



## Article

# The Missing Piece in Sustainability Indices: Accounting for the Human Factor

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**Abstract:** Sustainability is the result of a complex combination of factors. Social, cultural and personal elements are key for the pursuit of a sustainable future. Beyond the existing, very broad program on sustainability studies, additional research should contribute to specify how those social and human factors affect sustainability indices. General beliefs, values, attitudes, habits, assumed lifestyles or even meaning systems projecting purpose on one's own life have an impact on sustainability as well. Our aim in this paper is to describe these factors, which we group under the label of 'sustainability human factors'. This task requires a multidisciplinary effort involving anthropology, psychology and social sciences, covering cognitive, emotional or cultural dimensions. First, we set the stage describing the expected network of features and traits that could describe the human factor. Second, we propose a model which can help to assess it through multiple scales and surveying instruments. These instruments can provide valuable data that could expand the current indices. It is important to connect our program with the ongoing research in this field and to develop a broad model that highlights the human factor and its central role when planning for a sustainable future.



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## 1. Introduction

Building a sustainable future represents one of the greatest challenges humanity needs to address, after becoming aware of the fragility that affects many natural and social systems we inhabit. Such an endeavour requires a joint effort from very diverse areas: politics, economy, science and technology, as well as education and culture. It is an open question to what extent what we call 'human factors' play an important role in the pursuit of sustainable programs and, hence, how much they call for greater attention beyond technical developments and economic considerations.

Understanding this human factor is a complex challenge, but many academic disciplines are tackling the issue of understanding human behaviour and our interaction with the environment. A joint effort from these disciplines is needed. In addition, we need valid instruments to help us assess this human factor, with its different involved dimensions, and to figure out its influence in various settings under exam, such as organizations, firms or general populations we can survey.

We define our scope in three dimensions. The first section is devoted to better describe the human factor, after taking stock of available research and focusing on beliefs and believing. A paradigm shift in the understanding of behaviour has happened in the last decade and can provide an excellent stimulus to combine the human factor with the issues of sustainability. In a second turn, we highlight some of the most predominant values which have been held in sustainability debates as well as in ongoing programs regarding this issue. Finally, we provide some insights into the recent progress in assessing the human factor and how these findings can influence the ongoing dialogues in the sustainability arena.

The contributions of this paper are the following: First, we define the human factor in sustainability and relate it to the present research in an interdisciplinary context. Then, we identify the existing approaches that incorporate a human factor into sustainability. Our review covers from ESG criteria to sustainability indices and the inclusion of human criteria in sustainability projects. Using this review, we provide a list of the elements that comprise the human factor in sustainability. Last, we propose a practical instrument—a scale based on Milfont's work that can be used to measure these elements in a practical setting.

## 2. Theoretical Framework

The first issue an approach to the human factor needs to address concerns the most fitting theories that could help to account for such a factor, considering a variety of anthropologies, psychological models or social-cultural paradigms that try to make sense of such a complex subject. We start with rational choice theories to try to figure out how economic actors behave by maximizing utility. Economy, in this case, needs to share ground with psychology, and to provide better models to understand consumer and investor behaviour, an overly complex issue in which probably many more factors are involved, as past and recent turmoil or hard to manage reactions have shown in the financial context. Behavioural economy arises from this need to account for these factors and to assess to what extent several psychological and cultural features weight in decisions of great economic relevance and reach [1,2].

Our research connects with efforts in the field of behavioural and cultural studies aimed to understand these complex dynamics. Indeed, we assumed a complex system where more factors or variables are involved at different levels, and all of them influence the outcome, i.e., how sustainable a given practice, company or society is. From this premise, we pressed for recognizing a greater role to human features such as beliefs and values, with their own complexity, and to consider them less as a derived or dependent variable, and more as a critical factor that can determine the success or failure of any plan to improve sustainable models, policies or programs.

Any attempt to account for the many beliefs, attitudes and values that could be gathered into a single factor, which, for convenience, we call the 'human factor' in the study of sustainable systems, will necessarily be partial. It is essential to ponder that this is a subjective dimension, difficult to test and assess. Beliefs, attitudes and behaviours are included in this 'human factor', clearly inscribed in a cultural framework where humans grow and communicate with shared languages and symbolic systems, expressing their preferences and tastes. However, this difficulty does not mean the task is impossible. Subjective variables can be assessed and scales and instruments can be built to derive useful data to understand this human factor.

