a conference talk.

Results

We found several potential behavioral explanations based on evolutionary theory. For instance, our ancestral world differed greatly from the modern industrial world, and human's ancestral mind might be more adapted to detect threats that we could see or smell (like famine, fire or floods) [6] than to grasp the threat of not achieving the SDGs. This discrepancy is described in the literature as evolutionary mismatch. In the example of climate change, five evolved psychological biases seem to play a role in hindering sustainable behavior [6-8] :

- 1) Self-interest: people prioritize selfish over collective interests (as depicted by the TOC analogy).
- 2) Status: people valorize relative over absolute status. Indeed, higher status is associated with higher evolutionary fitness (for example access to food and mates) across human and non-human groups [9]. As evolutionary fitness is always relative (an allele, to spread, must do better than other competing alleles), people are more concerned about their relative status than their absolute status. This can again lead to selfish or reckless behavior.
- 3) Sensory mechanisms: people cannot grasp threats or dangers that they cannot see, smell, or feel. Indeed, because our threat detection system has evolved to detect acute dangers, it often fails to capture the distant, slow-moving problems like climate change or poverty in far away regions.
- 4) Social imitation: people copy what others around them do. In the ancestral environment, probably characterized by resource scarcity and uncertainty, people who copied what others did had an adaptive advantage in some situations. This behavior facilitates today the spread of conspiracy theory groups.

- 5) **Temporal myopia:** People value the present more than the future. Indeed, temporal discounting is viewed by evolutionary theory as an adaptation to enhance survival and reproductive success [10].

A similar reasoning can be applied to other SDGs, addressing other evolutionary theories.

Discussion and conclusions

The next step of the evolutionary approach to human behavior is to make use (instead of trying to change) our innate evolved behavioral tendencies in order to favor pro-environmental behavior [11] or more broadly, to favor pro-SDGs behaviors in individuals. Similarly, solutions based on evolutionary principles shall be developed.

In the case of antibiotic resistance, for instance, we have to ask how we should ration the use of antibiotics to save them for future generations, or if evolutionary based strategies can decelerate resistance progression. Regarding climate change, should we sacrifice a rapid development in developing countries to focus on renewable energy, and can the sharing of knowhow accelerate green technology development worldwide? Life below water might be conserved if fishing in international waters can be regulated more efficiently, or if eco-tourism can offer local fishermen higher incomes than the depletion of coastal habitats.

These examples show that we need to prioritize global solutions over local selfish profit, and to consider ultimate consequences over immediate benefits. We have to find sustainable practical solutions in order to guarantee the long-term survival of mankind and other species of the planet.

Outputs of the project

Following outputs were generated from this project:

- 1) **Publication:** The review described here is in preparation and will be published in the upcoming weeks in *Evolution Medicine and Public Health*.
- 2) **Master Thesis:** The publication will be used as Master Thesis for Matthieu Pitteloud, Medical Faculty of the University of Zurich, who worked on the review together and under supervision of Dr. Lafi Aldakak.
- 3) **Webpage:** A webpage has been created for this project with a description, a list of collaborators, a link to SSPH+ and Dubai 2020, a link to the leaflet, and a link to the ISEMPH 2021 video as soon as it is available on Youtube.

https://www.iem.uzh.ch/en/research/clinical_evolutionary_medicine_group_bender/project_Global_health_from_an_evolutionary_perspective.html

- 4) **Leaflet:** A leaflet with the main results and main messages of the review was created for the general public. This leaflet can be distributed by the IEM, the Institute of Global Health and the SSPH+. It also contains a QR-code that leads to the website of this project. The leaflet is attached to this protocol.
- 5) **Participation at Dubai 2020:** As SSPH+ will participate at the World Exposition 2020 in Dubai 2021 with the topic SDG, the QR-code leading to the webpage of this project will be displayed in the Swiss Pavillon in Dubai by SSPH+.
- 6) **Talk at ISEMPH 2021:** This project was presented at the online annual congress of the International Society of Evolution, Medicine and Public Health (ISEMPH) in July 2021 by Dr. Lafi Aldakak, within the session “The Utmost Importance of Evolutionary Medicine for Global Health” organized by Prof. Frank Rühli and Dr. Nicole Bender. The talk was recorded as a 15 minutes video and will be available open access on the society website in August. It will be linked on the website of this project.

<https://isemph.org/ISEMPH-2021>

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