Indeed, a first task was to identify those relevant beliefs, and then to propose instruments that could assist in assessing them in a given context, for instance an organization or a population. The main point in our design was that sustainability implies an integrated set of beliefs, values and attitudes, in the sense that, not just some of the described issues, but the whole needs be accounted for an effective measure in that area. This program reflects the model of 'integral ecology', trying to assume a broad spectrum of motifs and values interacting in the pursue of that goal.

The next step consisted of building an instrument with designed scales which would allow to assess to what extent such values are embraced by a population. A good starting point was the detailed work conducted by Taciano Milfont and colleagues, which developed a very complete instrument to measure environmental attitudes [3]. This program is quite mature and provides a very useful model, tested and standardized, for assessing those attitudes. The developed instrument includes 12 sub-scales, which in the original version comprised 10 items each:

1. Enjoyment of nature;
2. Support for interventionist conservation policies;
3. Environmental movement activism;

4. Conservation motivated by anthropocentric concern;
5. Confidence in science and technology;
6. Environmental threat;
7. Altering nature;
8. Personal conservation nature;
9. Human dominance over nature;
10. Human utilization of nature;
11. Ecocentric concern;
12. Support for population growth policies.

The instrument displays 120 items in its full version, but it suggests abbreviated versions of 72 and 24 balanced selected items, a reduced form which is much more manageable when trying to combine this with other scales and to gather data in a more effective way.

Milfont and colleagues offer much more than a well-developed instrument aimed at measuring environmental attitudes. They reflect and analyse how to define and describe such attitudes and try to answer or discuss the foreseen questions that arise around this proposal. Their suggested definition of environmental attitudes is:

“Environmental attitudes are evaluative beliefs, affect, and/or behavioural intentions about environmentally related activities or issues” [4].

Another interesting aspect of their research is their exploration of theories to understand these attitudes. Besides rational choice theory, they consider several related theories that guide action and connect beliefs and values with behaviour. For instance, the “Theory of Planned Behaviour” as a psychological model that helps to predict behaviour according to an evaluation of pros and cons associated with a line of action, and it is “predicted by three socio-cognitive factors: attitudes, subjective norms, and perceived behavioural control” (347). The “Norm-activation theory” is the next proposed theory and for which “behaviour is a function of a person’s assignment of personal responsibility for their actions” (348). The third suggested framework is called the “Value-Belief-Norm Theory”, more integrative and complex. It is followed by the so called “Value-Attitude-Behaviour-Cognitive Hierarchy Model”. These complex models point to an “Inclusion model” and to the need to better account for social norms and affective or emotional factors.

The former broad display of theories could confound more than clarify a rather complex human reality. Indeed, it is extremely hard to map the way humans connect their beliefs, ideas and emotions to their actions. Theories on decisions or trying to describe such a process and which is the best course of action when we obtain sufficient information can follow many paths and can be articulated in many models [5–7]. Our point is broad but effective: beliefs and values weight consistently in the way we behave and the decisions we take and, hence, they play a decisive role in conceiving a sustainable shared future.

We suggested a model to articulate the role beliefs play in such a process, and to state their decisive contribution to decision making and to build a more friendly cultural environment for sustainable attitudes. We called our model *Creditions*, which is a neologism based on the Latin verb *credere* (to believe) [8]. We described it after assuming with Milfont and others that beliefs and believing are the most nuclear or substantial issue in the human factor, and as described later, they are intimately interconnected with values and valuation processes.

#### *Accounting for Beliefs and Believing*

In the last decade, the study of belief has attracted growing interest in a wider range of disciplines, giving place to interesting developments that are being applied to a broad spectrum of human and social features [9–11]. Since belief is not a familiar category in sustainability research, we wanted (a) to highlight the importance of belief in this context, (b) to show the paradigm shift which can be observed in actual scientific debates about belief and (c) to provide a first insight into the relevance of this topic for sustainability studies. To avoid misunderstandings, we stressed upfront that beliefs are not necessarily related to any religious phenomena or religious behaviour but can be referred to any context in

general. A practical approach to belief can inform our understanding of decisions in any context. This has been reflected in the emerging research on beliefs that has appeared around a decade ago and that is still flourishing. We referred to the framework of Creditions [12] as a particularly helpful development. Credition is defined as the process of believing, and should be regarded as a complex human ability which is interrelated with many other processes such as perceiving, learning, valuing, planning or decision making. The Creditions framework provides a way to understand how external stimuli are linked to conscious and unconscious information and how emotion plays a role in this process.

Understanding the beliefs that are linked to sustainability is key to design and develop strategies to cope with current crises, from public participation in proposed measures to the process of policy making. This is especially true in the case of sustainability, where joint action is needed to face the current challenge.

### 3. Relating the Human Factor to Current Sustainability Programs

We needed now to review existing attempts to account for the human factor in sustainability studies or practices. Our revision identified a human component of sustainability in the following main contexts:

- ESG (environmental, social and governance) criteria, which are used to evaluate companies and their practices.
- Sustainability indicators, which are applied to assessing the conservation level of territories and the impact of policies.
- Human component directly introduced as a criterion or a constraint in environmental projects.
- Human component introduced as a defining factor in the evolution of the future of the industry, the economy or the energy system; in this case, values, attitudes and behaviours are some of the main inputs for the development of policy strategies.

The most general of these is the ESG program (environmental, social and governance), the responsible investment criteria that has established itself in most economic sectors, from finance and investment to production and marketing. It establishes three main fields where sustainability can find a broad application: attitudes towards the environment, toward social issues such as equality and inclusion, and regarding good governance practices. Some of the most relevant factors, according to the Chartered Financial Analysts institute (<https://www.cfainstitute.org/en/research/esg-investing> accessed on 1 September 2021) are included below:

Environmental (conservation of the natural world):

- Climate change and carbon emissions;
- Air and water pollution;
- Biodiversity;
- Deforestation;
- Energy efficiency;
- Waste management;
- Water scarcity.

Social (consideration of people and relationships):

- Customer satisfaction;
- Data protection and privacy;
- Gender and diversity;
- Employee engagement;
- Community relations;
- Human rights;
- Labour standards.

Governance (standards for running a company):

- Board composition;
- Audit committee structure;
- Bribery and corruption;

- Executive compensation;
- Lobbying—political contributions;
- Whistle-blower schemes.

These factors should be understood as non-exhaustive and interlinked. Ideally, they can be crystallized in objective metrics that can be assessed by specialized companies that calculate ESG scores and distribute them to investors and customers. ESG criteria have the merit of being widely applicable and summarizing a wide perspective of issues related not only to environmental sustainability, but to social and institutional sustainability as well. For these reasons, its practical application is growing rapidly.

Next, sustainability indicators are measurable aspects of environmental, economic, or social systems that are useful for monitoring changes in system characteristics relevant to the continuation of human and environmental wellbeing. Indicators can be used for the following purposes: public reporting of the state of the environment and observed trends (1), aiding the selection among different alternative actions (2), research planning on the most relevant identified areas (3) and the evaluation of implemented programs (4). Only some of the most widely used sustainability indicators include some areas that could be included in the definition of the human factor. For instance, the Ecological Footprint [13] is an indicator that accounts for human demand on global biological resources. It compares the level of consumption with the available amount of bioproductive land and sea area and has been designed to show a possible exceedance of this sustainability threshold. It includes factors from deforestation to eutrophication, but none that we could call human. Another very relevant indicator, the Environmental Performance Index, includes some categories that directly impact human life, such as wastewater management, but nothing related to values either. However, other more integrative indices exist. For instance, the Index of Sustainable Economic Welfare includes economic, environmental and social aspects of wellbeing. These indices are usually applied to wider territories such as countries, where they are believed to provide a better perspective than GDP per capita alone to assess the wellbeing of their citizens and the effectiveness of their policies. One of the categories in these indices tends to be access to energy or, conversely, energy poverty, such as in the Multidimensional Energy Poverty Index [14]. A comprehensive review of indicators can be found in [15].

Next, the introduction of human components directly as criteria or as constraints to projects with an environmental impact. One particularly interesting example is rural electrification [16], where the social acceptance of projects is remarkably complex. Issues, such as the location chosen for solar panels with respect to a village, or the adoption of diesel (or not), can be the key to the success or the failure of a project [17].

Last, the social component is also included as a defining factor in the evolution of the future of the industry, the economy or the energy system. In this case, attitudes and behaviours are one of the main inputs for the development of policy strategies. To the best of our knowledge, there is no existing inventory of these attitudes in the literature. We, therefore, performed the introductory task of reviewing existing large-scale projects with environmental impact, especially in the context of the European energy policy, which is known to be transparent and relatively explicit with respect to its assumptions. For instance, although the target of the European energy policy is to be fully decarbonized by 2050, it is values, attitudes and consumer behaviour (together with technological advances and other external factors) that are the ones determining how the transition towards a decarbonized system takes place.

We presented, as an example, project e-Highway [18,19], commissioned by the European Union, which performed the long-term planning of the network of the European System considering four main scenarios: Large scale RES, 100% RES, big and market, fossil and nuclear and small and local. Each scenario covers different backgrounds with respect to:



- Economy (GDP, population growth, fuel costs).
- Technology (for instance, optimism with respect to the development of carbon sequestration options; it is interesting to note that Milfont highlights the importance of the attitudes of optimism or pessimism with respect to the future development of technology). Pathways towards decarbonization that assume the possibility of sequestering carbon directly from the atmosphere are likely less ambitious in their shorter-term goals.
- Policy (incentives towards RES given at the European and national level, support for energy efficiency and the weight given to national and European energy independence). It is interesting to note that this third group of factors is purely human, but at a collective level, reflecting social preferences about how much renewables or energy efficiency should be supported (which crystallizes in incentives for their construction) or how important independence—also known as energy security—is considered in long-term planning. For instance, a scenario where high importance is placed on independence would never rely heavily on natural gas, given that most of it comes in imports from regions that could be considered geopolitically unstable. As such, the human factor—not gas prices, but how much Europe values independence—is a direct input for the creation of the panoramic energy strategy.
- Human behaviour (nuclear acceptance, preference towards a decentralized generation). This last group also depicts items that could be included in the human factor, although in this case, they are more closely related to the individual. Although more items could be included (and we attempted to do so below), these two are especially relevant for the future energy system: nuclear energy is extremely polarizing, and the public opinion with respect to its risks will be determinant to its future development (and not only its economy). Last, the preference for a decentralized generation is key. At the present moment, prosumagers are at the core of the future evolution of the system. Prosumagers are grid-connected electricity consumers who own small-scale solar generators—or other types—as well as batteries and use these installations to produce their own electricity at times, draw electricity from the grid at other times and feed electricity to the grid at yet other times. The dual nature of consuming and producing energy had been recognized with the term *prosumer*. The prosumer takes this one step further and considers that these consumers can also help manage the flexibility of the system by modulating their energy output or consumption. Previously, this was not possible because of technological limitations, but currently, smart grid developments make this possible. Even if large-scale plants are more economically efficient (which is not completely clear), public support could guide the shift from a very centralized energy landscape, with just a few large power plants feeding all consumers, to a decentralized scheme full of small players.

Another very recent example of human component input into energy planning is project SET-NAV [20], also commissioned by the European Union, where several decarbonization pathways were built based on two dimensions: cooperation vs. entrenchment and decentralization vs. path dependency. All pathways should achieve a 85–95% decarbonization by 2050, but in different manners. Cooperation scenarios rely heavily on European countries working together to meet their goals, for instance, installing solar, wind or hydro storage in the most suitable regions; then, building a large interconnection capacity to import or export energy among countries. Entrenchment scenarios are less efficient, but nations remain relatively independent from each other. Then, path-dependency refers to how much the present structure of the system will weigh on future designs. That is: how much aversion to change exists? If the aversion to change is high, we could have a structure similar to the present one, with large generators that serve all demand; however, if there is support for decentralization, prosumagers could have a central role, and there could be many semi-independent small communities. It is remarkable that these two factors are human rather than technological or even economical: according to project SET-NAV, the main factors that will decide the future European energy system will be human factors.

#### 4. Building a Model for the Assessment of Human Factor in Sustainable Programs

After performing this review, we identified the following list of relevant human factors in sustainability:

- Environmental concern, which reflects attitudes of caring and commitment for nature and ecological causes. Milfont provides an extensive disaggregation of this item.
- Equity, or concern for availability and fair distribution of resources. For instance, the importance given to energy poverty will fit in this item.
- Equality, respect for diversity; efforts to overcome discrimination for any reason, and to apply fairness in social relationships. For instance, gender inequality has been shown to lead to lower cooperation in sustainability actions [21].
- Austerity and waste avoidance vs. the need to display social status by consumption. This is a cultural trait that varies widely across nations and has a deep impact on sustainability.
- Value given to tradition and traditional forms of living. This might have a negative impact, such as in the consumption of traditional products with undesirable environmental consequences (such as eating shark) or a positive one, such as protecting nature as the traditional way of living.
- Intergenerational dependence, as a variable that accounts for responsibility for past and future generations, beyond present self-interest.
- Confidence given to devices of the market vs. the need for regulation and institutions. This could deeply impact the environmental actions that obtain social support.
- Similarly, the balance between individual freedom vs. collective action might dictate whether rules to protect the environment are promulgated or exist only at the level of recommendations.
- Consideration of the individual vs. the community vs. the national or supranational. The different accent given to each of these levels can lead to diverging actions and policies. For instance, a higher accent on the local levels might more likely protect local natural resources rather than sacrifice them for the higher utility of the country (i.e., in the construction of a dam).
- The importance of independence/autonomy regarding energy and other strategic resources. Related to this, it is important to acknowledge the role of collaboration or a disposition to share and exchange with other areas or nations.
- Perceptions of risk and responsibility. This may be one of the factors involved, for instance, in the consideration of nuclear energy.

##### *Proposed Operative Instrument*

Defining the elements that the human factor comprises is not enough; it is necessary to also develop the means to measure them. We proposed to expand the best available framework (Milford's) in order to accommodate all the elements that, as identified in our review, should be taken into account when projecting a sustainable future. Indeed, many more instruments and scales have been developed to assess such other aspects, for instance, for risk assessment or for intergenerational concern [22–24]. What is needed now is to apply and adapt such other instruments into a general framework, to cover the designed human factor in its multiple dimensions. We proposed to summarize or concentrate in a few items each relevant issue in order to render them operative and to assist in collecting useful data in a practical way. Here, our proposal is presented to add these items to the short version of the Environmental Attitudes Inventory. All these elements should be evaluated from completely agree to completely disagree.

To assess social equity:

- Governments should engage in reducing huge income disparities.
- Riches that result from common effort should be better distributed among all those involved.
- Nobody should be left behind because of misfortune or disgrace.
- Progressive taxation is the best mean to reduce inequity levels.

- Those who are poorer in material or cultural means should be assisted to offer them better chances.  
To assess equality:
  - Nobody should be discriminated against for his or her race, gender, religion, ideology or economic condition.
  - Treating everybody equally helps to build a better society.
  - No privilege or preference should subsist to access any public service beyond sheer needs.
  - Those who are in weakest social conditions deserve more attention and help from the State and society.
  - Women should have the right to be equally paid for equal work.To assess freedom and human rights:
  - Each human being should be recognized just because he/she is a human being, irrespective of credit or behaviour.
  - People should be free to express any opinion whatsoever.
  - People without criminal intent should have the right to associate, however extreme they may be.
  - People should be free to discuss all moral ideas, no matter what.
  - The state should not interfere with missionary activities in both the majority and minority religions.To assess austerity:
  - Education campaigns should discourage useless consumption.
  - People able to spare energy and other costly means should be rewarded.
  - Those generating more waste should be punished with higher taxes.To assess traditional living forms:
  - Very often, traditions help to preserve the environment in a more effective way.
  - Traditional ways of living still help many populations to reach a good social balance.To assess intergenerational concern:
  - We need to accomplish more to protect and care for the elderly.
  - Our current policies should take into account their consequences much more for future generations.
  - We are not entitled to enjoy available resources neglecting their scarcity for our children.
  - Investing in education is the best way to preserve solidarity with those that come after us.
  - We need to make several renounces to ensure good prospects for next generations.To assess collaborative attitude:
  - Sharing our resources and technologies with other people and countries would benefit everybody.
  - Those countries or societies which have more should make greater efforts to help those less well off.
  - A sharing economy offers better prospects for development than the traditional model based on self-interest.To assess independence at different levels:
  - The State should encourage each household to produce its own needed energy.
  - Investments should be addressed to ensure less energetic external dependency.
  - Energetic independence is an unattainable goal.
  - It is important that a country has strong, powerful companies.To assess risk perceptions:
  - Avoiding unnecessary risks in all activities helps to develop a better future.
  - Without assuming certain risk levels, no progress in science and technology is possible.
  - Some risks are unavoidable when trying to introduce changes at different social or economic levels.



To assess efficiency and the confidence in market mechanisms:

- More investments should be devoted to reach greater energetic efficiency.
- Investments should be carefully and transparently assessed in order to avoid wasteful decisions.
- Our future depends upon a more efficient use of our material, social and cultural resources.
- A free market is always more efficient in its use of resources than a centralized scheme.
- Subsidies tend to be wasteful.

This instrument requires to be answered through a Likert scale of five levels, from most to less agreement with the proposed items. Obviously, the present suggested instrument needs to be checked and standardized with sufficient cases to assess its reliability and internal consistence. The idea is to obtain a coefficient—for instance, from 0 to 100—after calculating the means of all those involved in the survey, members of a corporation, society or even a bigger social entity, such as a region or nation. Such a coefficient would be added or counted together with other indicators when trying to estimate the final and global ESG index.

## 5. Discussion and Concluding Remarks

A good assessment of sustainability, following the broadly accepted ESG model, requires paying more attention to its human factor: those beliefs, values and attitudes that clearly influence sustainability policies and strategies. We need to understand how beliefs determine attitudes and decisions, and so it is important to account for them in the most accurate way, after a detailed study, to assess their effective impact in a range of indicators related to sustainability.

Research into beliefs and the believing process has grown exponentially in the last few years [11]. A central point in that program has been to show how believing is unavoidably present in most social systems, such as the economy, politics, education, morals and even science [9]. Plans aimed at designing a more sustainable future are not an exception, and so we need to connect the current effort at better understanding beliefs and the policies and concerns for sustainability. The point is that neglecting the human factor in a process will miss an important variable and risk the unfeasibility of current programs. Ours was just a first approach, since the huge amount of published literature on beliefs and believing, their dynamics and functions, requires a more accurate assessment and application to the field of sustainability studies.

The proposed model intends to build on a solid theoretical basis and then move to the practical field, where any assessment becomes a great challenge. As a consequence, we need to design instruments that could offer some approach or a proxy for the relevant beliefs, and which could help to develop more accurate certifications for sustainability in a broad range of organizations, and to establish international rankings based on such beliefs and attitudes.

The undertaken effort knows some difficulties we cannot ignore. The first regards the suggested instrument, still in an exploratory and work-in-progress state. It is not easy to describe which subscales should be integrated and what they want to measure, or to what extent what is measured is really relevant when trying to design sustainable systems. Indeed, some of the pointed criteria could work in an ambiguous or even contradictory way. For instance, locality vs. globality; in some cases, more locally minded attitudes help more towards sustainable goals; in others, they are just disruptive and prevent more sustainable measures. This last case is the movements broadly identified as “not in my back yard” (NIMBY), which often opposes projects that could benefit a big population but harm a local minority. Something similar happens with some traditional uses, which could be positive or negative for some natural and social balances.

The second difficulty has to do with the very subjective nature of beliefs and values, whose assessment becomes very challenging compared with more objective and easier to assess indicators. Indeed, those collecting data through self-assessing questionnaires are used to the limits such an approach presents: many biases are at work, such as social desirability, and even more manipulative strategies, such as instructing staff about filling

questionnaires in a more flattering way. It is indeed relatively easy to fake those attempts to obtain true data on subjective means. We need to be aware of such limits. In any case, the empirical research developed in recent years means to address such flaws and spot contradictions or biases that could mask the true beliefs and attitudes members of a corporation could hold.

The third difficulty is related to the former: it is not clear what role beliefs, values and attitudes play in a model to assess ESG criteria. Being of subjective nature, but playing probably a big role, such beliefs could weight very much—about 50% in the resulting index—or very little, as less than 10%, compared with other indicators that become more objective and easier to account, such as energetic sustainable production or environmentally friendly waste treatment or transparency and accountability in management.

The point is that, even if the suggested instrument is still in its first steps and imperfect, the described limitations should not dissuade the need to engage on both: first, to integrate human aspects such as beliefs, attitudes and emotions in any sustainability program; second, to build instruments that assist in assessing such human variables and to follow their weight in such programs. In this way, we could integrate aspects which would render a more complete and accurate view on the advances and obstacles in the way to design a more sustainable future for all.

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